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Conspicuous Consumption and Household Indebtedness

Abstract

Using a novel, large dataset of consumer transactions in Singapore, we study how conspicuous consumption affects household indebtedness. The coexistence of private housing (condominiums) and subsidized public housing (HDB) allows us to identify conspicuous consumers. Conditional on income and other socioeconomic characteristics, those who choose to reside in condominiums – considered a status good in Singapore – are likely to be more conspicuous than their counterparts living in HDB units. We find that condominium residents spend considerably more (by 25%) on conspicuous goods but not differently on inconspicuous goods. Compared with their matched HDB counterparts, these consumers with higher conspicuous motivation carry 7% more credit card debt and 108% more delinquent credit card debt. Our results suggest that status-seeking-induced conspicuous consumption is an important determinant of household indebtedness.

Keywords: conspicuous consumption, consumer indebtedness, credit card delinquency, residential circle

JEL codes: D12, D14, E21, R20

1. Introduction

A significant increase in household debt has been reported in many developed countries despite these countries' economic strength. For example, the ratio of individual household debt to disposable income has grown from 20% in 1945 to 134% in 2009 in the United States, and 2014 statistics show that the ratio remained high in many OECD countries (e.g., 113% in the United States, 164% in South Korea, 205% in Australia, and 274% in Netherlands). Along with the increase in real estate mortgage debt, one of the main drivers of the substantial growth of household debt was the increase in revolving debt, mainly credit card loans. In the United States, the share of revolving debt in total non-real estate consumer debt was as high as 41% in 1999 and remains at approximately 30% (Federal Reserve). As of 2009, credit card debt outstanding was US$870 billion and the delinquency rate on such debt reached 6.8% (Federal Reserve). In particular, household indebtedness remains high after the 2008 financial crisis and has been the focus of various macro policies (e.g., Di Maggio et al., 2016).

Although traditional approaches focus on liquidity constraints to explain household indebtedness, an increasing number of studies highlight social influences. For example, income ranking within a social network serves as a proxy for social status and plays an important role in influencing household behavior of overspending and debt accumulation (Vissing-Jorgensen, 2012; Georgarakos, Haliassos, and Pasini, 2014; Bricker, Ramcharan, and Krimmel, 2014). One potential mechanism to explain this behavior is conspicuous consumption, that refers to expenditures not made for consumers' own comfort or use but for the purpose of flaunting their wealth and income and, in turn, achieving greater social status (Veblen 1899).

Although intuitively appealing, there is little evidence on the direct link between conspicuous consumption and household debt. Status-seeking incentives could create distortions in the intratemporal consumption decision by tilting disproportionately more consumption toward visible or conspicuous goods (Agarwal, Qian, and Zou, 2017; De Giorgi, Frederiksen, and Pistaferri, 2016). As such intratemporal substitution may not necessarily correspond to a spending level that leads to excess debt accumulation, however, it requires careful empirical investigation. Another empirical challenge lies in the difficulty of identifying conspicuous consumption motivation and accurately measuring (conspicuous) consumption.

In this study, we investigate the role of conspicuous consumption to understand household indebtedness. We measure status-seeking incentives by exploiting the unique dual feature of housing markets in Singapore that consist of public and private housing. Public housing called Housing Development Board (HDB[1]) provides the homes for 80% of the resident population with heavy government subsidies, while the private housing market is primarily comprised of condominiums (condos). Condos are viewed as an important status good in Singapore and aspired to more by those with stronger conspicuous desire.[2] As geographic distinctions between HDBs and condos tend to be minimal,[3] residential choices between HDBs and condos among individuals with similar income and demographics could potentially reveal the level of their conspicuous desire. The larger presence of conspicuous (middle-class) individuals in condos

[1] HDB also stands for Housing and Development Board, the statutory board of the Ministry of National Development that is responsible for public housing provision in Singapore.
[2] Singapore has often been viewed as materialistic and competitive society (NUS Institute of Policy Studies, 2018). It is revealed by 'Five Cs', namely condo, car, cash, credit card, and club memberships, which has been the common measure of success in Singapore. In this society where public housing is a dominant form of residence, condos have become a symbol of success that one could achieve only by paying a lot higher prices compared to public housing.
[3] Given that public housing in Singapore is the home for approximately 80% of the population, it is not associated with the same type of stigma typically prevalent in public or social housing in Anglo-American cities (Sin, 2002).

leads to the hypothesis that perceived peer income is much higher and peer effects on conspicuous motivation are much stronger in condos than in HDBs.

We employ a unique dataset of a large representative sample of consumers that includes credit card and debit card transactions between April 2010 and March 2012 from a leading bank in Singapore with a more than 80% market share. Similar to the United States, debit and credit cards account for approximately 30% of aggregate personal consumption (Agarwal and Qian, 2014).[4] Therefore, our data provide fairly complete and accurate information about individual-level non-housing consumption at high frequency. More importantly, merchant categories at the transaction level data allow us to obtain a finer measure of individual conspicuous consumption that identifies not only visibility and portability of the consumed goods but also the frequency and amount of consumption. We therefore believe that our analysis using this measure advances the existing research that relies on a specific spending item or a coarse classification scheme. Given the comprehensive nature of our consumption data, we are also able to examine whether conspicuous consumption crowds out inconspicuous consumption and analyze the direct link between consumption behavior and household indebtedness at the individual level.

We begin our analysis by identifying conspicuous consumption motivation based on individuals' residential circle choices between HDBs and condos. We analyze whether such motivation influences individuals' conspicuous consumption measured by the fraction of spending at conspicuous stores out of the total card spending as well as their indebtedness measured by credit

[4] The remaining 70% of consumption occurs through checks, direct transfers, and cash. Consumers with recurring payments, including mortgage, rent, and auto loan payments, typically use instruments such as checks and direct deposit.

card debt and delinquency. We then examine the direct relationship between conspicuous consumption and credit card indebtedness and explore whether this relationship is contingent on individuals' conspicuous consumption motives. Taking advantage of the rich information at the individual level, we also investigate whether the relationships between residential circles, conspicuous consumption, and indebtedness are heterogeneous among individuals with different demographic characteristics.

Through an analysis of the matched sample based on income, housing wealth, and demographic characteristics, we find that people residing in condos spend more on conspicuous goods but less on other wellbeing goods compared with their matched counterparts in HDBs. Residing in condos increases conspicuous consumption by 25% relative to that of matched individuals in HDBs. In contrast, condo residents' spending on invisible or inconspicuous goods is not statistically significantly different from that of matched HDB residents. These findings support both our identification strategy and conspicuous consumption measure by confirming that condo residents are indeed more conspicuous and their consumption of expensive luxury goods is driven by conspicuous motivation.

Next, we document that individuals with stronger conspicuous motivation have more credit card debt and experience delinquency more often than their matched counterparts with weaker conspicuous motivation. Compared with their matched HDB counterparts, condo residents have 7% more credit card debt and 108% more delinquent credit card debt. This effect is significant both statistically and economically. Furthermore, higher conspicuous consumption results in more credit card debt and delinquency only for condo residents who have stronger conspicuous

motivation. Among conspicuous individuals, younger, male, single individuals with low education level carried higher credit card debt. Finally, our results remain solid for alternative matching algorithms and additional robustness analyses.

This paper directly contributes to the literature on conspicuous consumption. The existing literature focuses on how conspicuous demand drives consumption behavior. Hopkins and Kornienko (2004) propose a theoretical model to suggest that people spend inefficiently high amounts on status goods and this tendency is amplified in a wealthier society. Similarly, Eaton and Eswaran (2009) demonstrate that conspicuous goods crowd out the consumption of wellbeing-inconspicuous goods as productivity increases. Drechsel-Grau and Schmid (2013) find that, in the U.S. context, envy motives are a more substantial driver of consumption behavior than habits. We add to the literature by documenting the debt consequences of conspicuous consumption. In measuring conspicuous consumption, most previous studies use relative income to capture the notion that it is motivated by comparisons of perceived socioeconomic standing or race among peers (Grinblatt, Keloharju, and Ikaheimo, 2008; Charles, Hurst, and Roussanov, 2009; Vissing-Jorgensen, 2012; Bricker, Ramcharan, and Krimmel, 2014; Georgarakos, Haliassos, and Pasini, 2014; Carr and Jayadev, 2015). Our study measures conspicuous motivation by exploring the individuals' revealed choices between residential circles that provide similar housing consumption services but differ in perceived status. By using administrative data on consumption and debt, we provide direct evidence of the associations between social influence, actual conspicuous consumption, and household indebtedness.

This paper is also broadly related to the real estate literature as it connects the household's non-housing consumption with their housing choice. One of the most popular topics in the literature is the effect of housing wealth gains on non-housing consumption. Vinson (2018) reports that while the net housing wealth effect is positive but modest, the collateral effect is significant for households with the higher borrowing constraint in the U.S.. On the other hand, Chen, Hardin, and Hu (2018) find that an increase in housing wealth has a much greater positive impact on consumption in the Chinese context compared to other developed countries. Others investigate how housing-related spending such as mortgage debts and mortgage payments influences non-housing consumption and saving behaviors (Tunc and Yavas, 2016; Tunc and Yavas, 2017; Fan and Yavas, 2018; Güneş and Tunç, 2018). While we also look into non-housing consumption as an outcome of housing choice, our focus is on the channel of conspicuous motivation and social influence rather than the direct financial channel. By doing so, we add to existing evidence suggested by Lee and Mori (2015) that higher housing consumption is associated with higher conspicuous demand for non-housing goods.

Finally, findings of this paper are relevant to the recent literature on the role of social networks in understanding household financial decisions. Guiso, Sapienza, and Zingales (2013) provide evidence of social influence on households' decisions to strategically default on their mortgages. Bailey et al. (2016) document the importance of accounting for social networks to understand the home purchase decision. Agarwal, Qian, and Zou (2017) and Di Maggio et al. (2016) find evidence consistent with a "keep-up-with-the-Joneses" effect on household consumption. This paper contributes to the literature by highlighting the role of residential circles in explaining household indebtedness through the mechanism of conspicuous consumption.

2. Data and Methods

2.1 Data

We use a unique proprietary dataset that contains consumer financial transactions between April 2010 and March 2012 of approximately 180,000 customers from the leading bank in Singapore.[5] For individuals in our sample, we have monthly statement information on each of their credit cards and debit cards with the bank, including balance, spending, credit card limit, credit card payment, and debt. Close to 30% of all personal consumption in the country is done using credit and debit cards.[6] The dataset, which covers all transactions done with credit cards and debit cards that individuals hold with the bank, contains transaction-level information, including transaction amount, transaction date, merchant name, and merchant category. It is reported that Singapore cardholders own, on average, 3.3 credit cards per individual,[7] and individuals in our analysis sample each own an average of 2.9 credit cards. Thus, our analyses are based on most – if not all – credit card and debit card transactions being done by each individual in our sample, although it is possible that these individuals still own credit cards with other banks. Their consumption using these credit cards is missing in our dataset. The dataset also contains a rich set of demographic information on each individual, including age, gender, income, type of residence, residential postal code,[8] nationality, ethnicity, and occupation.[9]

[5] The bank has more than 4 million customers, or 80% of the entire population of Singapore. Our sample is a random representative sample of the bank's customers. The same dataset was used in Agarwal and Qian (2014).
[6] We expect that a much larger proportion of conspicuous consumption, which is the main focus on our study, is done by credit cards.
[7] Singapore top in Asia in credit cards owned per person: survey (April 13, 2012). Retrieved from https://sg.finance.yahoo.com/news/singapore-top-asia-credit-cards-105414790.html.
[8] Unlike in the United States, a postal code in Singapore is assigned to a building representing a single-family house or a building with multiple apartment units so it is a very precise measure of residential location.
[9] Occupation variable is a crude measure showing only whether individuals are "professional" or not.

Following Agarwal and Qian (2014), we first compute credit card spending by adding up the monthly spending for all credit card accounts for each individual. Debit card spending is computed by adding up the monthly spending for all debit card accounts for each individual. All of our consumption measures are based on total credit card and debit card spending. However, we exclude transactions at stores outside of Singapore because they may be affected by other factors such as the opportunity and probability of going abroad as well as potential changes in consumption behavior when traveling abroad. Considering the entry barrier of stores, we also exclude transactions at auction houses for the calculation of card spending.[10]

Our credit card data do not offer the information on the home values of one's residence, which may be associated with individuals' consumption and indebtedness. Therefore, we obtain the universal transaction data of HDBs and condos from the Housing and Development Board and the Real Estate Information System database managed by the Urban Redevelopment Authority, respectively. We calculate the mean price and size of transacted units at each postal code over the credit card sample period of 2010–2012 and match this information with individual observations in the credit card data by using the postal code. Thus, the home values and sizes used for the following analyses are proxied at the level of each building of HDBs or condos instead of each unit. To account for potential differences in housing equity, we also calculate the average annual rate of house price appreciation over the period of 2000–2012 at the two-digit postal sector level separately for HDBs and condos.[11]

[10] Therefore, we exclude individuals who made card transactions only at foreign stores or auction houses during the entire study period.

[11] The postal sector is represented by the first two digits of the postal code, and Singapore is divided into 82 sectors. The mean of this appreciation rate for condos is quite similar to that for HDBs but the standard deviation is slightly higher for condos.

2.2 Measures

For the main measure of conspicuous consumption, we start with all local stores listed in our credit card data in merchant categories that are likely to sell visible conspicuous goods based on Heffetz (2011).[12] We rank these stores by the average per-transaction amount spent by all consumers in our initial sample and define the top 10% stores[13] as conspicuous stores.[14] By doing so, we identify stores where sample individuals purchase the most expensive conspicuous goods that are visible to others. Because the purpose of conspicuous consumption is to flaunt wealth to others, conspicuous individuals would want to consume more at these stores where others spend a lot. Appendix A-1 and Table A1 provide details of the definition of conspicuous stores, that follows Heffetz (2011). In addition, we use the definition that follows Charles, Hurst, and Roussanov (2009) (hereafter CHR) for the robustness check. The categories defined in CHR (2009) are more limited and the stores in these categories are more likely to sell visible and portable goods.

Next, we calculate conspicuous consumption of individuals as follows:

$$Conspicuous\ Consumption_{it} = \frac{\frac{CS_{im1}}{TS_{im1}} + \frac{CS_{im2}}{TS_{im2}} + \frac{CS_{im3}}{TS_{im3}}}{3}, \quad (1)$$

[12] We use the store-based measure for our analysis mainly because our credit card data do not provide separate information on the merchant name. And it is quite challenging to extract the merchant name from each store as it does not appear in the exactly same format (sometimes incomplete) across different stores. We do not believe this would be a very serious issue because any stores with the same luxury brands in Singapore are likely to be ranked high in terms of the average per-transaction amount. It is quite unlikely that a specific store only sells chip stuffs to all credit card holders in the sample.

[13] The top 20% stores are used for the robustness check.

[14] Appendix A-2 provides summary statistics on transactions made in these conspicuous stores, and Appendices A-3 and A-4 show examples of conspicuous stores. As shown in Appendix A-2, conspicuous stores are stores in which individuals in the initial sample spent an average of $2,011 in one transaction. Appendix A-3 and A-4 show that these stores include luxury brand stores, such as ROLEX (rank: 1), BVLGARI (rank: 7), PATEK PHILIPPE (rank: 8), IWC (rank: 10), HARRY WINSTON (rank: 18), and BALLY (rank: 4,894). Even at other conspicuous stores with lower ranks (Appendix A-4), sample individuals spent more than $668 per transaction.

where CS_{im} is the card spending at local conspicuous stores by individual *i* in month *m* and TS_{im} is the total card spending at any local store by individual *i* in month *m*. We then average this relative ratio of conspicuous consumption for each quarter *t*. By using the fraction of spending at conspicuous stores out of the total card spending, we attempt to indirectly control for potential differences in real disposal income and general consumption patterns between condo and HDB residents.[15] We believe that our measure more precisely captures real conspicuous desire reflected in non-housing consumption than measures used in previous research that relied on the Consumer Expenditure Survey or the transaction data from a single retail chain (e.g., Charles, Hurst, and Roussanov, 2009; Vissing-Jorgensen, 2012).

Another important measure of our study is consumer indebtedness. We account for both the credit card debt balance and the credit card debt under delinquency. For the credit card debt, we compute a quarterly mean of the monthly credit card debt balances which are the difference between the current month's credit card payment and the previous month's balance. We generate the measure of credit card delinquency by taking the quarterly mean of the monthly credit card debt balances that are delinquent for 30–210 days (i.e., 30, 60, 90, 150, 180, and 210 days[16]).

2.3 Sample

As demographic characteristics are likely to play an important role in consumption desire and behavior, we first limit our sample to individuals with the proper information on age, income,

[15] Higher real disposable income should influence not only spending at conspicuous stores but also the total card spending.

[16] Our data do not contain information on debt that is delinquent for periods longer than 210 days. By nature, this delinquency measure has many zero values. Therefore, it represents both the likelihood of experiencing delinquency and the amount of delinquent debt.

type of residence, nationality, ethnicity, marital status, and residential postal code. To identify conspicuous consumers using two residential circles in Singapore – public (HDB) or private (condo) – we exclude individuals whose residence type is a foreign address, an office, a post office box, or unknown. After eliminating individuals with missing demographic information and only with invalid transactions as well as those who reside in neither a HDB nor a condo, our sample size is reduced to 122,531 individuals from the initial sample of 187,249. For the regression analyses, we arrange all variables in the data at the individual-quarter level. Summary statistics based on the sample of 122,531 individuals are reported in Table 1. Table 1 compares conspicuous consumption behavior, indebtedness, and socioeconomic attributes between condo and HDB residents. Compared with HDB residents, condo residents spent much more at conspicuous stores regardless of the definition of such stores. For example, at the top 10% conspicuous stores based on the definition of Heffetz (2011), condo residents spent $156 per month while HDB residents spent $62. Condo residents also carry larger credit card debts ($612) than HDB residents ($595) and slightly larger credit card debts under delinquency.

[Insert Table 1 about Here]

Although these results may imply a difference in conspicuous consumption and indebtedness between condo and HDB residents, it is clear that condo residents are not directly comparable with HDB residents in several key dimensions. For example, because condo residents have considerably higher monthly incomes ($9,916) than HDB residents ($4,478), condo residents may simply have greater economic capacity to buy more expensive goods than do HDB residents. It is also notable that condo residents live in more expensive and larger homes and are older than HDB residents. Condo residents are more likely to be foreigners, married, and educated with bachelor degree but less likely to be Malay. If individuals' income and

demographic attributes are associated with their economic capacity for and patterns of consumption, these attributes, instead of conspicuous motivation, may drive more conspicuous consumption and higher indebtedness among condo residents.

2.4 Identification strategy

Our goal is to minimize potential confounding issues and provide a causal interpretation of the role of conspicuous consumption to indebtedness. To do so, we identify conspicuous consumers using residential circles and employ the standard logic of a counterfactual causal inference design (e.g., Rosenbaum, 2002; Morgan and Winship, 2007).[17] Our potential treatment group is comprised of all sample individuals residing in condos, and those who reside in HDBs belong to the potential comparison group. Among the pool of 106,450 HDB residents (Table 1), we select the closest match for each individual residing in condos by using both manual and propensity score matching (PSM) procedures. First, we manually match within the strata by income decile to ensure no difference in income between treatment and comparison groups, because income is directly related to economic capacity for conspicuous consumption.

Next, within each stratum, we match each treatment observation with a comparison observation based on the criteria that are potentially associated with (conspicuous) consumption behavior, including age, gender, and marital status. We also use the price per square meter and size of residence at the six-digit postal code level as matching criteria to control for potential differences

[17] Two conditions are necessary to obtain "strong ignorability" of any confounding or potential selection bias to treatment (Rosenbaum and Rubin, 1983). First, the treatment and comparison groups must have no significant difference in the means on all variables that could influence the treatment assignment. Second, the treatment and comparison groups must have common support in their distributions.

in housing consumption and potential housing wealth between condo and HDB residents.[18,19] We use one-to-one matching with no replacement closest in the propensity score within a 0.003 caliper width to improve covariate balance and reduce bias. During the matching process, we lost some individuals in our treatment groups who were left unmatched because no one in the comparison group was in the same income decile or had a propensity score within a 0.003 caliper width of these individuals' scores.[20] Our final sample size after matching is 2,629 individuals for the treatment group and 2,629 for the comparison group.

Table 2 summarizes the quality of the matched sample. Our treatment group (condo residents) and comparison group (HDB residents) are highly homogeneous with respect to income, value of residence per square meter, size of residence, age, and marital status. The mean differences of these variables are reduced by more than 85% as a result of matching. In the matched sample, there are slightly more females in the treatment group than in the comparison group. However,

[18] Condos usually provide better amenities than HDBs, such as a swimming pool and gym, and residential choice may be driven by demand for these amenities rather than conspicuous motivation. If this assumption is true, those who sorted into condos simply have higher demand for such amenities than those who chose HDBs and this difference should not affect their non-housing conspicuous consumption. On the other hand, it is less likely but possible that HDB residents have similarly high desire for such amenities but made suboptimal residential choices. As a result, they may end up spending on similar amenities in addition to their housing consumption. We do not think this additional spending on amenities is huge as community centers in most HDB estates offer various exercise options at minimal costs and the average cost of the monthly membership of private fitness centers in Singapore is less than $100. To further address this concern, however, we attempt to use the amount of spending at conspicuous stores (instead of its fraction out of the total card spending) which is not related to the non-conspicuous consumption as the measure of conspicuous consumption, and estimation results are robust.

[19] Since the size of condos is generally larger than the size of HDBs before matching, it is possible that condo residents share their rents among more people to reduce housing costs and secure higher disposable income. While our credit card data do not offer the information on housing tenure status, we try three things to rule out this possibility. First, we use the floor area as a matching criterion to make sure that the condo size is not larger that the HDB size. Second, based on the Singapore Census of Population 2010, we find no significant difference in household size other than a higher probability of 1-person households among condo residents. Finally, we redo our analysis with the subsample of only Singaporeans who are most likely to be homeowners (the average homeownership rate for Singaporeans is around 90%) in the later robustness check.

[20] We lose many observations mainly given our strict matching criteria including exact matching for income deciles and a very small caliper size, which we believe are critical to identify comparable treatment and comparison groups. We conduct a robustness check by removing the caliper restriction and report the result in Appendix C.

this does not undermine the quality of our matched sample because the direction of this difference is not in favor of our hypothesis.[21] Furthermore, all variables including the proportion of females, satisfy Cochran's rule of thumb. This means that none of these variables differs by more than a quarter of a standard deviation of the respective variable between the treatment and comparison groups, suggesting that our matched sample is well balanced (Cochran, 1968; Ho et al., 2007).[22] Finally, Figure 1 demonstrates that the distributions of monthly income, value of residence per square meter, size of residence, and age of condo and HDB residents are quite homogeneous after matching. Therefore, we have a panel of reasonably balanced treatment and comparison individuals, which allows us to claim that any observed treatment effect on conspicuous consumption and indebtedness is not biased by differences between treatment and comparison groups in individual socioeconomic characteristics.

[Insert Table 2 about Here]

[Insert Figure 1 about Here]

We argue that our identification strategy is convincing in identifying the conspicuous motivation that should drive the direct relationship between conspicuous consumption and household indebtedness. First, unlike gated communities in other countries, the important function of condos in Singapore represents exclusive membership and prestigious lifestyle rather than ensuring security (Pow, 2009).[23] Next, there is anecdotal evidence on a closer association between one's residential circle and social networks in Singapore. According to the Study of

[21] Base on the unmatched sample, Table 1 shows that condo residents who spent more at conspicuous stores and carried more credit card debt were less likely to be female.
[22] A *t*-test of the mean difference with respect to each of these variables confirms that the differences are not statistically significant except for the proportion of females. However, we do not report the results of the *t*-tests, because balance is a characteristic of the observed sample and not a hypothetical population. Thus, *t*-statistics below 2, for example, have no special relevance for assessing balance.
[23] Hence, many Singaporeans set the condo purchase as their status enhancement target and aspire to be identified through such exclusive "landscape of privilege" (Duncan and Duncan, 2003; Pow, 2009).

Social Capital in Singapore done by the NUS Institute of Policy Studies (2017), Singaporeans who reside in private housing have more friends who also reside in private housing while people residing in public housing are more likely to form social ties among themselves.[24] Hence, comparisons of socioeconomic standing among peers are most likely to happen in residential circles. Finally, the relative income position of condo residents is expected to be lower in their residential circles than their matched counterparts in HDBs, given that the average income level in condos is much higher than in HDBs, as shown in Table 1.[25] As demonstrated by previous research (Grinblatt, Keloharju, and Ikaheimo, 2008; Charles, Hurst, and Roussanov, 2009; Bricker, Ramcharan, and Krimmel, 2014; Georgarakos, Haliassos, and Pasini, 2014), lower (perceived) own income compared with peers has a significant association with conspicuous consumption and debt.

3. Results

3.1 Residential circles and conspicuous consumption

First, we attempt to test whether condo residents with higher conspicuous motivation are indeed engaged in more conspicuous consumption than matched HDB residents. Table 3 reports the results of quarterly regressions (Panel-GLM with log link[26]) that examine the relationship between residential circles (condo vs. HDB) and conspicuous consumption:

[24] On average, public housing residents have fewer than one friend residing in private housing while private housing residents have more than three friends residing in private housing in their social network.

[25] To verify this, we compute the income deciles separately for two residential circles (i.e., condo or HDB) within the same postal sector among all individuals in our unmatched sample. We then assign to each individual in the matched sample an income decile, where 1 represents the lowest decile and 10 represents the highest decile. We find that the mean deciles are 4.71 and 7.69 for condo residents and HDB residents in the matched sample, respectively (the difference is statistically significant at the 1% level).

[26] We use a generalized linear model (GLM) with log link regression using the quasi-maximum likelihood method for all analyses (i.e., Poisson-type regression) because our dependent variables, such as conspicuous consumption and credit card debt, contain many zero values. The ordinary least squares (OLS) tends to underestimate the

$$\text{Conspicuous Consumption}_{it} = \alpha + \beta * Condo_i + \gamma * X_i + \varepsilon_{i,t}, \quad (2)$$

where Conspicuous Consumption$_{it}$ is the quarterly average of the fraction of monthly card spending made by individual *i* at conspicuous stores out of the total monthly card spending made by *i* as shown in Equation (1), *Condo*$_i$ is a dummy variable that takes the value of 1 if individual *i* is a condo resident and 0 if individual *i* resides in HDB, and X_i denotes a vector of socioeconomic control variables. While we include only the condo dummy variable and the constant term in Model 1, we add proxies for wealth and permanent income (price of residence, size of residence, rate of price appreciation of residence, and income) in Model 2 and demographic controls in Model 3.[27] Regressions are run with the matched sample of 5,258 individuals (2,629 condo residents and 2,629 HDB residents) and at quarterly frequency.

[Insert Table 3 about Here]

As shown in Table 3, we find a strongly significant positive effect of residing in condos on conspicuous consumption. Although individuals in the matched sample share similar income, residence, and demographics, the fraction of spending at conspicuous stores out of the total card spending is 25%[28] higher among condo residents compared with their HDB counterparts (Model 3). In addition, the point estimate of the condo variable is quite consistent across models, suggesting that unobserved factors associated with expected disposable income or wealth would not contaminate our results significantly.

treatment effects in such a situation. The Poisson quasi-maximum-likelihood method has been reported to be more appropriate than log-linearized OLS, even when the dependent variable is a continuous variable (Gourieroux, Montfort, and Trognon, 1984; Silva and Tenreyro, 2006). Therefore, our regressions follow the assumption that ln{E(y)}=xB, y~Poisson, where y is a dependent variable and x is a vector of covariates. As a robustness check, we run OLS regressions and find that our main analysis results are quite robust except for larger standard errors.

[27] Even after matching, simply comparing the difference in the means of outcomes between the treatment and comparison groups assumes that the treatment variable and covariates are unrelated. When this assumption is false, the results are subject to omitted variable bias.

[28] The percentage change is calculated using 100 x ($e^{\beta} - 1$).

We further investigate the overall consumption patterns and indebtedness of condo residents compared with their matched counterparts in HDBs, and results are presented in Table 4. As expected, all of the conspicuous consumption measures are significantly higher for condo residents than for HDB residents. Next, we find that condo residents in the matched sample own a larger number of credit cards and that a larger proportion of these residents, relative to HDB residents, own the most prestigious type of credit card (Amex Elite) issued by the bank. This further supports the stronger conspicuous desire of condo residents. Finally, we compare consumption patterns between condo and HDB residents in various categories, including inconspicuous, invisible consumption. As shown in Table 4, condo residents spend on average a slightly larger amount in total ($768) than HDB residents ($673). However, this excess spending by condo residents is strongly evident in consumption categories that are visible and conspicuous, such as travel, durable, apparel, transportation, and dining. In contrast, condo residents do not spend significantly more at stores in the categories of service and supermarket, which tend to sell more invisible and/or inconspicuous wellbeing goods. Table 4 also shows that condo residents carry higher credit card debt and delinquent credit card debt without controlling for socioeconomic attributes.

[Insert Table 4 about Here]

To summarize, the results in Tables 3 and 4 clearly suggest that condo residents with potentially higher conspicuous motivation indeed spend more on conspicuous goods and less on inconspicuous wellbeing goods compared with their matched counterparts in HDBs. This finding is consistent with the theoretical prediction of Eaton and Eswaran (2009). As mentioned in the previous section, residential sorting (i.e., concentration of resident peers with the similar level of conspicuous desire) and relative economic standing have likely motivated conspicuous

consumption among condo residents. These results support our identification strategy that uses quasi-experiment matching based on their residential circles to define the level of conspicuous motivation. They also confirm that our conspicuous consumption measure reflects conspicuous motivation and not just expenditures on higher-priced goods.

3.2 Conspicuous consumption and indebtedness

Having established that individuals with higher conspicuous motivation are engaged in more conspicuous consumption, we move to examine the role of conspicuous consumption in indebtedness. Table 5 shows the results of quarterly regressions (Panel-GLM with log link) that examine the relationship between residential circles (condo vs. HDB) and household indebtedness using the same matched sample as follows:

$$Indebtedness_{it} = \alpha + \beta * Condo_i + \gamma * X_i + \varepsilon_{i,t}, \quad (3)$$

where $Indebtedness_{it}$ is the quarterly average of monthly credit card debt balance carried by individual *i* for Panel A and the credit card debt that is delinquent for more than 30 days for Panel B, $Condo_i$ is a dummy variable that takes the value of 1 if individual *i* is a condo resident and 0 if individual *i* resides in HDB, and X_i denotes a vector of socioeconomic control variables.

We find that condo residents carry more credit card debt and more delinquent debt than matched HDB residents by 7% and 108%, respectively, controlling for individual socioeconomic and residential characteristics (Model 3).[29] We argue that this increase is significant. Considering the average monthly credit card debt ($669) and the debt under delinquency ($18) for all individuals in the matched sample, 7% and 108% increases translate into $47 and $19, respectively, keeping

[29] Similar to results shown in Table 3, the point estimate of the condo variable is quite consistent across our models.

other variables constant. Together with the previous finding, this suggests that people with higher conspicuous motivation tend to consume significantly more on expensive, visible goods and this consumption may sometimes go beyond their financial capacity and result in debt and delinquencies.[30]

[Insert Table 5 about Here]

Next, to examine the direct relationship between conspicuous consumption and indebtedness, we add the conspicuous consumption measure and the interaction term between this and the condo dummy variable to the quarterly regression shown in Equation (3) as follows:

$$\text{Indebtedness}_{it} = \alpha + \delta * Conspicuous\ Consumption_{it-1} + \beta * Condo_i + \theta * (Condo_i \times Conspicuous\ Consumption_{it-1}) + \gamma * X_i + \varepsilon_{i,t}, \quad (4)$$

where *Indebtedness*$_{it}$ is the quarterly average of monthly credit card debt balance carried by individual *i* for Panel A and the credit card debt that is delinquent for more than 30 days for Panel B, Conspicuous Consumption$_{it-1}$ is the lagged quarterly average of the fraction of monthly card spending at conspicuous stores out of the total monthly card spending *i*, *Condo*$_i$ is a dummy variable that takes the value of 1 if individual *i* is a condo resident and 0 if individual *i* resides in HDB, and X_i denotes a vector of socioeconomic control variables. Our main focus is on the interaction term, *Condo*$_i$ x *Conspicuous Consumption*$_{it-1}$.

Table 6 summarizes the results. First, consistent with the results in Table 5, condo residents carry significantly higher credit card debt (9% more as shown in Panel A) and higher delinquent credit card debt (134% more as shown in Panel B) than HDB residents. More importantly, the results of

[30] To test the effect on the extensive margin of delinquency, we also run the regression where the dependent variable is a dummy variable that takes the value of 1 if individuals have any delinquent debt and 0 otherwise. The coefficient for the Condo variable is positive but statistically insignificant. This means that conspicuous motivation itself does not have statistical power to explain the external margin of delinquency, but the direction is consistent.

the interaction term between condo and conspicuous consumption suggest that condo residents who spend more at conspicuous stores carry significantly higher credit card debt and delinquent credit card debt compared with other condo residents. In contrast, the relationship between conspicuous consumption and credit card debt is negative among HDB residents, as is evident from the coefficients of conspicuous consumption (B=–0.095; z=–37.69 in Panel A and B=–2.641; z=–48.61 in Panel B). Thus, HDB residents who spend more at conspicuous stores carry less credit card debt and delinquent credit card debt, potentially because their consumption is less driven by conspicuous motivation.[31]

[Insert Table 6 about Here]

The results in Tables 5 and 6 together suggest that consumption of visible luxury goods leads to higher indebtedness only when consumers have strong conspicuous motivation. In other words, it is conspicuous consumption not consumption of expensive goods that has negative financial consequences. These results reinforce the importance of identifying consumers with conspicuous motivation to precisely investigate the role of conspicuous consumption in indebtedness. For example, because Vissing-Jorgensen (2012) does not identify consumers with different levels of conspicuous motivation, the positive relationship between luxury consumption and credit default shown in her study may be underestimated.

3.3 Heterogeneity among conspicuous consumers

Not all condo residents with potentially stronger conspicuous motivation would spend more at conspicuous stores, thus leading to higher indebtedness. We examine the potential heterogeneity

[31] They may also be better than condo residents at substituting conspicuous desires between housing and non-housing goods. A significant price difference exists between condos and HDBs (see Table 1). In a rational framework, individuals that chose condos should have responded to higher housing costs by consuming less in other categories.

of conspicuous consumption and indebtedness among condo residents in terms of age, gender, marital status, and education level. Table 7 summarizes the results of the quarterly regressions (Panel-GLM with log link) using the same matched sample.[32]

[Insert Table 7 about Here]

The results of conspicuous consumption models show that, among condo residents that are potentially conspicuous, male individuals actually spent more at conspicuous stores relative to their total card spending (Panel B) while other demographic factors do not have a significant impact on actual conscious consumption patterns. On the other hand, the results of credit card debt models show that the debt behavior significantly differs by demographic factors: among condo residents, younger (Panel A), male (Panel B), single (Panel C), and lower educated (Panel D) individuals carried higher credit card debt balance. These results imply that that age, marital status, and education level that could be proxies for income and wealth tend to play an important role in household indebtedness, regardless of their excess conspicuous consumption.

We also find that more conscious consumption leads to higher debt only among individuals with higher conspicuous motivation. As mentioned above, among condo residents, male individuals spent more at conspicuous stores, and in turn, carried higher credit card debt balance. On the other hand, this link does not hold for HDB residents. For example, Table 7 shows that, among HDB residents, while younger individuals spent more at conspicuous stores, their carried debt amount was no higher than that of others. These results reiterate our previous finding that

[32] Conspicuous consumption models follow Equation (2) and Credit Card Debt models follow Equation (3). To these equations, we add the interaction terms between a condo dummy variable and demographic variable which is the main variable of interest for the heterogeneity analyses. For credit card debt models, we focus on the credit card debt balance because the number of delinquent cases is very small for the matched sample and the maximum likelihood method did not converge for specifications with an additional interaction term.

conspicuous motivation is critical in explaining the relationship between conspicuous consumption and indebtedness, possibly because those with stronger conspicuous motivation have lower capacity to substitute conspicuous desires across different items (e.g., housing vs. non-housing goods) and engage in better financial management.

3.4 Robustness checks

First, we test whether our estimation results are robust to different definitions of conspicuous stores. In addition to the measure we use for the main analyses, the top 10% conspicuous stores based on Heffetz (2011), we re-define conspicuous stores following CHR (2009). As mentioned earlier, the categories defined in CHR (2009) are more limited and the stores in the categories are more likely to sell visible and portable goods. Therefore, purchases at these stores may have a more significant association with conspicuous motivation. We also examine the list of both top 10% and top 20% stores based on the rank by average per-transaction amount spent. The results in Appendix B confirm that condo residents in the matched sample are clearly more conspicuous than their HDB counterparts, regardless of the definition of conspicuous stores.

Next, we re-run our analyses using the matched sample that meets more rigorous matching criteria.[33] Although we use a number of important socioeconomic variables as matching criteria for our main analyses, we now attempt to further address the potential concern that other variables may systematically differ between treatment and comparison groups and are associated

[33] For all of these robustness checks, value of residence (log), size of residence (log), the rate of price appreciation of residence, income (log), age, female, and married variables are included as control variables. For all matchings, we use the same logit model to estimate the propensity score, for which the dependent variable is the condo dummy and the base independent variables are value of residence per square meter, size of residence, income decile, age, gender, and marital status. One-to-one matching is done with no replacement, where each matched pair is forced to be drawn from the same income decile. We add different criteria for different robustness checks.

with dependent variables. For example, because non-Singaporeans are concentrated in condos, our results may be subject to selection bias if they have systematically different conspicuous motivation from that of Singaporean citizens. It is also possible that neighborhoods in which condos and HDBs are located differ and the neighborhood environment beyond residential circles affects individual consumption behavior. Next, arguably, people with higher levels of education may have higher expectations about their future income, and condo residents tend to have higher education, as shown in Table 1. Therefore, expected future income and not conspicuous motivation leads condo residents to spend more on luxury goods and carry higher debt. To address these concerns, we create a series of new matched samples only among Singaporeans (Panel A), those who reside in the same postal sector (Panel B), individuals whose highest degree is a Bachelor's (Panel C). The results shown in Appendix C (Panel A, B, C) using these samples show that the treatment effects of residing in condos on conspicuous consumption and credit card debt are consistent with our main results.

The opposite potential concern is that our matching process may result in large sample reduction which may affect the external validity of our results. We therefore create the matched sample without using any caliper (vs. 0.003 for the main analyses) based on the same matching criteria used for the main matched sample. Panel D of Appendix C confirms that the results are robust even without caliper restriction. Panel E further shows the results of the regressions that use the unmatched sample of 122,231 without any matching algorithm, and confirms that they are consistent with our main results.

Lastly, we test whether our analysis results using home values at the six-digit postal code level to control for housing costs are robust to housing tenure status, for which our data do not provide information. While most HDB residents are likely to be homeowners, there would be more renters among condo residents in our sample.[34] If housing costs significantly differ between owners and renters, therefore, this difference may affect their disposable income, and in turn, non-housing conspicuous consumption and indebtedness.[35] To address this issue, we estimate monthly housing costs for owners of HDBs, owners of condominiums, and renters of condominiums. For owners, we use the median values of HDBs and condos ($647,406 and $644,500, respectively) from our matched sample and assume that owners take out an 80% loan with a 25-year maturity and a 2% interest rate. Monthly mortgage payments of HDB and condo owners are estimated at $2,195 and $2,185, respectively. To measure the monthly rent for a condominium with a value of $644,500, we identify several condominiums of similar values and collect rental data[36] for units sized 120 square meters – about the mean size of condominium and HDB units in the matched sample. We find that the monthly rent of the typical condominium in the matched sample should be approximately $2,800, which verifies that condo renters' housing costs must be higher than HDB owners' housing costs.[37] Thus, it is very unlikely that higher conspicuous consumption and higher debt among condo residents (both owners and renters) relative to among HDB owners is attributable to lower housing costs.

[34] Among Singaporean citizens and permanent residents, the homeownership rates for HDBs and condos are 92% and 84%, respectively, as of 2015. The homeownership rate for foreigners should be lower.
[35] Another possibility is that the household size is larger for condo renters and they share rents to secure higher disposable income. We have tried to rule this out in the prior section.
[36] Rental data are from the Urban Redevelopment Authority in Singapore as of the end of 2012.
[37] While the size of condos is generally larger than the size of HDBs before matching and one may be concerned that condo residents share their rent among several people to reduce housing costs, we use the size of residence as a matching criterion as well as a control variable.

4. Concluding Remarks

We identify the different level of conspicuous motivation in the Singapore context on the basis of residential circles, private condominiums, and HDBs, and analyze conspicuous consumption and indebtedness. A series of analyses using the matched sample of individuals that reside in condos and HDBs first confirms that condo residents that are hypothesized to have higher conspicuous motivation were indeed engaged in more conspicuous consumption than HBD residents. They spent more on conspicuous goods but not necessarily on other wellbeing goods, and were more likely to own prestigious credit cards compared with their matched counterparts in HDBs. Our main finding is that condo residents who have greater conspicuous motivation had more credit card debt and credit card debt under delinquency than their matched counterparts in HDBs. Moreover, conspicuous consumption led to higher credit card debt only among condo residents. Finally, among these condo residents, male individuals particularly spent more at conspicuous stores and, in turn, carried higher credit card debt balance.

Our findings provide an important insight into the discussion on recent increases in household indebtedness. Consumption of visible, luxury goods, especially driven by higher conspicuous motivation, makes a significant contribution to indebtedness. Hence, conspicuous motivation provides one possible explanation for why some people consume more than their available economic resources and carry debt. Furthermore, conspicuous consumers seem to have lower capacity to substitute conspicuous desires between different items. As shown in our results, individuals who already made a conspicuous residential choice further increase non-housing conspicuous consumption. In contrast, in a rational framework, they should respond to higher housing costs by consuming less in other categories. Among conspicuous consumers, particular

concern needs to be given to the group of people who are more vulnerable to higher indebtedness. Our results suggest that male individuals belong to this group.

In terms of conspicuous motivation, our results suggest the importance of individual residential choices. Even in non-Singapore contexts, it is highly plausible that persons with stronger conspicuous desire sort into single family housing units on prestigious streets or multifamily housing complexes with brand names. If they are surrounded by and interact with neighbors who are similarly conspicuous and/or have higher incomes, they are likely to perceive their economic standing as relatively low, motivating them to engage in more conspicuous consumption. In contrast, certain areas may have significant variations in community and locational amenities, such as a swimming pool in a gated community and higher educational quality across different residential circles. Individuals who choose conspicuous residential circles for these amenities and not because of their own conspicuous desire may be exposed to peer effects from conspicuous neighbors. As our results suggest, choosing a conspicuous residential circle on the basis of either their own conspicuous motivation or other reasons could trigger a higher level of non-housing conspicuous consumption that eventually leads to higher debt and delinquency.

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Table 1 Summary statistics

Condo residents vs. HDB residents (before matching)

	Condo		HDB		Diff (Condo - HDB)		
	Mean	Std. Dev.	Mean	Std. Dev.	Diff	*t (z)*	*Sig.*
Credit and debit card spending							
Monthly total spending	$959.92	$1,162.45	$552.84	$694.59	$407.08	160.00	***
Monthly spending at conspicuous stores:							
Top 10% as defined in Heffetz (2011)	$155.75	$1,489.95	$62.12	$575.11	$93.64	59.89	***
Top 20% as defined in Heffetz (2011)	$242.58	$1,581.94	$110.37	$682.81	$132.21	75.31	***
Top 10% as defined in CHR (2009)	$83.25	$1,229.48	$29.58	$346.60	$53.67	47.11	***
Top 20% as defined in CHR (2009)	$116.61	$1,262.59	$46.74	$389.51	$69.88	57.90	***
Credit card debt and deliquency							
Monthly credit card debt amount	$611.66	$2,146.26	$595.10	$1,717.32	$16.57	2.82	***
Monthly delinquent credit card debt amount	$11.16	$493.25	$11.00	$440.18	$0.16	0.11	
Characteristics of residence at 6 digit postal code							
Size (sqm)	139.06	241.83	104.73	38.85	34.33	110.00	***
Price	$1,457,517.00	$3,880,821.00	$460,373.70	$453,301.50	$997,143.60	200.00	***
Price per sqm	$9,833.31	$3,451.65	$4,433.33	$945.83	$5,399.98	1100.00	***
Demographics							
Montly income	$9,916.18	$12,773.56	$4,478.10	$3,547.87	$5,438.07	290.00	***
Age	44.19	9.68	39.98	10.03	4.22	130.00	***
% foreigner	28.24%		18.40%		9.84%	75.40	***
% female	39.76%		41.29%		-1.53%	-9.45	***
% married	62.66%		41.17%		21.48%	130.00	***
% Chinese	79.54%		81.92%		-2.38%	-18.67	***
% Malay	1.03%		5.65%		-4.62%	-64.56	***
% Indian	6.65%		6.52%		0.13%	1.60	***
% with bachelor degree	33.66%		27.72%		5.94%	40.04	***
Number of individuals	16,081		106,450				

Notes: Table 1 reports summary statistics of the unmatched sample of 122,531 individuals after deleting those with incomplete demographic information. Credit card and debit card spending is computed by adding monthly spending over all card accounts for each individual. Conspicuous stores are defined by ranking all local stores in our dataset that correspond to the categories defined in Heffetz (2011) or CHR (2009) by per-transaction amount. Statistics based on both top 20% and top 10% conspicuous stores are summarized. Appendix A-1 provides the details of the definition of conspicuous stores. Credit card debt is computed as the difference between the current month's credit card payment and the previous month's credit card balance. Characteristics of residence are based on information at the postal code level, which refers to each building. All dollar amounts are in local currency (SG$), and SG$1 = US$0.78 as of February 2011. Variables are winsorized at the 1% and 99% levels. *** indicates significance at the 1% level, ** indicates significance at the 5% level, and * indicates significance at the 10% level.

Table 2 Quality of propensity score matching (PSM) sample

		Treatment: Condo	*Comparison: HDB*	*Difference*	*% reduction*	*Difference in means as proportion of standard deviation*	*Cochran's rule of thumb*
Montly income	Unmatched	$9,739.90	$4,309.40	$5,430.50			
	Matched	$6,508.30	$6,434.30	$74.00	98.60	0.013	y
Price per sqm of residence	Unmatched	$9,830.80	$4,421.00	$5,409.80			
(6 digit postal code)	Matched	$6,050.20	$6,388.50	-$338.30	93.70	0.141	y
Size of residence (sqm)	Unmatched	138.9	104.2	34.73			
(6 digit postal code)	Matched	112.7	117.8	-5.19	85.10	0.039	y
Age	Unmatched	43.7	39.3	4.37			
	Matched	40.7	40.7	0.03	99.20	0.003	y
% female	Unmatched	40.2%	41.2%	-0.01			
	Matched	43.7%	39.1%	0.05	-329.30	0.093	y
% married	Unmatched	61.2%	39.4%	0.22			
	Matched	48.9%	49.5%	-0.01	97.20	0.012	y

Notes: Table 2 compares the statistics of the unmatched sample of 122,531 individuals and the matched sample of 5,258 individuals (2,629 condo residents and 2,629 HDB residents). To estimate the propensity score, we use the logit model, in which the dependent variable is the condo dummy (1 for condo residents and 0 for HDB residents) and the independent variables are value of residence per square meter, size of residence in square meter, income decile, age, gender, and marital status. One-to-one matching is done with no replacement, for which each matched pair is forced to be drawn from the same income decile. The column "*% reduction*" shows the percentage reduction in the mean difference between condo and HDB residents. "*Cochran's rule of thumb*" reports whether the mean difference of a variable with the matched sample is less than a quarter of a standard deviation of the respective variable ("y" indicates that the mean difference is smaller than this threshold, suggesting that good balance is achieved after matching).

Table 3 Residential circles and conspicuous consumption

	Model 1			Model 2			Model 3		
Dependent variable:	Conspicuous consumption			Conspicuous consumption			Conspicuous consumption		
	B	*z*		*B*	*z*		*B*	*z*	
Condo	0.215	3.98	***	0.217	4.02	***	0.225	4.15	***
Price of residence (log, 6 digit postal code)				-0.033	-0.43		-0.003	-0.05	
Size of residence (log, 6 digit postal code)				-0.088	-0.62		-0.062	-0.44	
Rate of price appreciation of residence (2 digit postal sector)				-0.503	-0.34		-0.607	-0.41	
Income (log)				0.070	2.34	**	0.081	2.67	***
Age							-0.014	-4.47	***
Female							-0.194	-3.45	***
Married							0.092	1.63	*
Constant	-3.317	-82.48	***	-3.031	-3.45	***	-3.036	-3.47	***
Number of observations	34,117			34,117			34,117		
Number of individuals	5,258			5,258			5,258		

Notes: Table 3 summarizes the results of quarterly regressions (Panel-GLM with log link) that examine the relationship between residential circles (condo vs. HDB) and conspicuous consumption using the matched sample. The dependent variable of "conspicuous consumption" is the quarterly average of the fraction of monthly card spending at the top 10% conspicuous stores based on Heffetz (2011) out of the total monthly card spending. The main independent variable is the condo dummy variable that takes the value of 1 if individuals are condo residents and 0 if they are HDB residents. Model 1 includes only the condo dummy and the constant term. Model 2 adds proxies for wealth and permanent income. Model 3 also adds the demographic controls. *** indicates significance at the 1% level, ** indicates significance at the 5% level, and * indicates significance at the 10% level.

Table 4 Consumption and indebtedness patterns of individuals in the matched sample

	Treatment: Condo	*Comparison: HDB*	*Diff: Condo-HDB*	
Conspicuous consumption				
Monthly spending at conspicuous stores:				
Top 10% as defined in Heffetz (2011)	$118.75	$83.13	$35.62	***
Top 20% as defined in Heffetz (2011)	$190.88	$140.22	$50.66	***
Top 10% as defined in CHR (2009)	$56.54	$36.83	$19.71	***
Top 20% as defined in CHR (2009)	$80.20	$56.88	$23.32	***
Credit card accounts				
Number of credit cards held	3.14	2.97	0.17	***
% with Amex Elite	1.71%	1.02%	0.69%	***
Monthly spending				
Total	$768.28	$672.82	$95.46	***
Travel	$148.02	$131.83	$16.19	***
Durable	$113.34	$87.35	$25.99	***
Apparel	$105.20	$81.61	$23.59	***
Transportation	$80.33	$65.27	$15.06	***
Dining	$93.15	$80.51	$12.63	***
Service	$223.42	$220.27	$3.15	
Online	$25.90	$22.67	$3.23	***
Supermarket	$34.77	$37.40	-$2.63	***
Entertainment	$31.37	$30.02	$1.35	*
Indebtedness				
Monthly credit card debt amount	$686.86	$651.95	$34.91	**
Monthly delinquent credit card debt amount	$23.81	$11.97	$11.84	**
Number of individuals	2,629	2,629		

Notes: Table 4 summarizes overall consumption patterns and indebtedness of our matched sample of condo and HDB residents. To enhance the convenience for readers, conspicuous consumption measures are shown as the dollar amount of consumption at conspicuous stores instead of its fraction out of the total card spending. "Amex Elite" is the most prestigious type of credit card issued by the bank. All dollar amounts are in the local currency (SG$), and SG$1 = US$0.78 as of February 2011. Variables are winsorized at the 1% and 99% levels. *** indicates significance at the 1% level, ** indicates significance at the 5% level, and * indicates significance at the 10% level.

Table 5 Residential circles and credit card indebtedness

Panel A: Total credit card debt

Dependent variable:	Model 1 Credit card debt			Model 2 Credit card debt			Model 3 Credit card debt		
	B	*z*		*B*	*z*		*B*	*z*	
Condo	0.052	124.59	***	0.055	132.13	***	0.072	171.47	***
Price of residence (log, 6 digit postal code)				0.000	-0.54		-0.014	-24.38	***
Size of residence (log, 6 digit postal code)				0.106	100.36	***	0.072	66.46	***
Rate of price appreciation of residence (2 digit postal sector)				-5.348	-452.22	***	-4.933	-416.82	***
Income (log)				0.084	355.56	***	0.050	221.71	***
Age							0.013	573.34	***
Female							-0.367	-806.13	***
Married							-0.088	-202.38	***
Constant	6.480	22000.00	***	5.586	853.23	***	5.835	889.96	***
Number of observations	34,117			34,117			34,117		
Number of individuals	5,258			5,258			5,258		

Panel B: Delinquent credit card debt

Dependent variable:	Model 1 Delinquent credit card debt			Model 2 Delinquent credit card debt			Model 3 Delinquent credit card debt		
	B	*z*		*B*	*z*		*B*	*z*	
Condo	0.686	171.88	***	0.677	169.65	***	0.731	182.42	***
Price of residence (log, 6 digit postal code)				-1.144	-189.31	***	-1.123	-185.82	***
Size of residence (log, 6 digit postal code)				0.328	32.49	***	0.257	25.53	***
Rate of price appreciation of residence (2 digit postal sector)				-3.799	-36.88	***	-2.637	-25.29	***
Income (log)				0.317	125.83	***	0.206	89.17	***
Age							0.004	20.15	***
Female							-1.410	-258.87	***
Married							0.117	29.78	***
Constant	1.712	526.43	***	12.863	186.49	***	13.903	205.21	***
Number of observations	34,117			34,117			34,117		
Number of individuals	5,258			5,258			5,258		

Notes: Table 5 summarizes the results of quarterly regressions (Panel-GLM with log link) that examine the relationship between residential circles (condo vs. HDB) and indebtedness using the matched sample. The

dependent variable is the quarterly average of monthly credit card debt balance in Panel A and the quarterly average of monthly credit card debt under delinquency for 30–210 days in Panel B. The main independent variable is the condo dummy variable that takes the value of 1 if individuals are condo residents and 0 if they are HDB residents. Model 1 includes only the condo dummy and the constant term. Model 2 adds proxies for wealth and permanent income. Model 3 also adds the demographic controls. *** indicates significance at the 1% level, ** indicates significance at the 5% level, and * indicates significance at the 10% level.

Table 6 Conspicuous consumption and credit card indebtedness

Panel A: Total credit card debt

Dependent variable:	Credit card debt		
	B	*z*	
Conspicuous consumption	-0.095	-37.69	***
Condo	0.090	205.55	***
Condo x Conspicuous consumption	0.423	121.00	***
Constant & Controls	included		
Number of observations	27,770		
Number of individuals	4,928		

Panel B: Delinquent credit card debt

Dependent variable:	Delinquent credit card debt		
	B	*z*	
Conspicuous consumption	-2.641	-48.61	***
Condo	0.851	196.66	***
Condo x Conspicuous consumption	0.982	15.13	***
Constant & Controls	included		
Number of observations	27,770		
Number of individuals	4,928		

Notes: Table 6 summarizes the result of quarterly regressions (Panel-GLM with log link) that examine the relationship between conspicuous consumption and indebtedness interacted with the residential circles (condo vs. HDB) using the matched sample. The dependent variable is credit card debt balance in Panel A and credit card debt under delinquency for 30–210 days in Panel B. Conspicuous consumption is the lagged quarterly average of the fraction of monthly card spending at the top 10% conspicuous stores based on Heffetz (2011) out of the total monthly card spending. The condo dummy variable takes the value of 1 if individuals are condo residents and 0 if they are HDB residents. Our main focus is the interaction between the condo dummy and conspicuous consumption. *** indicates significance at the 1% level, ** indicates significance at the 5% level, and * indicates significance at the 10% level.

Table 7 Heterogeneity of conspicuous consumption and indebtedness

Panel A: Age

Dependent variable:	Conspicuous Consumption			Credit Card Debt		
	B	*z*		*B*	*z*	
Age	-0.451	-2.64	**	0.793	603.58	***
Condo	0.417	11.70	***	1.489	217.96	***
Condo x Age	-0.150	-0.63		-0.380	-208.02	***
Constant & Controls	included			included		

Panel B: Gender

Dependent variable:	Conspicuous Consumption			Credit Card Debt		
	B	*z*		*B*	*z*	
Female	-0.061	-0.73		-0.244	-376.69	***
Condo	0.314	4.58	***	0.147	289.66	***
Condo x Female	-0.239	-2.14	**	-0.237	-263.03	***
Constant & Controls	included			included		

Panel C: Marital status

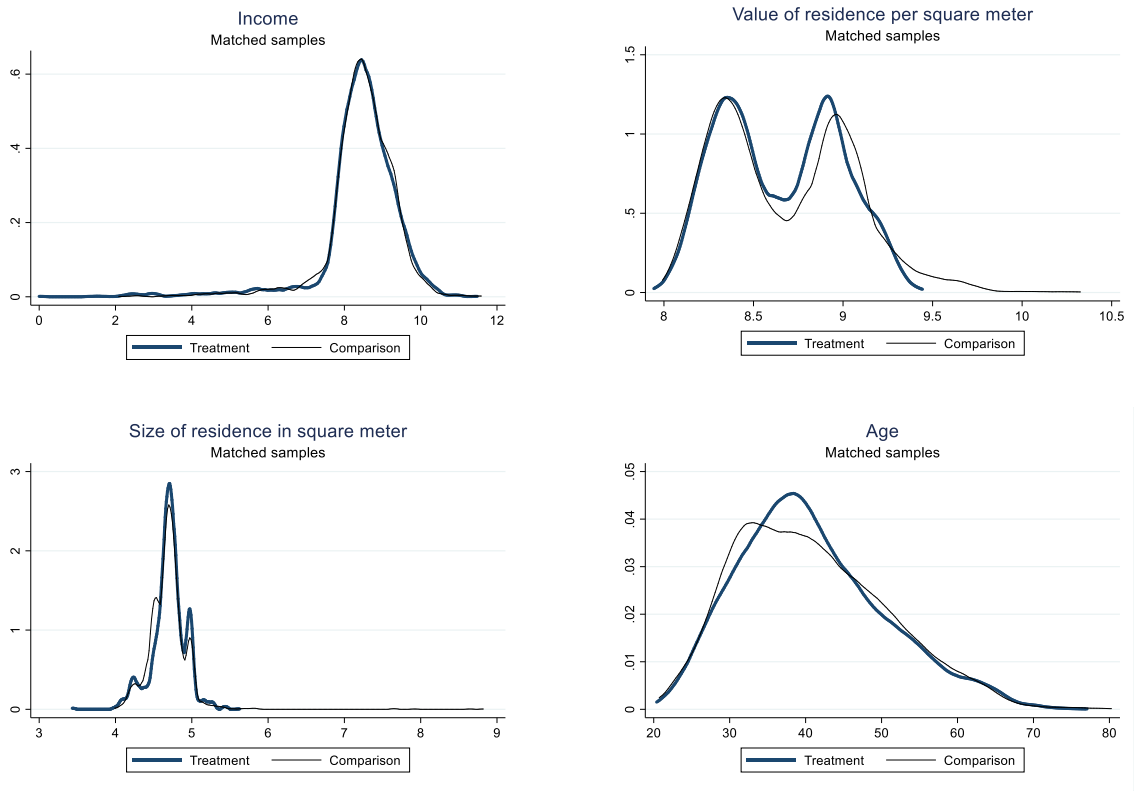
Dependent variable:	Conspicuous Consumption			Credit Card Debt		
	B	*z*		*B*	*z*	
Married	0.113	1.37		-0.042	-68.73	***
Condo	0.245	3.14	***	0.117	195.88	***
Condo x Married	-0.038	0.35		-0.089	-105.91	***
Constant & Controls	included			included		

Panel D: Education level (with BA or higher degrees)

Dependent variable:	Conspicuous Consumption			Credit Card Debt		
	B	*z*		*B*	*z*	
High education	-0.163	-1.81	*	-0.183	-261.68	***
Condo	0.259	3.96	***	0.126	257.90	***
Condo x High education	-0.079	-0.68		-0.164	-172.85	***
Constant & Controls	included			included		

Notes: Table 7 summarizes the results of quarterly regressions (Panel-GLM with log link) that examine the heterogeneity of the relationship between the residential circles and conspicuous consumption and indebtedness using the matched sample (5,258 individuals). In the conspicuous consumption model, the dependent variable is the quarterly average of the fraction of monthly card spending at the top 10% conspicuous stores based on Heffetz (2011) out of the total monthly card spending. In the credit card debt model, the dependent variable is the quarterly average of monthly credit card debt balance. The condo dummy variable takes the value of 1 if individuals are condo residents and 0 if they are HDB residents. The female variable in Panel B takes the value of 1 if individuals are female and 0 otherwise. The married variable in Panel C takes the value of 1 if individuals are married and 0 otherwise. In Panel D, the high education variable takes the value of 1 if individuals have a Bachelor's or higher degrees and 0 otherwise. All of the same control variables (except for variables used to test heterogeneous effects, e.g., age in Panel A) are included in the regressions. *** indicates significance at the 1% level, ** indicates significance at the 5% level, and * indicates significance at the 10% level.

Figure 1 Quality of propensity score matching sample



Notes: Figure 1 shows the treatment group (condo residents) and the comparison group (HDB residents) comparison of distributions (QQ plots) of monthly income (log), value of residence per square meter (log), size of residence in square meter (log), and age, after the matching process.

Appendix A-1: Definition of conspicuous stores

We define the merchant categories that are likely to sell visible goods based on Heffetz (2011) and Charles, Hurst and Roussanov (2009) (hereafter CHR) as potential conspicuous stores.

By conducting anonymous online survey of 320 students at the University of Chicago's Harris School and Graduate School of Business, CHR (2009) define "visible goods" as: expenditures on apparel (including accessories such as jewelry), personal care, and vehicles (excluding maintenance). Similarly, Heffetz (2011) uses a randomized survey among a sample from the population over age 18 in the continental United States. Based on 480 completed interviews, a "visibility index" (hereafter VI) is created for all the 31 categories of goods included in the paper. The VI varies from 0 to 1, and a higher value means higher perceived visibility from the interviewees. We compare the measures from two papers and find that all categories of "visible goods" defined in CHR (2009) have a higher VI than the 0.6 in Heffetz (2011).

Specifically, there are 10 categories of goods out of 31 categories in Heffetz (2011) that have VI≥0.6, including cigarettes (VI=0.76), cars (VI=0.73), clothing (VI=0.71), furniture (VI=0.68), jewelry (VI=0.67), recreation 1 (VI=0.66), food out (VI=0.62), alcohol home (VI=0.61), barbers, etc. (VI=0.60), and alcohol out (VI=0.60). There is another category of recreation goods in Heffetz (2011) – "recreation 2" – with a VI of 0.58, which ranks next to "barbers, etc." and "alcohol out". Because the merchant categories in our card transaction data do not cleanly distinguish between the two types of recreational activities/goods, we classify all goods/services in "recreation 1" and "recreation 2" defined in Heffetz (2011), together with the other 9 categories of goods that with VI≥0.6 are defined as "visible goods".

We report how we relate the merchant categories in the card transaction data to the visible goods' categories defined in CHR (2009) and Heffetz (2011) in Table A1 below. Note that if any categories of goods among the above-mentioned 11 categories in Heffetz (2011) are not reported in Table A1, it means that there is no corresponding merchant category in our card transaction data.

For our measurement of conspicuous consumption, we start with all local stores (excluding auction houses) in our dataset that fall into the categories defined in Heffetz (2011) or CHR (2009). Then, we rank these stores by per-transaction amount spent by all individuals in our initial sample. For our main analyses, we define the top 10% stores based on Heffetz (2011) as conspicuous stores. For robustness checks, we use the top 20% stores based on Heffetz (2011) as well as the top 10% and 20% stores based on CHR (2009). The stores in the categories defined in CHR (2009) tend to sell goods that are both visible and portable.

[Insert Table A1 about Here]

Table A1 Merchant categories of conspicuous stores in credit card transaction data

Category Name in Credit Card Transaction Data	Category Name in CHR (2009)	Visible Goods in CHR (2009)	Category Name in Heffetz (2011)	Visibility Index in Heffetz (2011)
(1)	(2)	(3)	(4)	(5)
specialty retail	Clothing/jewelry	Yes	Cigarettes/jewelry/alcohol home	0.76/0.67/0.61
automotive related	Vehicle (expanded)	Yes	Cars	0.73
rental	Vehicle (expanded)	Yes	Cars	0.73
apparel	Clothing/jewelry	Yes	Clothing	0.71
departmental stores	Clothing/jewelry	Yes	Clothing	0.71
watches & jewelry	Clothing/jewelry	Yes	Clothing	0.71
home/office furnishing & appliances		No	Furniture	0.68
electronic and computer		No	Recreation 1	0.66
music		No	Recreation 1	0.66
entertainment & recreational		No	Recreation 1/ recreation 2	0.66/0.58
dining		No	Food out/alcohol out	0.62/0.60
associations/ memberships	Personal care	Yes	Barbers, etc./ recreation 2	0.60/0.58
pets		No	Recreation 2	0.58

Note. This table presents the merchant categories used to define conspicuous stores. If any categories of goods among the 11 categories with VI≥0.58 in Heffetz (2011) are not reported here, it means that there is no corresponding merchant category in our data.

Appendix A-2: Summary statistics of conspicuous stores

Number of conspicuous stores		4,895
Total number of stores in the categories defined in Heffetz (2011)		48,953
Per-transaction amount		
	Mean	$2,010.97
	Std. Dev.	$7,494.46
	Min.	$667.50
	Max.	$435,981.50

Notes: This table summarizes the statistics on transactions at 4,895 conspicuous stores, which are ranked as the top 10% stores in terms of per-transaction amount among all local stores in the categories defined in Heffetz (2011) in our dataset. Statistics are based on the entire sample of 187,249 individuals for the complete sample period between April 2010 and March 2012.

Appendix A-3: Examples of stores defined as "conspicuous stores": Rank 1–50

Rank	Merchant name	Merchant category	Average per-transaction amount (Singapore Dollar)
1	ROLEX	Specialty Retail	435,982
2	MALAYAN MOTOR	Automotive Related	155,241
3	KING FOOK JEW GROUP	Watches & Jewelry	100,289
4	RICHARD MILLE	Watches & Jewelry	96,000
5	SWISS WATCH GALLERY	Specialty Retail	84,680
6	RICHARD MILLE SINGAPORE	Watches & Jewelry	81,098
7	BULGARI	Department Stores	53,898
8	PATEK PHILIPPE MBS	Watches & Jewelry	50,950
9	ITAL AUTO SING	Automotive Related	50,660
10	IWC 1881 HERITAGE	Department Stores	41,333
11	ART SEASON	Watches & Jewelry	40,000
12	BJ ARTRIVIUM ART COMMU	Department Stores	33,100
13	JEWEL BY SARA	Watches & Jewelry	31,000
14	DEGEM	Watches & Jewelry	29,000
15	WATABE	Personal Services	28,859
16	GEORG LANG SEL ERBEN	Specialty Retail	24,766
17	KENSOON ASIATIC ART	Specialty Retail	23,800
18	HARRY WINSTON SINGAPORE	Watches & Jewelry	21,667
19	OMEGA BOUTIQUE	Watches & Jewelry	20,750
20	HUBLOT BOUTIQUE-MBS	Watches & Jewelry	20,270
21	LOTTO CARPET GALLERY	Home/Office Furnishing & Appliances	19,935
22	ITAL AUTO	Automotive Related	18,913
23	MU-DIAN	Home/Office Furnishing & Appliances	17,655
24	AAKAAR EXQUISITES	Specialty Retail	16,901
25	SWISS WATCH GALLERY SI	Watches & Jewelry	16,819
26	KWOK GALLERY	Specialty Retail	16,000
27	LOANG & NOI SI	Watches & Jewelry	16,000
28	CREAM	Home/Office Furnishing & Appliances	15,511
29	SIANG HOA Jewelry	Watches & Jewelry	15,000
30	GUBELIN LUZERN	Watches & Jewelry	14,490
31	ART SEASON SI	Specialty Retail	14,400
32	AL MULLA Jewelry	Watches & Jewelry	13,349
33	EMPEROR WATCH & JEW 97	Watches & Jewelry	12,836
34	LAGUNA-GUEST ROOM	Entertainment & Recreational	11,908
35	MOIE	Home/Office Furnishing & Appliances	11,712
36	RWS CMS	Entertainment & Recreational	11,630
37	CHLOE 3862	Watches & Jewelry	11,600
38	SOO KEE LUXURY	Watches & Jewelry	11,500
39	BOUTIQUE BREGUET	Watches & Jewelry	11,315
40	SINCERE HAUTE HORLOGER	Watches & Jewelry	11,251
41	BULGARI ASIA PACIFIC CENTRAL	Watches & Jewelry	11,216
42	LIGNE ROSET	Home/Office Furnishing & Appliances	11,183
43	AUDI CAR SALES	Automotive Related	11,147
44	ZIGERLI + IFF	Watches & Jewelry	11,099
45	THE ATTIC PLACE SINGAPORE	Apparel	10,833
46	LOANG & NOI-PARAGON	Watches & Jewelry	10,733
47	ROLF BENZ	Home/Office Furnishing & Appliances	10,667
48	E'COLLEZIONE	Watches & Jewelry	10,600
49	SALAM CARPET	Home/Office Furnishing & Appliances	10,500
50	MALAYAN MOTOR	Automotive Related	10,453

Notes: This table lists the top 50 conspicuous stores (1–50 ranked by the average per-transaction amount spent) in our dataset based on Heffetz (2011).

Appendix A-4: Examples of stores defined as "conspicuous stores": Rank 4846–4895

Rank	Merchant name	Merchant category	Average per-transaction amount (Singapore Dollar)
4846	STUART WEITZMAN	Apparel	672
4847	LIN KONG WATCH	Watches & Jewelry	672
4848	THE MONTELLA DESIGN-IM	Home/Office Furnishing & Appliances	672
4849	ONE DRESS/ TAP	Apparel	672
4850	K SUITES @ OPH	Dining	672
4851	SAVELINK CONNECTION-TR	Home/Office Furnishing & Appliances	672
4852	BOSSIN HAIR CARE & BEA	Personal Services	672
4853	SUNDAN SUN DEPARTMENT	Department Stores	672
4854	ST DAVID & NORFOLK	Dining	672
4855	PRAISE BEAUTY & SLIMMI	Personal Services	672
4856	D'LOOKZ THE REVIVAL	Personal Services	672
4857	FLYING DRAGON ADVENTURE	Entertainment & Recreational	671
4858	DE LAMAI	Dining	671
4859	KALLANG SELF STORAGE	Specialty Retail	671
4860	CYBER CAR SERVICE	Automotive Related	671
4861	HONG TYRE-274 BRADDELL	Automotive Related	671
4862	DERMA FLORA BEAUTY	Personal Services	671
4863	MERLIN BEACH RESORT	Dining	671
4864	STAMFORD CATERING	Dining	671
4865	QUAYSIDE SEAFOOD SIN	Dining	670
4866	JANE ART & CRAFT SIN	Specialty Retail	670
4867	BOSCH	Electronic and Computer	670
4868	KEMPINSKI HOTEL	Dining	670
4869	ITC SONAR FRONT OFFICE	Dining	670
4870	THE MANDARIN COMPANY	Apparel	669
4871	WEE HENG AUTO SUPPLY-E	Automotive Related	669
4872	DREAMZ KABUKI	Dining	669
4873	BAN NEE CHEN ENTERPRISE	Specialty Retail	669
4874	DANIEL EDWARD	Personal Services	669
4875	01EASE COX INTERNATIONAL	Personal Services	669
4876	SUNWAY PUTRA HOTEL -M	Dining	669
4877	TILO ROSSMANITH	Electronic and Computer	669
4878	L & B BEAUTY HOUSE	Personal Services	669
4879	BEI CHEN SHIYE-GONGYU	Dining	669
4880	TAJ MAHAL HOTEL FOC	Dining	669
4881	SWING KING ACADEMIES	Entertainment & Recreational	669
4882	GRACE HOTEL	Dining	669
4883	02FRANCES BEAUTY CLINIC	Personal Services	669
4884	05GLOWER HAIR CARE-06M	Personal Services	669
4885	MEDICAL AESTHETIC SPA	Personal Services	669
4886	PARKNASILLA HOTEL	Dining	668
4887	LARGOS HOTEL	Dining	668
4888	FM SKINCARE	Personal Services	668
4889	ST REGIS	Dining	668
4890	EDISON ELECT IND	Electronic and Computer	668
4891	TX SONGBIAO SILK CO	Home/Office Furnishing & Appliances	668
4892	MAX MARA-MBS	Apparel	668
4893	LE ARTICLE	Home/Office Furnishing & Appliances	668
4894	BALLY	Apparel	668
4895	BLISSLITE GALLERY	Home/Office Furnishing & Appliances	668

Notes: This table lists the bottom 50 stores (4846–4895 ranked by the average per-transaction amount spent) in our dataset based on Heffetz (2011).

Appendix B: Robustness checks with alternative conspicuous consumption measures

Residential circles and alternative conspicuous consumption measures

	Panel A:			Panel B:			Panel C:			Panel D:		
Dependent variable:	Hefffetz (2011), Top 10%			Hefffetz (2011), Top 20%			CHR (2009), Top 10%			CHR (2009), Top 20%		
	B	*z*		*B*	*z*		*B*	*z*		*B*	*z*	
Condo	0.225	4.15	***	0.157	4.20	***	0.175	2.06	**	0.152	2.70	***
Price of residence (log, 6 digit postal code)	-0.003	-0.05		-0.089	-1.68	*	0.006	0.05		-0.065	-0.82	
Size of residence (log, 6 digit postal code)	-0.062	-0.44		0.000	0.00		0.070	0.32		0.048	0.32	
Rate of price appreciation of residence (2 digit postal sector)	-0.607	-0.41		-0.930	-0.90		-0.330	-0.14		-0.270	-0.17	
Income (log)	0.081	2.67	***	0.040	1.97	**	0.190	3.65	***	0.070	2.25	**
Age	-0.014	-4.47	***	0.001	0.43		-0.010	-2.14	**	0.004	1.40	
Female	-0.194	-3.45	***	-0.216	5.52	***	-0.272	-3.04	***	-0.272	-4.56	***
Married	0.092	1.63	*	-0.015	-0.39		0.104	1.18		0.066	1.14	
Constant	-3.036	-3.47	***	-1.590	-2.63	***	-5.721	-4.25	***	-3.405	-3.77	***
Number of observations	34,117			34,117			34,117			34,117		
Number of individuals	5,258			5,258			5,258			5,258		

Notes: This table summarizes the results of robustness checks with alternative conspicuous consumption measures. It shows the results of quarterly regressions (Panel-GLM with log link) that examine the relationship between residential circles (condo vs. HDB) and conspicuous consumption using the matched sample. In Panel A, the dependent variable is our main conspicuous consumption measure, the quarterly average of the fraction of monthly card spending at the top 10% conspicuous stores based on Heffetz (2011) out of the total monthly card spending, so the result is same as the one shown in Table 3. In Panel B, the dependent variable is the quarterly average of the fraction of monthly card spending at the top 20% conspicuous stores based on Heffetz (2011) out of the total monthly card spending. As shown in Table A1, the categories defined in CHR (2009) are more limited and the stores in the categories are more likely to sell visible and portable goods. In Panel C and D, the dependent variable is the quarterly average of the fraction of the monthly card spending at the top 10% and 20% conspicuous stores based on CHR (2009) out of the total monthly card spending, respectively. The condo dummy variable takes the value of 1 if individuals are condo residents and 0 if they are HDB residents. *** indicates significance at the 1% level, ** indicates significance at the 5% level, and * indicates significance at the 10% level.

Appendix C: Robustness checks with different matched samples

Panel A: Only Singaporeans

Dependent variable:	Conspicuous Consumption			Credit Card Debt		
	B	*z*		*B*	*z*	
Condo	0.190	3.26	***	0.103	18.26	***
Constant & Controls	included			included		
Number of observations	33,095					
Number of individuals in						
Treatment: Condo	2,501					
Comparison: HDB	2,501					

Panel B: Same neighborhood

Dependent variable:	Conspicuous Consumption			Credit Card Debt		
	B	*z*		*B*	*z*	
Condo	0.304	3.61	***	0.059	200.14	***
Constant & Controls	included			included		
Number of observations	14,011					
Number of individuals in						
Treatment: Condo	1,081					
Comparison: HDB	1,081					

Panel C: Only individuals with Bachelor's degree

Dependent variable:	Conspicuous Consumption			Credit Card Debt		
	B	*z*		*B*	*z*	
Condo	0.167	1.95	**	0.148	198.28	***
Constant & Controls	included			included		
Number of observations	15,004					
Number of individuals in						
Treatment: Condo	1,182					
Comparison: HDB	1,182					

Panel D: No caliper

Dependent variable:	Conspicuous Consumption			Credit Card Debt		
	B	*z*		*B*	*z*	
Condo	0.180	8.23	***	0.058	206.79	***
Constant & Controls	included			included		
Number of observations	212,562					
Number of individuals in						
Treatment: Condo	16,055					
Comparison: HDB	16,055					

Panel E: No matching

Dependent variable:	Conspicuous Consumption			Credit Card Debt		
	B	*z*		*B*	*z*	
Condo	0.092	3.25	***	0.125	560.53	***
Constant & Controls	included			included		
Number of observations	773,072					
Number of individuals in						
Treatment: Condo	16,081					
Comparison: HDB	106,450					

Notes: This table summarizes the results of quarterly regressions (Panel-GLM with log link) for robustness checks with different matched samples created using different criteria. In the conspicuous consumption model, the dependent variable is the quarterly average of the fraction of monthly card spending at the top 10% conspicuous stores based on Heffetz (2011) out of the total monthly card spending. In the credit card debt model, the dependent variable is the quarterly average of monthly credit card debt balance. The condo dummy variable takes the value of 1 if individuals are condo residents and 0 if they are HDB residents. For all regressions, the value of the residence (log), the size of residence (log), the rate of price appreciation of residence, income (log), age, female, and married variables are included as control variables. For all matched samples (except for Panel E), we estimate the propensity score by using the logit model, in which the dependent variable is the condo dummy (1 for condo residents and 0 for HDB residents) and the independent variables are value of residence per square meter, size of residence in square meter, income decile, age, gender, and marital status. One-to-one matching is done with no replacement, for which each matched pair is forced to be drawn from the same income decile. The matched sample is created only among Singaporeans (Panel A), those reside in the same postal sector (Panel B), individuals whose highest degree is a Bachelor's (Panel C). In Panel D, the matched sample is created without using any caliper (vs. 0.003 for the main analyses) based on the same matching criteria used for the main matched sample. In Panel E, regressions are run with the unmatched sample of 122,531 individuals (16,081 condo residents and 106,450 HDB residents). *** indicates significance at the 1% level, ** indicates significance at the 5% level, and * indicates significance at the 10% level.