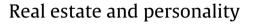
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#### 1. Introduction

#### ABSTRACT

This paper explores preferences and choices in the real estate market from a personality perspective. First, we employ micro-level data on individual scores on the Big Five personality test and personal financial real estate preferences to evaluate the role of personality in individual real estate market-related preferences. Empirical results provide solid evidence for an association between personality traits and individual preferences on a series of housing tenure, mortgage, and real estate investment attributes. Moreover, based on cross-sectional state-level aggregate personality scores and macro real estate market indicators, we find evidence indicating that the detected micro-level personality-preferences association conveys macro consequences on real estate market equilibrium outcomes. Research findings thus provide a new perspective for understanding individual preferences and equilibrium outcomes in the real estate market.

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Applied studies of personality show that personality traits can predict various dimensions of human behavior, preferences, and affects. It has been found, for example, that personality traits correlate with sales performance (Furnham and Fudge, 2008), career success and work satisfaction (Boudreau, Boswell, and Judge, 2001), earnings (Nyhus and Pons, 2005), academic success (O'Connor and Paunonen, 2007), political opinions (Barbaranelli et al., 2007; Riemann et al., 1993), car accident involvement (Arthur and Graziano, 2006), willingness to buy counterfeit products (Swami, Chamorro-Premuzic, and Furnham, 2009), alcohol consumption (Kuntsche, von Fischer, and Gmel, 2008), and the decision to get tattoos or body piercings (Tate and Shelton, 2008).

Personality traits are further found to explain economic decision making: personality traits may predict participants' cooperation when faced with the "prisoner's dilemma" paradigm (Hirsh and Peterson, 2009), anchoring heuristic behavior (McElroy and Dowd,

\* Corresponding author. Tel.: +972 3 6408194; fax: +972 3 6407741. *E-mail addresses:* bdanny@post.tau.ac.il (D. Ben-Shahar), rgolan@tx.technion.ac.il (R. Golan). 2007), availability and disposition heuristic effects (Durand et al., 2013), and attitudes toward materialism and money (Shafer, 2000). Within the financial arena specifically, personality traits are shown to correlate with the amount of risk assumed by investors and their portfolio achievements (Durand et al., 2013; Durand, Newby, and Sanghani, 2008) and with short-term versus long-term investment choices (Mayfield, Perdue, and Wooten, 2008.).

Studies also show that personality patterns exhibit regional differences (e.g., McCrae, 2001; McCrae and Terracciano, 2008; Schmitt et al., 2007; and Steel and Ones, 2002 for cross-national variation, and Krug and Kulhavy, 1973; Plaut, Markus, and Lachman, 2002; and Rentfrow, Gosling, and Potter, 2008 for geographical variation within the U.S.). These regional personality differences are, in turn, shown to be associated with geographical variation in socio-economic and demographic indictors. For example, Rentfrow et al. (2013) provide evidence showing that regional-level aggregate personality scores correlate with statelevel variation in political, economic, social, and health variables.<sup>1</sup>



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<sup>&</sup>lt;sup>1</sup> See also, among other recent studies on the correlation of state-level personality and socio-economic variables, Rentfrow (2010), de Vries, Gosling, and Potter (2011), and Obschonka et al. (2013).

It is interesting to note, however, that to the best of our knowledge there is no personality literature related to preferences and choices in the real estate market. We seek to fill this void by exploring the correlation between personality traits and individual preferences regarding housing tenure, mortgage, and real estate investment attributes.<sup>2</sup> Moreover, we examine the consequences of the micro-level personality-preference association on real estate market equilibrium outcomes.

Micro-level data for the analysis is based on an online survey that includes the Big Five Inventory (BFI) personality test (see description in Section 2), a series of individual ratings of preferences on real estate-related issues, and control information on personal background and socio-economic and demographic characteristics. A total of 1138 subjects – well distributed across gender, marital status, age, and income – participated in the survey. For the macro-level analysis, we use Rentfrow et al.'s (2013) cross-sectional state-level aggregate personality scores, along with state-level indicators on macro housing and mortgage attributes.

Our findings provide solid evidence on the correlation between personality traits and individual preferences over real estate topics. Specifically, we find that openness, conscientiousness, neuroticism, agreeableness, and extraversion associate with preferences over mortgage attributes such as loan-to-value level, fixed versus adjustable interest rate, and mortgage duration and housing attributes such as homeownership versus rental tenure modes. Moreover, we find evidence indicating that the detected micro-level personality-preference association conveys macro consequences on real estate market equilibrium outcomes. Specifically, we show that state-level aggregate personality scores associate with real estate market indicators such as homeownership rate, average loan-to-value ratio, and market share of adjustable-rate mortgages. We discuss our evidence in the context of the outcomes that emerged from previous empirical studies of personality. Our empirical results propose a new perspective for understanding individual and household preferences and choices and their effect on real estate market equilibrium.

The paper proceeds as follows. Section 2 provides background on the Big Five personality traits and the implied hypotheses for our research. Section 3 examines the association between personality and individual preferences in the real estate market, whereas Section 4 explores the association between state-level aggregate personality scores and real estate market indicators. Finally, Section 5 provides a summary and conclusion.

## 2. The Big Five personality traits: background and hypotheses

In contrast to being an evolutionary outcome of a purely psychologically based theory, the Big Five model emerges from a systematic taxonomy and factorial analysis of adjectives in the spoken language. That is, under the assumption that personality differences are reflected in the language, adjectives that describe traits are put into correlative personality trait clusters. This allows categorization and differentiation among essential traits – keys to a reliable personality model.

The original work of Allport and Odbert (1936) specified 18,000 adjectives in the English lexicon describing individual differences. The work on adjectives continued with Cattle (1943, 1945), Fiske (1949), Tupes and Christal (1961), Norman (1963), Borgatta (1964), Digman and Takemoto-Chock (1981), Costa and McCrae (1985), Goldberg (1990), and, more recently, Costa and McCrae (1992) and John and Srivastava (1999). From these efforts, the list of adjectives was clustered into five dimensions, known as the Big Five: (*a*) extraversion (versus introversion); (*b*) agreeableness (versus antagonism); (*c*) conscientiousness (versus lack of direction); (*d*) neuroticism (versus emotional stability); and (*e*) openness (versus closedness) to experience.<sup>3</sup>

Several self-reporting questionnaires (inventories) on the Big Five personality traits are suggested in the literature. These inventories differ in the substance and the number of facets that are chosen to represent each personality dimension. Personality inventories thus range from 10 to 240 questions. In this study, we use a relatively short self-reporting questionnaire (the BFI) that includes 44 questions and refers to 8–10 facets of each personality dimension. According to John and Srivastava (1999), the major advantages of the BFI are that it is clear and understandable to self-reporters and is sufficiently comprehensive to reliably evaluate personality, even though it is relatively short. The output of the BFI is a score on a continuous index ranging from one to five in each personality dimension.<sup>4</sup>

Following Costa and McCrae (1992), people scoring high on Neuroticism tend to feel tense, irritable, discontented, shy, moody, and not self-confident. Neuroticism is further characterized, among other features, as the degree to which a person experiences the world as threatening and beyond one's control (Hogan and Hogan, 2007). Lauriola and Levin (2001) and Paunonen and Jackson (1996) show that neuroticism negatively correlates with risk seeking. Correspondingly, in the tenure choice literature, homeownership (compared to rental) associates with a sense of security and stability (e.g., Ben-Shahar, 2007; Megbolugbe and Linneman, 1993; Colic-Peisker and Johnson, 2012), insuring against housing price fluctuations (Ben-Shahar, 1998, and Sinai and Souleles, 2005). Similarly, in the mortgage literature, adjustable-rate (compared to fixed-rate) mortgages impose greater interest rate risk on the borrower, whereas high loan-to-value ratio (LTV) imposes a greater financial burden in repaying the loan and thus greater default risk [see, for example, Campbell and Cocco, 2003 and Coulibaly and Li, 2009]. Finally, in the investments literature, real estate (compared to stock) investment is commonly perceived as less risky, offering diversification opportunities of the investment portfolio [e.g., Goodman, 2003 and Lorenz and Truck, 2008]. In light of the above, we hypothesize that, due to risk considerations, neuroticism, ceteris paribus, associates with the preference of homeownership over rental, fixed- over adjustable-rate mortgages, lower LTV levels, and real estate over stock investment.

*Conscientiousness* associates with efficient, organized, thorough, not careless, not lazy, and not impulsive [Costa and McCrae, 1992]. Empirically, it is also found to negatively correlate with alcohol

<sup>&</sup>lt;sup>2</sup> To that end, our proposed personality approach greatly differs from the traditional rationality-based approach to studying preferences in the real estate market. See, for example, Brueckner and Follain (1988), Campbell and Cocco (2003), Ben-Shahar and Feldman (2003), Coulibaly and Li (2009), and Fortowsky et al. (2011) for a partial list of rationality-based studies of mortgage choice; and see Rouwendal and Meijer (2001), Hofman, Halman, and Ion (2006), and Raya and Garcia (2012) for a partial list of rationality-based studies of housing attribute preferences. For behavioral- and psychological-based (although not personality-based) studies of preferences in the real estate market, see, for example, Ben-Shahar (2007) and Mori et al. (2010).

<sup>&</sup>lt;sup>3</sup> A similar classification was found in various languages, including Hebrew, Dutch, Turkish, Italian, and Russian (See, for example, John and Srivastava, 1999).

<sup>&</sup>lt;sup>4</sup> It should be noted that while many scholars adopt the Big Five classification and find significant evidence that correlates the Big Five personality traits with behavior, preferences, and affects (see the evidence reported in Section 1 above), several studies criticize the use of the Big Five. See Block (1995), Waller and Ben-Porath (1987), and Eysenck (1991). Responses to the critique and further support of the Big Five may be found, however, in Goldberg (1990, 1992), Costa and McCrae (1992), Trull and Widiger (1997), Hofstee (1994), and Digman (1997).

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