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WHY DID THEY NOT BORROW? DEBT-AVERSE FARMERS IN RURAL VIETNAM

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Nonborrowers are defined as debt averse if they have never borrowed in the past and prefer avoiding debt in the future, even when offered generous borrowing terms such as zero interest rates, zero collateral, and easy debt-forgiveness. Other nonborrower types have either borrowed in the past or are open to doing so in the future. To better understand nonborrowing behavior, credit preference types (CPTs) were measured among 575 low-income farmers in Mekong Delta, Vietnam. Among 208 current nonborrowers, 156 had never borrowed and only seven were credit rationed. Among never-borrowers, 102 were debt-averse. Thus, more than half of eligible nonborrowers (102 out of 201) were debt averse. This high prevalence challenges the assumption of unmet credit demand among the poor. Disaggregating CPTs reveals heterogeneity among nonborrowers that would remain observationally equivalent otherwise. We report reasons for not borrowing and investigate how observable characteristics influence the likelihood of debt aversion.

Keywords: Nonborrower; Nonborrowing behavior; Debt aversion; Reasons for borrowing; Credit preference types
JEL classification: O1, O3, Q1, R2

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1. INTRODUCTION

EXISTING studies of debt aversion have focused on university students (Eckel et al. 2007; Meissner 2016; Caetano, Palacios, and Patrinos 2019) or small businesses (Levenson and Willard 2000; Nguyen et al. 2020), in mostly urban environments or developed countries. To the best of our knowledge, our study is the first to measure debt aversion among farmers in a rural developing economy. We document a surprisingly high rate of prevalence of debt aversion and investigate the extent to which it is associated with observable characteristics, which include demographic information, big-five personality measures, (i.e., extraversion, agreeableness, conscientiousness, openness, and emotional stability), and economic variables measuring social capital, wealth, and income. We also present debt-averse farmers' self-reported reasons for avoiding debt, asking them to select reasons for their decision *not* to borrow.

We surveyed 575 smallholder farmers in Mekong Delta, Vietnam, 63.8% of whom carried one or more outstanding loans, referred to as *current borrowers* (CB, $N_{CB} = 367$). Another 18.4% had taken out a loan in the past or were open to borrowing in the future, referred to as *non-debt-averse* (NDA, $N_{NDA} = 106$) noncurrent borrowers. The remaining 17.7% said they would refuse to borrow even when offered a zero-interest-rate loan with no collateral requirements and easy borrowing terms in the event of default, referred to as *debt-averse* (DA, $N_{DA} = 102$) noncurrent borrowers. We refer to CB, NDA, and DA as credit preference types (CPTs). Thus, the prevalence of DA type was 17.7% overall (102 out of 575), or 49.0% among all nonborrowers (102 out of $208 = N_{NDA} + N_{DA}$).

We define DA farmers as those who have never borrowed, do not want to borrow at present, *and* have a preference against borrowing in the future. Thus, debt aversion codes a combination of revealed preferences (having never borrowed in the past and refusing an attractive loan offered in the present) and a hypothetical or stated preference about choices they will (not) make in the future.

Only seven out of 575 households said they were credit rationed (on the extensive margin), wanting to borrow but not being able to (or *expecting* not to be able to) find a willing lender. Thus, most nonborrowers in our data were nonborrowers by choice. We also checked for credit rationing on the intensive margin by asking borrowers the amount they had applied for versus the amount they were approved for (i.e., actual loan drawdown amount). Eighty-three percent of borrowers received the full amount they had requested, revealing, once again, little evidence of credit rationing (on the intensive or extensive margins). Thus, from the viewpoint of smallholder farmers, southern Vietnam appears to have sufficient availability of both formal and informal credit, consistent with previous empirical studies of credit access and utilization in rural Vietnam (Barslund and Tarp 2008; Phan et al. 2013).

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Despite the availability of subsidized credit and various programs encouraging loan uptake (by central government, local government, and NGOs active in Mekong Delta), our data reveal that a substantial proportion of eligible potential borrowers are observed to carry out precisely zero-credit transactions. The non-borrower proportion among the eligible (after removing the seven who were credit rationed) was 35% ≈ (208 – 7) / (575 – 7). When considered in conjunction with failures to achieve widespread uptake of subsidized credit in other countries as documented in previous studies (Hoff and Stiglitz 1990; Pham and Lensink 2007), this result points to the question of "why?", which provides further motivation for the policy relevance of debt aversion as a research priority.

To address this question of why so many people who are eligible to borrow refuse to do so (i.e., low-income farmers who policymakers assume could benefit from greater credit utilization), we investigate heterogeneity of CPTs among eligible nonborrowers. It should be acknowledged that Barslund and Tarp (2008) caution against one-size-fits-all answers to this question. To make progress, we consider a simple disaggregation that splits noncurrent borrowers into two types. The first type (NDA) is open to borrowing in the future if the borrowing terms are sufficiently generous (e.g., low-interest rates and limited collateral requirements). The second type (DA) prefers not to borrow "even if interest rates were zero and there was no collateral requirement" (as stated in our survey). This question that we used to elicit nonborrowers' credit preference types (CPTs) is a modified version of Nguyen et al.'s definition of DA types, described as people who "did not apply for formal loans specifically because [the respondent did] not want to incur debt" (2020, p. 2). Their study focused on aversion to formal credit, whereas ours focuses on debt aversion with respect to all available types of credit (including informal).

Various definitions of debt aversion (sometimes not referred to explicitly as such) were used in previous research. For example, Levenson and Willard (2000, p. 83) study "creditworthy firms that decide not to apply for desired external financing." Meissner (2016, p. 283) defines individuals as debt averse if they are "less willing to borrow than … to save in order to smooth consumption." In the context of consumer behavior, Walters et al. (2016) develop a four-item survey instrument referred to as the "debt attitude scale" and classified survey responses scoring above a threshold on that scale as debt averse. And Caetano, Palacios, and Patrinos (2019) report framing effects in an experimental treatment in which one of two identical cash flows is labeled as "debt" as an instance of debt-averse behavior.

In studies seeking to measure determinants of credit demand, people are typically coded as having zero-credit demand if they have no outstanding loans in a retrospective time (e.g., the previous 12 months) or at the time the data is collected (Phan et al. 2013). Empirical models in the credit demand literature

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typically estimate marginal effects of explanatory variables such as age (Barslund and Tarp 2008), income (Karaivanov and Kessler 2018), farm size (Kochar 1997), or borrowers' collateral (Pham and Lensink 2007) on the probability of borrowing or the expected amount borrowed. People with zero-credit demand are not the primary focus in such studies. Nonborrowers are sometimes excluded entirely from the estimation dataset or show up only indirectly in a selection equation (the conditional probability of being a borrower), unreported in many cases because it is regarded as an auxiliary step. Understanding the determinants of nonborrower status and the heterogenous causes, motives, or preference types that influence its probability remain relatively understudied. This gap in the literature motivates us to focus on nonborrowers, their characteristics, and heterogenous preference types.

We undertake to empirically characterize and distinguish CPTs, especially among nonborrowers, motivated by the context of policy challenges related to loan programs in developing countries not achieving their desired rates of uptake and gaps in the empirical literature regarding heterogeneity of CPTs. We report statistical associations employing multinomial logit models of an unordered discrete dependent variable (CPT $\in$ {CB, NDA, DA}), conditional on demographics, personality, and economic explanatory variables. We also present self-reported reasons for not borrowing and discuss prospects for segmenting the population of farmers who are potentially eligible for subsidized credit with different types of loan offers, incentives, or modes of communication appealing to each segment's distinct CPT.

The remainder of this article is structured as follows. Section 2 summarizes the relevant literature. Section 3 describes our data and method. Section 4 presents the main results based on self-reported reasons for avoiding debts and a regression model investigating factors influencing the decision to borrow, not to borrow, or avoid debts. Section 5 presents a discussion and conclusion.

2. LITERATURE

There is, by now, substantial empirical literature investigating farmers' borrowing decisions (e.g., binary choice models of borrower status, regression models of the amount borrowed or debt levels, and discrete dependent variable models of choice over formal versus informal credit). As motivation for our disaggregation of nonborrowers by CPTs, we observe that, in this literature, people who became nonborrowers for different reasons are typically aggregated into a single nonborrower reference class or excluded from the kinds of empirical models mentioned above. Although the voluminous literature on credit rationing includes sophisticated econometric advances toward distinguishing those who are credit rationed from those who become nonborrowers for other reasons, we are

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unaware of any empirical studies in the development literature that disaggregate nonborrowers into NDA and DA types. The literature discussed below guides our selection of explanatory variables to include in the conditional empirical models of debt aversion and provides useful benchmarks against which to compare our results.

Explanatory variables in previous studies that were found to significantly influence the probability of choosing a particular type of credit include the following: the household head's sex (Kochar 1997; Pitt and Khandker 2002; Petrick 2004), age (Barslund and Tarp 2008), education (Kochar 1997), household size (Yadav, Otsuka, and David 1992), dependency ratio (Kochar 1997; Barslund and Tarp 2008), wealth and income (Siamwalla et al. 1990; Karaivanov and Kessler 2018), and experimentally measured trusting behavior (Etang, Fielding, and Knowles 2011). Assets used to generate farm income (e.g., landholding size and livestock value) are frequently used as explanatory variables in empirical models of credit demand (Siamwalla et al. 1990; Tsai 2004, Barslund and Tarp 2008; Karaivanov and Kessler 2018). In their study of risk preferences among farmers in Vietnam, Nielsen, Keil, and Zeller (2013) argue that social capital is an important conduit for accessing credit which, in turn, serves as a critical tool for low-income households to cope with risk. Following these studies, we tried to include similar sets of demographic and economic variables measuring social capital, land assets, and household expenses and income.

Regarding the so-called big-five personality measures, Nyhus and Webbley (2001) and Brown and Taylor (2014) estimate the effects of these measures on household borrowing decisions and debt levels. Nyhus and Webbley (2001) find that agreeableness and emotional instability (also known as neuroticism) were both positively associated with higher debt levels. Confirming those findings, Brown and Taylor (2014) also find that extraversion was associated with higher debt levels.

Previous studies have investigated self-reported reasons for not borrowing among firms or households that were credit constrained. Bigsten et al. (2003) focus on credit constraints among manufacturing enterprises in six African countries. They found that 34% of managers did not apply for a loan because they did not need one; 17% lacked adequate collateral or said interest rates were too high; 14% said they already had debt or did not want to become (further) indebted; 12% thought the lender would refuse their loan application. Chen and Chivakul (2008) use a large household panel dataset from Bosnia and Herzegovina to estimate how demographic information affects the probability of being credit constrained. They reported that "not needing a loan" was the most frequent self-reported reason (36%), followed by "not liking being in debt" (19%), high borrowing costs (15%), not knowing any lenders (11%), a belief by the respondent that their loan application would be refused (10%), insufficient collateral (7%), and other reasons (3%).

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Dupas et al. (2016) present self-reported reasons (not mutually exclusive) among poor households in Western Kenya for not taking out a loan, which include fear of losing collateral in the event of default (51%), unwanted risk of being unable to repay (45%), other reasons (38%), not having a plan to present to the bank (27%), inability to pay off the loan (18%), no need for borrowed funds (14%), hassle costs (12%), distrust of the bank (9%), not liking the idea of being in debt (8%), and already carrying too much debt (1%).

3. DATA AND METHOD

3.1. Research Design, Geographic Location, and Method of Recruitment

Written approval for data collection was granted by the Soc Trang Province People's Committee and University of Otago's Human Ethics Committee (application #20/009). Data collection took place from July to September 2020. This section discusses the locations where data were collected and the research design considerations underlying their selection.[1] All data were collected in Soc Trang Province (STP), in part, due to opportunity. The first author was born there and his work experience in this region enabled him to receive written approval from the provincial government to conduct field work there. Commune-level local government officials (the approximate equivalent of local city council that sits under provincial government) helped us draw a random sample from an exhaustive list of households living in the commune.

Another reason was the region's recent history of agricultural entrepreneurship (often debt-financed) among smallholder farmers and its rapid trajectory of economic development over the last three decades. STP is, we believe, a typical province in terms of per capita income growth in rural Mekong Delta, although STP was, and remains, among the poorest provinces. Monthly income per capita increased approximately fourfold from 1997 to 2018 in Mekong Delta (GSO 1997; 2019a) and its growth in agricultural exports is widely acknowledged to have played an important role in improving the standards of living for many rural families in southern Vietnam, although persistent poverty remains challenging in some locations (MOLISA et al. 2018). Recent empirical studies have documented upward mobility in Vietnam (Fujita 2020) and in Mekong Delta in particular (Kojin 2020).[2]

[1] This article is part of the first author's PhD thesis titled "Credit Utilization, Multidimensional Poverty and Preferences of Farmers in Vietnam: An Empirical Investigation in Rural Mekong Delta."

[2] These papers appeared as part of a special issue titled "Pathways to Prosperity in Vietnam: Structural and Transitional Inequality in the Distribution of Opportunity," *Developing Economies* 58, no. 4 (December 2020).

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This history led us to expect that random samples of farm households in STP would provide econometrically useful sample variation in farmers' wealth, income, and their decisions about whether—and how—to use debt (e.g., in undertakings aimed at improving farm productivity and/or for purposes of consumption smoothing). Because of Mekong Delta's important role in the economic development strategies of Vietnam's government, international development organizations, policymakers, and NGOs have been active in promoting uptake of subsidized credit in the region for over three decades. Prominently included among these development goals has been to encourage cultivation of new varieties of rice, fruit, and aquaculture; adoption of new production techniques to improve farm productivity; and new land management practices to achieve improvements in environmental sustainability (Benedikter et al. 2013).

More than two-thirds of STP dwellers live in rural areas, and 83% of land area in the province is used for agricultural production. Agriculture accounts for 45% of STP's regional GDP (SOSTP 2019). Its physical geography is mostly "low terrain" (e.g., 250 meters or less above sea level). The eastern boundary of STP is the Hau River (downstream from the Mekong River), where substantial quantities of rice, fruit, and freshwater and saltwater aquaculture products are produced (People's Committee of Soc Trang Province 2016; SOSTP 2019). Multioutput farming (rather than monoculture) is common. Agricultural land area is allocated (not mutually exclusively, and therefore summing to more than 100%) as follows: 86% rice growing, 19% aquaculture, and 15% fruits and annual crops, with additional percentages multiply allocated for livestock, salt production, and forestry (SOSTP 2019).

Regarding how representative our sample is with respect to the rural population of STP or rural Vietnam as a whole, we acknowledge that this question is not easy to assess. Even the nationwide survey, the Vietnam Household Living Standards Survey (VHLSS), includes very small samples of three or so households collected from only 48 of the 99 communes reported to exist in STP. In recent waves of the VHLSS, only around 150 households were sampled from STP, which means that precise information about the demographic composition of any specific commune was unavailable. The issue of external validity with respect to rural developing economies in other parts of Vietnam and overseas is discussed subsequently.

As shown in Appendix Figure 1, we selected 16 rural communes in a semi-checkerboard spatial pattern, aiming for approximately uniform spacing around Soc Trang City, which is one of the urban areas located near the province's geographic center. Communes were selected with the goal of capturing as much sample variation as possible in demographics, land quality, and farm type (rice and fruit cultivation, aquaculture, or livestock). Two communes were selected

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along the major river that defines the province's primary river boundary to the east, where some farmers engage in freshwater aquaculture. Two communes were selected along the southern coastal boundary, where some farmers engage in saltwater aquaculture. Some geographically interior communes also have access to "saltwater rivers" and interior bodies of water with mixes of freshwater and saltwater that some farmers use for saltwater aquaculture (which, we note, is therefore not an exclusively coastal production activity). To span as much geographic variation as possible, one commune was selected on the northern boundary line and nine interior communes were selected to provide variation in local rainfall and river-water salinity from 12 weather stations dispersed geographically throughout the province (as shown in Appendix Figure 1). One of the interior communes was a specially designated farmer commune in the central city comprised of farmers who reside in the city (presumably enjoying the broadest access to formal and informal credit providers) but work rural land they own outside the city.

We planned to survey 36 randomly chosen household heads in each of the 16 communes shown in Appendix Figure 1. This target was achieved in all but one commune, where 35 (instead of 36) surveys were collected, resulting in a sample of 575 households. The unit of observation for most of this paper (aside from loan-level analysis reported later) is a head of household, which we will refer to synonymously as a farmer.

We contacted each of the 16 communes' local governments, requesting access to their official list of resident households, grouped by village (*ấp*, sometimes translated as "hamlet"), of which there were around 10 villages in the communes we visited. Following the usual record-keeping protocols used by local governments throughout Vietnam, these commune-specific lists of households were listed in alphabetical order and enumerated by consecutive integers (with no systematic link between the list order and the spatial geography of the village) for each household in a village (typically around 200 households per village). Following survey methodology used by methodologically rigorous external research teams that have collected data in rural Vietnam, we first asked the local government official with access to the official list how many villages there were in the commune, and selected one village at random. Then we asked how many households were in the village, and randomly selected 36 integers corresponding to households. The timing of data collection was chosen to avoid harvest times and maximize the chance of finding randomly selected household heads at home.

After door knocking at a randomly selected household, it was announced that we would pay a "show-up" fee of NZ$2 to the household head (worth US $1.34 at the time) if they agreed to participate in a one-hour survey. This fee was

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the equivalent of around 3.6 hours of low-skilled agricultural work.[3] Those we approached were enthusiastic to participate. Very few said they were too busy or refused to participate. When no household head was at home at the time of our visit, we visited at geographically adjacent households until we found a household head who was at home. Data were recorded by hand by a team of roughly 10 data collectors (including free-text responses to open-ended questions) who were lecturers and students at a local community college. Data collectors were trained to standardize the surveying technique and data-recording protocols.

The local government official introduced us to the household head and then departed, leaving one of our data collectors to complete the survey in private inside the household head's home. Before beginning the survey, participants were informed that their names and any identifying information would not be recorded anywhere in our data. Participants appeared to have spoken candidly about debt and loans they had applied for (successfully or unsuccessfully) and other private financial information.

3.2. Details of Data

Households were the primary unit of analysis as shown in the upper part of Figure 1, which summarizes household counts by three mutually exclusive CPTs. Loans appear as a secondary unit of analysis in the lower part of the figure, which we only make use of in passing.[4] Our main focus is nonborrowers (NDA and DA types) and comparing household-head characteristics across the CB, NDA, and DA types.

We asked household heads whether they had any outstanding loans, their reasons for borrowing, and their reasons for not borrowing from each of three types of formal lenders: (1) commercial banks, (2) two state-owned-enterprise banks,[5] through which the central government offers well-known and widely-utilized subsidized credit programs—the Vietnam Bank for Social Policies (VBSP) and Vietnam Bank for Agricultural and Rural Development (VBARD), and

[3] According to the GSO (2018), average monthly earnings among the low-earning group in rural Vietnam was VND 1,489,000 (US$64.74) as of 2018. Average earnings per hour of US$0.37 was calculated under the assumption of 22 eight-hour workdays per month. At the time the data were collected, the exchange rate was approximately US$1 = VND 23,000.

[4] Appendix Figure 2 compares the amounts applied for versus the amounts CB types actually received (i.e., drawdown amounts), aggregating over each household's possibly multiple loans (511 loans among 367 CB types in Figure 1) back up to the household level of observation, to check for credit rationing (among CB types) on the intensive margin.

[5] According to their official websites, VBSP is not for-profit, but VBARD is a limited liability corporation that has both not for-profit (70% of loans) and for-profit divisions. We acknowledge that our English-language labels for VSBP, VBARDs, and other lending institutions' organizational types are approximate.

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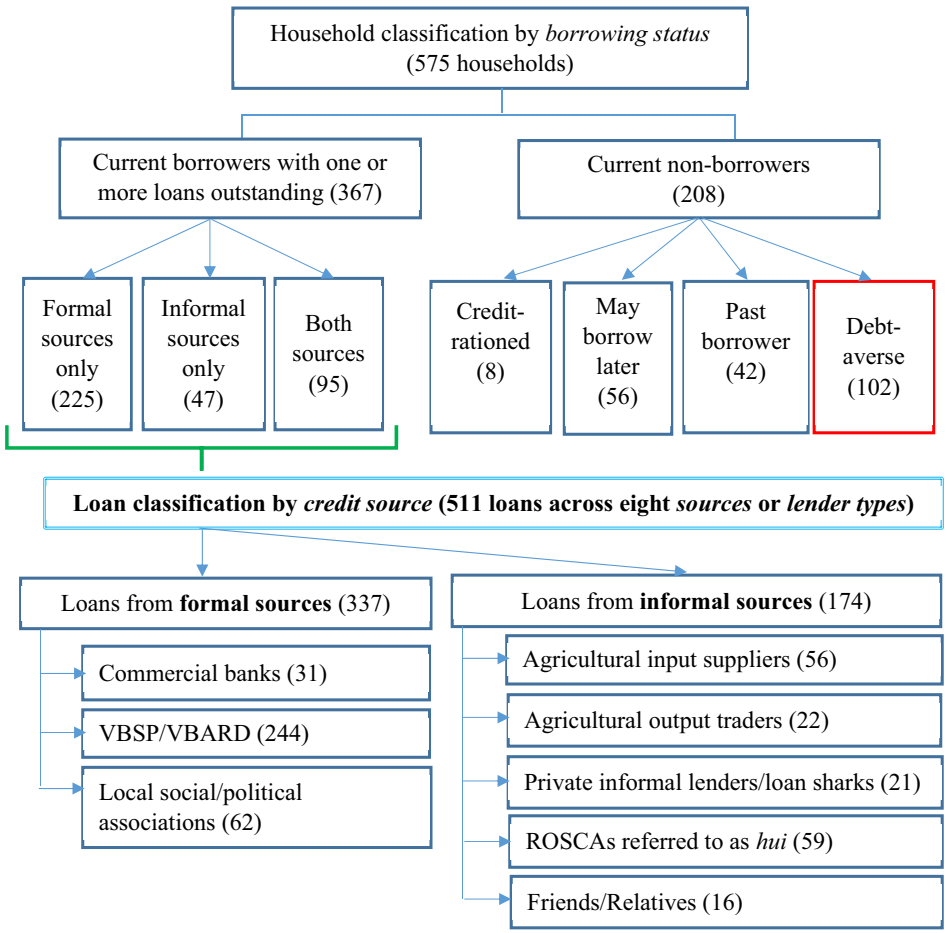
Figure 1. Classification Scheme for 575 Household-Level Observations of CPTs



Note: CPTs = credit preference types.
[Colour figure can be viewed at wileyonlinelibrary.com]

(3) not-for-profit local social/political associations. We also asked the same questions (did you borrow?, why?, or why not?) about each of the five types of informal credit shown in the lower part of Figure 1 (one by one): (1) agricultural input suppliers that offer in-store credit for purchasing farm inputs (e.g., seed and fertilizer), which the farmer repays after harvesting and selling their farm output, (2) agricultural traders (intermediaries) that offer immediate cash to farmers in exchange for the farmer forward-selling their future farm output at a discount, (3) rotating savings and credit associations (ROSCAs), (4) private informal lenders, and (5) friends and relatives. Figure 1 shows the responses as two

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empirical frequency distributions with distinct units of observation. The upper part counts CPTs among household observations. The lower part counts loan types among all loans that current borrowers carry. We also asked if they had borrowed from any other types of credit sources and found, without exception, that all lending institutions that they had heard of operating in Mekong Delta fit cleanly into one of the eight types of credit discussed in this paragraph and summarized in Figure 1.

Among current borrowers in Figure 1, the 95 carrying debt from both formal and informal lenders demonstrate that the rural credit system in STP is characterized by the coexistence of formal and informal credit sources as has been similarly reported in rural areas elsewhere in Vietnam (e.g., Barslund and Tarp 2008). This concurrent use of formal and informal credit sources is already well documented in the literature. In the remainder of this article, we focus on describing DA types in greater detail and testing whether their observable characteristics are distinct from those of other noncurrent borrowers (i.e., NDA type).

3.3. Coding Debt-Averse (DA) Noncurrent Borrowers

We coded farmers as *DA* if the following three conditions are satisfied:

1. They have never borrowed in the past or at present (answering "no" nine times consecutively in response to the question: "Has your household ever borrowed money… from any of the following sources [*s*]?," where *s* indexes over the three formal and five informal credit sources in the lower part of Figure 1 as well as other sources).
2. They selected "I did not want to borrow," in response to the forced-choice question: "Why did you not borrow?" (asked only of non-current-borrowers), with only two response options offered (the other response option being "I wanted to but could not"—i.e., credit rationed).
3. They answered "no" in response to the question: "In the future, if there is any reason you need money, would you borrow?"

We believe the high incidence of DA types in Figure 1 is a novel descriptive finding. The remainder of the descriptive statistics in this section investigates whether DA type has observable characteristics distinct from that of the other two CPTs. Observable characteristics that may or may not help differentiate DA type include demographics, the big-five personality measures, and six economic variables with plausible theoretical links to CPTs identified in previous studies of credit access and utilization. These include: (1) social capital, measured as a binary indicator identifying households in which one or more family members work at a formal lending institution or are party members or other political and social associations, (2) the physical area of land the farmer uses in agricultural production, (3) the market value of the farmer's housing, which, in almost all cases, is on a

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separate title from the farmer's land used in agricultural production, and (4) household expenses and total household income inclusive of total farm and nonfarm income of all household members. The intuitive question motivating this search for correlates of DA type relates to how researchers and economic development institutions might identify which kinds of people tend to be DA (i.e., their profile of typical characteristics), better understand why, and perhaps offer different interventions to DA versus NDA types assuming the goal of policy is to help both groups lift their standards of living.

3.4. Summary Statistics Searching (Mostly Unsuccessfully) for Observable Correlates of DA Type

Household demographics are summarized in Table 1, broken down by the three mutually exclusive CPTs (CB, NDA, and DA). Household heads were 87% male, had mean age of 54.0 years old, and had 5.7 years of schooling on average (88% had primary school or higher, which is typical of rural Vietnam's high literacy rate). Only 33% were *Kinh* (the majority ethnic group in Vietnam's overall population) and 67% were non-*Kinh* (65% Khmer and less than 2% other minority ethnic groups). Five percent lived in a multiethnic household with one or more members belonging to a different ethnic group than the household head.

Compared to the NDA type, the last three columns of Table 1 show there were significantly larger proportions of DA household heads that were f*emale* (20% versus 12%, $p = 0.021$) and ethnic minority (73% versus 59%, $p = 0.046$). On average, DA farmers scored slightly lower than NDA farmers did on the big-five *Conscientiousness* measure (70% versus 74%, $p = 0.110$). The only other statistically significant difference in Table 1 was that the NDA type had slightly more valuable real estate (although not by much).

The challenge of finding observable characteristics that distinguish DA type is noteworthy. Appendix Figure 3 shows there was no evidence of statistically significant differences by CPTs for rates of home ownership (93%–95% across all three types), the number of dwellings on the household's land, square meters of living area, square meters of farm production area, and households' multigenerational homeowner tenure. Appendix Figure 4 shows there was no evidence of differences by CPT (i.e., little separation between the three types' overlapping empirical distributions) in household income, living expenses, farming revenue, farming costs, and net farming income. Appendix Figure 5 and Appendix Table 1 break down farming revenue and production costs by three farm types—growing (rice and fruits), aquaculture, and animal husbandry or livestock—showing, once again, no statistically significant differences. Further unsuccessful attempts are shown in Appendix Figure 6 (education differences) and Appendix Figure 7, which present age-sex interactions by CPTs, looking for empirical separation in the predicted probabilities of DA and NDA types, but with very little statistical differentiation across the entire age range.

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Table 1. Subsample Means by CPTs and Full-Sample Summary Statistics

Variables	Subsample Means			Full Sample					*p*-value for Null of Equal Subpopulation Means† Corresponding to 3 Hypotheses		
	CB	*NDA*	*DA*	Mean	Min	Median	Max	SD	*CB* = *NDA* = *DA*	*CB* = (*NDA*∪*DA*)	*DA* = *NDA*
Demographics									(2 restrictions)	(1 restriction)	(1 restriction)
Female	0.12	0.08	0.20	0.13	0.00	0.00	1.00	0.33	0.039	0.438	0.021
Age	53.61	55.06	54.44	54.03	20.00	54.00	90.00	12.16	0.522	0.280	0.741
Education	5.75	5.60	5.40	5.66	0.00	5.00	16.00	3.72	0.696	0.449	0.683
Minority ethnic HHH	0.67	0.59	0.73	0.67	0.00	1.00	1.00	0.47	0.129	0.776	0.046
Multiethnic HH	0.06	0.07	0.03	0.05	0.00	0.00	1.00	0.23	0.453	0.641	0.217
Big-five personality											
Extraversion	0.53	0.56	0.54	0.54	0.00	0.58	1.00	0.19	0.317	0.182	0.484
Agreeableness	0.70	0.70	0.71	0.70	0.17	0.67	1.00	0.15	0.902	0.909	0.662
Conscientiousness	0.73	0.74	0.70	0.73	0.17	0.75	1.00	0.15	0.220	0.504	0.110
Openness	0.51	0.49	0.44	0.50	0.00	0.50	1.00	0.22	0.432	0.232	0.672
Emotional stability	0.61	0.59	0.52	0.59	0.00	0.58	1.00	0.20	0.325	0.141	0.673
Social capital, wealth, and income											
Social capital	0.05	0.02	0.03	0.04	0.00	0.00	1.00	0.20	0.315	0.141	0.620
ln(*productive land area*)	8.84	8.95	8.92	8.87	0.00	8.99	11.96	1.36	0.700	0.404	0.886
Home owner	0.95	0.93	0.95	0.95	0.00	1.00	1.00	0.22	0.714	0.549	0.599
ln(*market value of home*)	12.25	12.56	12.26	12.31	0.00	12.21	15.42	1.03	0.019	0.059	0.019
ln(*living expenses*)	10.93	10.89	10.87	10.91	8.83	10.90	12.39	0.47	0.538	0.297	0.726
ln(*income HH*)	11.91	12.08	12.13	11.98	0.00	12.18	15.02	1.63	0.368	0.161	0.792
Obs.	367	106	102	575					575	575	208

Note: CPTs = credit preference types, CB = current borrowers, NDA = non-debt-averse, DA = debt averse.
†For binary explanatory variables, *p*-values are reported for chi-squared tests of the null hypothesis of equal proportions across the subsamples included in each of the last three column headings. For nonbinary explanatory variables, *p*-values are reported for the *F*-test in Stata's *mvtest* command which assumes joint normality of the explanatory variable across CPTs.

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3.5. Ethnic Composition

Vietnam's majority ethnic group, *Kinh*, comprises a significantly smaller proportion of STP's farmer population than in rural populations elsewhere in Vietnam. According to GSO (2019b, p. 204), the province is known to have a relatively large population of Khmer people (30% of the province's overall population including its urban center—which may or may not be representative of the province's rural or farmer populations whose true ethnic compositions were unavailable in the Vietnamese census data we had access to—and 45% of the 163 farmers sampled from STP in the 2016 waves of the VHLSS). The proportion Khmer in our sample was 65%. Without census data specific to the STP's rural or farmer population, it is difficult to say which percentage is more representative of the province's population of farmers.

According to the available census data, the Khmer proportion of Vietnam's population as a whole is 1.4% (GSO 2019b). We can be confident that the proportion Khmer in the province's true population is substantially higher. Thus, the province's rural population is not representative of rural Vietnam as a whole in terms of ethnic composition. Furthermore, our sample may also underrepresent ethnic majority *Kinh* farmers with respect to the province's actual farmer population. We, therefore, investigate whether these issues of representativeness are likely to bias the estimated rate of debt aversion and subsequent statistical models of CPTs.

There was no statistically significant bivariate association (chi-squared test) between CPTs and the four ethnic groups in our sample ($p = 0.562$). Other than Khmer, the 10 household heads in our sample who self-identified as non-Kinh included 9 *Hoa* (Han Chinese ancestry, thought to be around 0.8% of Vietnam's population [GSO 2019b]) and 1 *Cham*, which is a Muslim ethnic group (thought to be around 0.14% overall). Excluding the 1 *Cham* farmer due to insufficient sample size (who was a CB type), this absence of any association between ethnicity and CPT remains ($p = 0.369$). Recoding ethnicity as the binary indicator *minority ethnic HHH* (for non-*Kinh* household heads in Table 1) does not reject the null of equal proportions of CPTs either ($p = 0.129$).

The proportion of DA by ethnicity is 15% among *Kinh* and 19% among non-*Kinh* ($p = 0.161$ when DA and ethnicity are both coded as binary using the full sample). Appendix Figure 8 shows ethnic distributions by CPTs, revealing little evidence of any significant differences in rates of DA by ethnicity. The one place where ethnic subpopulations *do* exhibit statistically significant differences is in the final column of Table 1, where we tested the null of equal proportions of *minority ethnic HHH* only among the subsample of 208 noncurrent borrowers: 59% versus 73% ($p = 0.046$) in the NDA and DA subsamples, respectively, which may or may not constitute an economically significant difference, depending on context.

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3.6. External Validity

Regarding the external validity of our estimated prevalence of debt aversion of 18% (≈102 / 575) among smallholder farming households—or 51% ≈102 / (208 – 7) among eligible non-borrowing households—it must be acknowledged that this question can only be addressed conclusively in future replication studies with data collected in other locations. Some speculation is possible, however. In league tables of GDP per capita among Vietnam's 58 provinces and 5 comparable provincial-level administrative units, STP is one of the poorest in Vietnam[6] and most multiethnic in Mekong Delta. Therefore, one could argue that STP is *more* representative, at least in some respects, of developing rural economies outside Vietnam than the rest of rural Vietnam is. In our review of multiple annual reports published by Vietnam's General Statistics Office, STP would appear highly representative of the economic development "success story" (especially among the lower half of rural Mekong Delta's income distribution in terms of credit access, farm entrepreneurship and rapid increases in the standard of living over the last three decades), as described in the following passage:

> Vietnam is a remarkable success story of rapid growth, poverty reduction, and shared prosperity. Beginning with the launch of the Doi Moi reforms in the late 1980s Vietnam has sustained rapid economic growth rates that catapulted the country from the bottom ranks of poor nations to middle-income status in one generation. With GDP growth averaging 5.5 percent annually, real per capita GDP more than tripled between 1990 and 2014, and more than 40 million people were lifted out of poverty, using the national poverty line. Extreme poverty has been nearly eliminated. Unlike other fast-growing economies, Vietnam has not experienced major increases in income inequality, with its income Gini coefficient (0.39 in 2012) remaining substantially lower than China, Indonesia, and Thailand. The country has achieved widely shared prosperity: average consumption of the bottom 40 percent of the consumption distribution (bottom 40) grew 6.8 percent annually over the period 1993-2014. Social indicators have also greatly improved, underpinned by wider access to basic services including broad access to primary education, health care, and vital infrastructure such as paved roads, electricity, piped water, and sanitation. (World Bank 2016a, p. 9)

Readers may wonder whether Vietnam's relatively recent history of land reforms might limit the external validity of our findings on debt aversion. According to some authors (e.g., Bui and Preechametta 2016; World Bank 2016b), this history could have negatively affected entrepreneurial incentives, farm productivity, and, therefore, farmers' attitudes toward debt-financed investment. Should we worry about whether the high prevalence of debt aversion is special to STP or southern Vietnam? Or can we interpret our findings as

[6] Ministry of Labor, Invalids and Social Affairs of Vietnam (MOLISA). 2016. Decision 1095/QD-LDTBXH Approving the Results of the 2015 Census of Poor and Near-Poor Households.

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generalizable to other parts of Vietnam and to other developing rural economies with their own histories of land ownership (cf. the development literature regarding expropriation risk—for example, Akhtaruzzaman, Berg, and Hajzler 2017)?

Authors writing from various (often opposing) political perspectives seem to agree that the collectivization of Vietnamese farms, which took place from 1954 through 1975, was far more widespread and long-lived in northern Vietnam than in the south (Wolz and Duong 2010). By all accounts, there were significant drops in farm productivity that led to food shortages in the 1970s (World Bank 2016b), but Vietnam's government recognized there were misaligned economic incentives and addressed them (at least in part) with de-collectivization and market-oriented reforms (i.e., the *doi moi* "opening up" policies from 1986 onwards), including land use rights (LURs), which gradually became tradable, bequest-able, and usable as collateral for bank loans (Article 77 in the Land Law of Vietnam in 1993, further liberalized in 1998).

Regarding debt aversion, a relevant question that could be asked is whether historical memory of land redistribution should be considered among the hypotheses that could, in theory, explain the observed prevalence of debt aversion in STP. We have little reason to believe that was the case, especially in light of widespread debt-financed agricultural entrepreneurship there, which has been, and currently is, observable throughout Mekong Delta. This would be consistent with the region's agricultural export growth, the emergence of numerous successful agricultural startups, its success attracting FDI from the 1990s through present[7], and the widespread use of credit observed as the modal CPT in Figure 1 and Table 1 (i.e., well over half of farmers were CB type (63.8%) and, among them, the average number of loans was 1.4 per household). Debt-financed entrepreneurial activity and productivity-enhancing innovation are supported by numerous government policies and would appear to have broad social license among smallholder farmers in STP in particular and throughout Mekong Delta and Vietnam in general.

3.7. Debt-Averse Noncurrent Borrowers' Reasons for Not Borrowing

Relating to the previous discussion of external validity, we have additional descriptive findings in the form of self-reported reasons for having chosen not to borrow. For each of the eight credit sources in Figure 1, farmers who had not borrowed from that source were asked, "Why did you not want to borrow?", with "select all that apply" options (see Table 2).

[7] The Government's Decision No.1237/1992/HD-BT was of particular relevance to rural farmers (in the context of the raft of policy changes in the direction of economic liberalization under *doi moi*), because it permitted farmers to become exporters. Farmers became independent producers selling (most products) at unregulated market prices. Agricultural productivity grew rapidly as a result (World Bank 2016b). By 1989, Vietnam had switched from importing to exporting rice.

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Table 2. Reasons Why Debt-Averse Non-Borrowers Did Not Want to Borrow

Reasons	Frequency	%
I have enough savings and do not require any borrowed funds for my needs.	44	43.1
I do not want to spend time/money/hassle traveling to see the lender.	40	39.2
I do not want the hassle of collecting land ownership documents and presenting them to a bank.	37	36.3
Unsure if I will be able to repay the loan.	30	29.4
I do not want the hassle of filling out loan-application documents.	25	24.5
I am worried that creditors could take my land or other possessions in the event that I could not repay the loan.	15	14.7
I think I can get the free support from other sources (i.e., aid programs of the government, social/political associations).	5	4.9
Other (e.g., too old to repay the loan)	4	3.9

Note: Percentages are calculated based on debt-averse households ($N_{DA} = 102$) who do not want to borrow (i.e., whose credit demand is zero). The choice of reasons are not mutually exclusive and the average participant chose 1.9 reasons for not borrowing. Because of these multiple reasons given, the sum of percentages is not 100%.

The most frequent reasons that DA farmers gave were: already having enough money; hassle costs and inconvenience of applying for a bank loan; collecting land ownership documents; uncertainty about debt repayment; and the eligibility rules at subsidized credit institutions requiring that borrowers exhaust all savings before becoming eligible to borrow. Among DA type in our sample, 43.1% said they already had enough savings for their needs, which was also the most cited reason for being a nonborrower in Bigsten et al. (2003) and in Chen and Chivakul (2008), as well as being the third most frequently cited reason in Dupas et al. (2016). 39.2% said that the hassle costs of traveling to the lender's location was a reason, again, similar to Bigsten et al. (2003) and Chen and Chivakul's (2008) findings; and 36.3% said they did not want the hassle of collecting land ownership documents and presenting them to a bank. The hassle of filling out loan application documents was selected by 24.5%. Fear of being unable to repay debt was selected by 29.4% in our data, which contrasts with 45% in Dupas et al. (2016). Fear of losing collateralized assets was selected by 14.7% in our data, which contrasts with 51% in Dupas et al. (2016), although our finding is broadly consistent with Tran's (2014) findings from southern Vietnam in which participants said they were unwilling to pledge land as collateral because land was their most valuable asset. Another noteworthy contrast was that no one in our DA sample cited lack of collateral as a reason, compared with 17% of participants in Bigsten et al. (2003). Interestingly, 4.9% in our DA sample said they would not borrow in the future because they expected to receive free aid in an emergency.

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3.8. Reasons Given by Non-Debt-Averse Noncurrent Borrowers (NDA) as to Why They Would Consider Borrowing in the Future

It is noteworthy that the only formal credit sources that NDA farmers said they *would* consider were two subsidized lenders (VBSP/VBARD and local social/political associations). Frequently selected reasons were low interest rates, quick disbursement, easy lending procedures, and reasonable penalties for late repayment. Regarding informal credit sources, some NDA farmers also said they would consider borrowing from agricultural input suppliers, agricultural output traders, or private informal lenders because of quick disbursement and easy lending procedures. Friends and relatives were the least popular informal credit source among NDA types' hypothetical preferences (and also among CB types' revealed preferences in Figure 1, accounting for only 3.1% of borrowers' loans), in line with Lee and Persson (2016) and Ojong (2019) but opposite of Tran (1998).

3.9. Multinomial Logit Model of Credit Preference Types (CPTs)

To pursue the possibility of overlooked statistical separation between CPT in a multivariate model, the following section presents estimates from a multinomial logit model of the three-value unordered discrete dependent variable *CPT*:

$$\Pr(CPT_i = j) = \frac{e^{Xib(1)}}{e^{Xib(1)} + e^{Xib(2)} + e^{Xib(3)}} = j, \text{for } j \text{ in} \{1, 2, 3\}, \tag{1}$$

where X_i represents the 1×16 row vector of observations for the explanatory variables in Table 1 for household head i, and $b(j)$ represents a conformable column vector of parameters estimated by maximum likelihood estimation that jointly determine the marginal effects reported in the next section. The multinomial logit model, of course, depends on the well-known independence of irrelevant alternatives (IIA) assumption, which we tested for following the procedure given by Hausman and McFadden (1984) without rejecting the null hypothesis of IIA.

4. RESULTS

Table 3 presents the average marginal effects of the explanatory variables in Table 1 on CPTs, measuring changes in the predicted probabilities of CB, NDA, and DA, respectively, associated with a one-unit change in each explanatory variable. Model A includes only demographic information. Model B adds the big-five personality measures (nesting demographic variables), and Model C adds economic variables (nesting Model B) that have a plausible theoretical link to credit preferences.

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Among demographics, *Female* was the only variable with a large-magnitude effect on the predicted probability of *DA*. Female household heads were approximately 9 percentage points more likely to have *DA* credit preferences across all three models in Table 3. The *big-five personality* measures were scaled (in both Tables 1 and 2) so that their theoretical range was the unit interval and, therefore, their marginal effects in Table 3 measure changes in the predicted probability associated with the difference between two counterfactuals of an average farmer (all else equal) having the theoretical maximum and minimum scores for a given personality measure. The five personality variables were jointly significant (i.e., the data rejected the null that all five coefficients were zero) in the *DA* but not in the *NDA* equation. This result was good news in terms of our search for observable characteristics that statistically differentiate *DA* and *NDA* types, because none of the six economic variables in Model C provided that kind of statistical separation.

Table 3 shows that high *Agreeableness* was associated with a substantial increase in the probability of *DA* (more than doubling the likelihood from its base rate of 17.7% in the full sample). The lack of any substantial effect of *Agreeableness* on the other two CPTs (similar to the *Female* variable) means that it differentiates *DA* type from the pooled sample of *CB* and *NDA* types but is nonspecific for the purpose of separating *DA* from *NDA* types among nonborrowers. *Openness* and *Emotional Stability* were among the only variables that had statistically distinct marginal effects on all three predicted probabilities, associating positively with *CB*, having no significant association with *NDA* and negatively with *DA*. The data reject the null that the five coefficients on the personality measures are the same in the *NDA* and *DA* equations in Models B ($p = 0.025$) and C ($p = 0.042$), suggesting the *big-five personality* could be useful in characterizing differences between *NDA* and *DA* types. Our findings are roughly consistent with previous findings (although contradictory for *Agreeability*) linking *Openness* to debt-financed entrepreneurship (Koe 2016) and *Emotional Stability* to willingness to take on debt (Nyhus and Webbley 2001).

All three models in Table 3 include both a linear and quadratic term in *Age* to allow for the possibility of nonmonotonic effects. The average marginal effects in Table 3 (averaging over marginal effects evaluated at each observation rather than a single marginal effect evaluated at the mean vector of explanatory variables) obscure some statistically significant marginal effects with respect to *Age* that cancel each other out (over different portions of the empirical *Age* range), leading to the statistically insignificant average *Age* effects in Table 3.

Plots of predicted probabilities with respect to *Age* and the *big-five personality* measures appear in Appendix Figure 9. From those margins plots, we can see statistically and economically significant separation between the predicted probability of *CB* and the highly overlapping probabilities of noncurrent borrower (*DA*

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Table 3. Marginal Effects of Explanatory Variables on CPTs (i.e., Changes in Predicted Probabilities) in Three Nested Multinomial Logit Models

	Model A			Model B			Model C		
Variables	*CB*	*NDA*	*DA*	*CB*	*NDA*	*DA*	*CB*	*NDA*	*DA*
Demographics									
Female	0.001	−0.094	0.093**	0.015	−0.100	0.086**	0.010	−0.097	0.088**
	(0.991)	(0.102)	(0.032)	(0.817)	(0.08)	(0.045)	(0.876)	(0.085)	(0.042)
Age†	0.000	0.001	0.000	0.000	0.001	0.000	0.000	0.000	−0.001
	(0.836)	(0.665)	(0.848)	(0.819)	(0.616)	(0.8)	(0.832)	(0.884)	(0.682)
Education	0.003	−0.003	0.000	0.001	−0.002	0.002	0.000	−0.002	0.001
	(0.615)	(0.56)	(0.965)	(0.921)	(0.623)	(0.706)	(0.947)	(0.755)	(0.818)
Minority ethnic HHH	0.017	−0.063	0.046	0.038	−0.068	0.029	0.049	−0.069**	0.020
	(0.706)	(0.069)	(0.208)	(0.391)	(0.054)	(0.412)	(0.27)	(0.048)	(0.58)
Multiethnic HH	0.075	0.048	−0.124	0.054	0.041	−0.095	0.071	0.03	−0.101
	(0.434)	(0.469)	(0.169)	(0.564)	(0.544)	(0.273)	(0.443)	(0.651)	(0.241)
Big-five personality									
Extraversion				−0.129	0.185**	−0.056	−0.087	0.142	−0.055
				(0.247)	(0.044)	(0.513)	(0.434)	(0.125)	(0.527)
Agreeableness				−0.206	−0.128	0.333***	−0.261	−0.079	0.339***
				(0.191)	(0.322)	(0.007)	(0.100)	(0.543)	(0.006)
Conscientiousness				0.004	0.107	−0.112	0.035	0.111	−0.145
				(0.976)	(0.364)	(0.296)	(0.808)	(0.350)	(0.182)
Openness				0.241**	−0.052	−0.189**	0.261***	−0.06	−0.201**
				(0.015)	(0.516)	(0.018)	(0.009)	(0.458)	(0.014)
Emotional stability				0.260**	0.043	−0.303***	0.270**	0.026	−0.296***
				(0.018)	(0.629)	(0.000)	(0.013)	(0.772)	(0.001)
Social capital, wealth, and income									
Social capital							0.154	−0.149	−0.005
							(0.198)	(0.180)	(0.956)
ln(*productive land area*)							−0.014	0.000	0.014
							(0.364)	(0.972)	(0.295)
ln(*market value of home*)							0.011	−0.024	0.013
							(0.901)	(0.723)	(0.855)
ln(*living expenses*)							−0.053**	0.053***	0.000
							(0.017)	(0.005)	(0.982)
ln(*household income*)							0.064	−0.034	−0.031
							(0.144)	(0.347)	(0.384)
p-values associated with null that all big-5 coeffs are zero:					0.402	0.001		0.532	0.000
Obs.		575			575			575	

Note: CPTs = credit preference types, CB = current borrowers, NDA = non-debt-averse, DA = debt averse. *p*-values are in parentheses.
†To allow for nonmonotonic effects, a linear *and* quadratic term in *age* are included in all models in Table 3.
***$p < 0.01$. ** $p < 0.05$.

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and *NDA*) types, but no separation of *DA* and *NDA* types. For age, for example, the predicted probability of *CB* is significantly greater than the probabilities of *NDA* and *DA* from ages 30 to 75 (peaking at age 55), with no difference at the tails of the *Age* distribution. Similarly, for the personality measures, we find very weak explanatory power differentiating the predicted probabilities of *DA* and *NDA*. *Emotional Stability* comes closest to differentiating *DA* from *NDA* types but only in the extreme tails of its distribution.

Thus, our search for observable characteristics specific to *DA* type and new insights about what drives this puzzling behavioral anomaly, for the most part, has proved elusive. Personality variables differentiate *CB* from *DA* and *NDA* but not *DA* from *NDA* (Appendix Figure 9). The economic variables added in Model C revealed hardly any useful descriptive insights. The marginal effects with respect to five economic variables in Model C suggest (counterintuitively perhaps) that household heads with better political connections, more wealth, more productive land, and higher incomes are no more or less likely to be *DA*. We can rationalize these null or indeterminate findings, at least in part, by interpreting them as the result of two offsetting effects. Being in possession of greater endowments of social and/or financial capital could plausibly lead to decreased need for borrowed funds on the one hand and greater willingness to take entrepreneurial risk with debt-financed farm entrepreneurship (if borrowing terms are sufficiently generous) on the other. The statistical significance of the personality measures would also seem to suggest that intrinsic differences, especially *Openness* and *Emotional Stability* are important in the context of a rural developing economy, just as they have been shown to be associated with entrepreneurial behavior and willingness to use debt financing in other contexts. The relevance of *Openness* and *Emotional Stability* to borrowing behavior and debt aversion in rural developing economies is, we think, a novel empirical contribution.

So, what have we learned? All else equal, female household heads are significantly more likely to be DA type. Sex differences in bargaining power in rural households in developing countries are well documented in the development literature. Females are rarely the head of household in rural Vietnam unless they are widowed. There is of course a substantial literature on sex differences in risk preferences (e.g., Cohen and Einav 2007; Gilliam, Chatterjee, and Grable 2010), although those findings and their interpretation are hotly contested.

5. DISCUSSION AND CONCLUSION

A primary objective of this paper was to document the high prevalence of debt aversion: 18% overall ($N_{DA} = 102$ out of $N = N_{CB} + N_{NDA} + N_{DA} = 575$)

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or, equivalently, nearly half ($N_{DA} = 102$ out of $N_{NDA} + N_{DA} = 208$) of the noncurrent borrower subsample and 51% of eligible-to-borrow nonborrowers (after excluding the few credits rationed households in our sample). We investigated whether observable characteristics are statistically associated with DA credit preference type, which included exogenous demographics, internal big-five personality measures, and economic variables, which are very likely to be endogenous with respect to borrowing behavior (i.e., social capital, wealth, and income). If DA type could be shown to have distinct profiles of observable characteristics, then those statistical associations could (in principle) be used by governments and NGOs that operate subsidized credit programs, better-achieving target levels of participation and progress on development goals by improving farm productivity. Finally, our data also included *self-reported reasons* for avoiding debt, allowing DA participants to give multiple reasons for having chosen not to borrow.

Although we did not directly study lenders' views about supply and demand conditions in local credit markets in STP, it is well established that subsidized credit suppliers (including government, NGOs, and sometimes commercial banks) often have trouble achieving their desired uptake rates when seeking to expand program participation (Hoff and Stiglitz 1990; Pham and Lensink 2007). In this regard, two observations stand out in our data: the high frequency of debt aversion and low frequency of those who perceive themselves to be credit rationed. It would seem that lower-than-desired uptake is indeed among the primary challenges that subsidized lending initiatives in rural Vietnam and elsewhere have experienced, thus, motivating debt aversion as a research priority. Our approach to disaggregating CPTs draws on similar motivation, especially nonborrowers into NDA and DA types (and CB type into more fine-grained preference types, depending on which combinations of credit sources they have chosen), as a step toward filling gaps in the literature concerning heterogenous reasons for borrowing or not borrowing. The motivation for empirically distinguishing three CPTs (i.e., CB, NDA, and DA) and reporting statistical associations—unconditional bivariate and fully conditional estimates from multinomial logit models of the unordered discrete dependent variable CPT $\in$ {CB, NDA, DA}, conditional on demographics, personality, and economic variables—was to investigate whether it would be practicable to segment the rural population of those who are potentially eligible for such programs by incentivizing or strategically communicating with them in ways that appeal to distinct CPTs.

In previous empirical studies, NDA and DA households have been frequently aggregated into a single group of noncurrent borrowers. The credit rationing literature has acknowledged, and dealt with, the challenge of differentiating credit-constrained households from those that choose not to borrow for other reasons, both of whom unfortunately wind up being observationally equivalent

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in many datasets. We argued that it can be helpful to disaggregate noncurrent borrower households by CPTs so that DA noncurrent borrowers can be distinguished from NDA nonborrowers who are open to the idea of borrowing but, for example, may be waiting for improved borrowing terms or a productivity-enhancing project that requires debt financing. Our data revealed that females are around 9 percentage points more likely to be DA and that the personality traits of emotional stability and openness to new experience were negatively associated with debt aversion, just as intuition would suggest.

When asked why they will never want to borrow, DA farmers' primary reasons were: they have enough savings already; hassle costs relating to the loan application process and gathering the required documents; uncertainty about being able to repay; and not wanting to use the land as collateral because they feared their land could be taken by creditors in the event of default.

Our empirical findings fill a gap in the literature on rural credit markets in which debt aversion has not been previously documented and is often (for convenience or lack of data) ignored. Future research will hopefully collect data that can be used to conduct replication studies so that the high prevalence of debt aversion reported in this paper can be put to further empirical tests and questions of external validity addressed with more evidence. New research strategies aimed at including heterogeneous credit preferences (rather than the representative agent approach) and understanding where they come from would be worthwhile, too. Deeper understanding of debt-avoiding behavior would be highly relevant to policymakers in a variety of contexts—especially in the design of poverty reduction programs, microfinance, and related entrepreneurship-nurturing programs in the developing economy context, which could benefit by rethinking the assumption that low-income nonborrowers in rural areas necessarily have unmet credit demand.

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APPENDIX

App. Table 1. Descriptive Statistics for Variables not Included in the Multinomial Logit Model

	Subsample Means			Full Sample				
Variables	CB	NDA	DA	Mean	Min	Median	Max	SD
Types of farm revenue and production costs								
Total farm revenue	2,45,577.7	2,28,895.1	2,56,074.1	2,44,364.3	0.0	1,32,500.0	43,75,000.0	3,72,442.1
Total farm production costs	1,17,803.5	1,01,926.7	1,15,960.4	1,14,549.7	0.0	64,800.0	13,50,000.0	1,53,164.9
Rice and fruit cost share	0.8	0.9	0.8	0.8	0.0	1.0	1.0	0.4
Aquaculture cost share	0.1	0.1	0.1	0.1	0.0	0.0	1.0	0.3
Animal husbandry cost share	0.1	0.0	0.1	0.1	0.0	0.0	1.0	0.2
Rice and fruit primary	0.8	0.9	0.8	0.8	0.0	1.0	1.0	0.4
Aquaculture primary	0.1	0.1	0.1	0.1	0.0	0.0	1.0	0.3
Animal husbandry primary	0.1	0.0	0.1	0.1	0.0	0.0	1.0	0.2
Ethnic composition								
Kinh	0.3	0.4	0.3	0.3	0.0	0.0	1.0	0.5
Khmer	0.7	0.6	0.7	0.6	0.0	1.0	1.0	0.5
Hoa (Han Chinese ancestry)	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.1
Cham	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0
N	367.0	106.0	102.0	575.0				

Note: CB = current borrowers, NDA = non-debt-averse, DA = debt averse.

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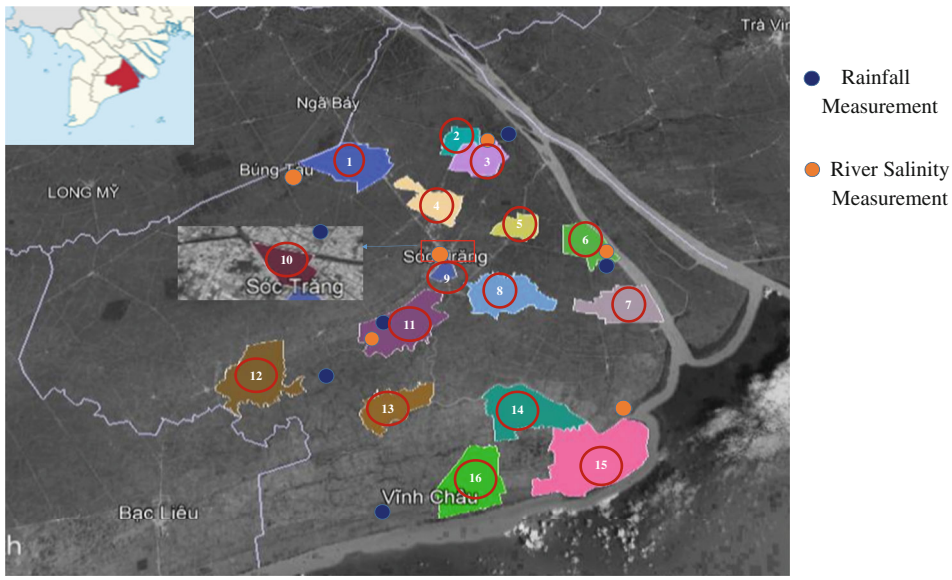
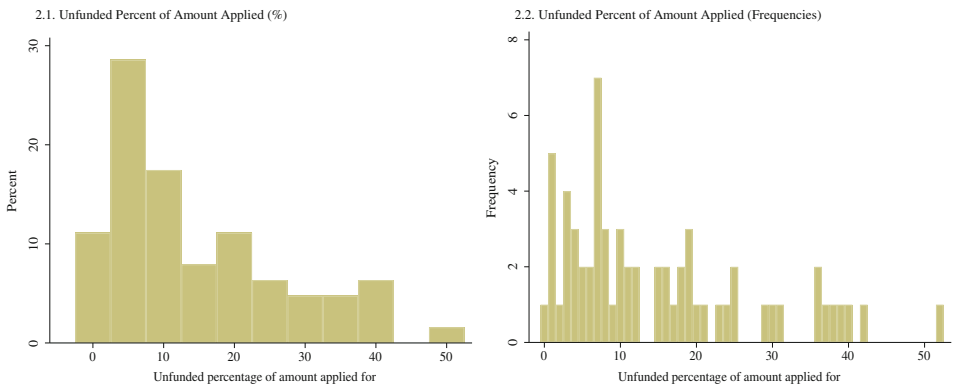
App. Figure 1. Map of Soc Trang Province and 16 Communes Where Data Were Collected



Source: Made by the author using Cùng Phượt (https://cungphuot.info/soc-trang/page/2) and Google Earth.
[Colour figure can be viewed at wileyonlinelibrary.com]

App. Figure 2. Intensive-Margin Credit Rationing Among 63 Farmers Whose Nonzero Drawdown Amount Was Less than They Had Applied for



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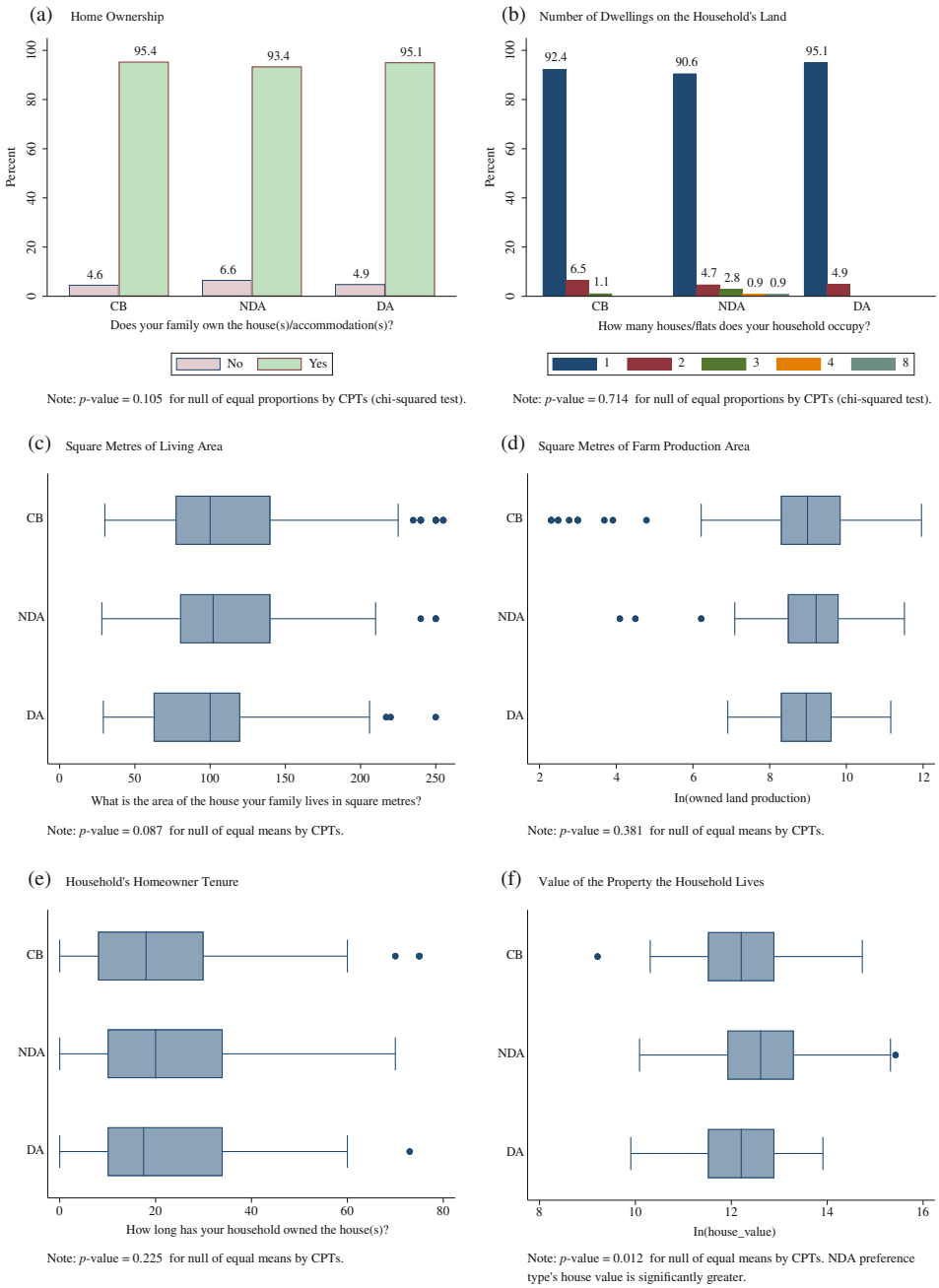
App. Figure 3. Descriptive Statistics of the Sample Household Heads by CTPs



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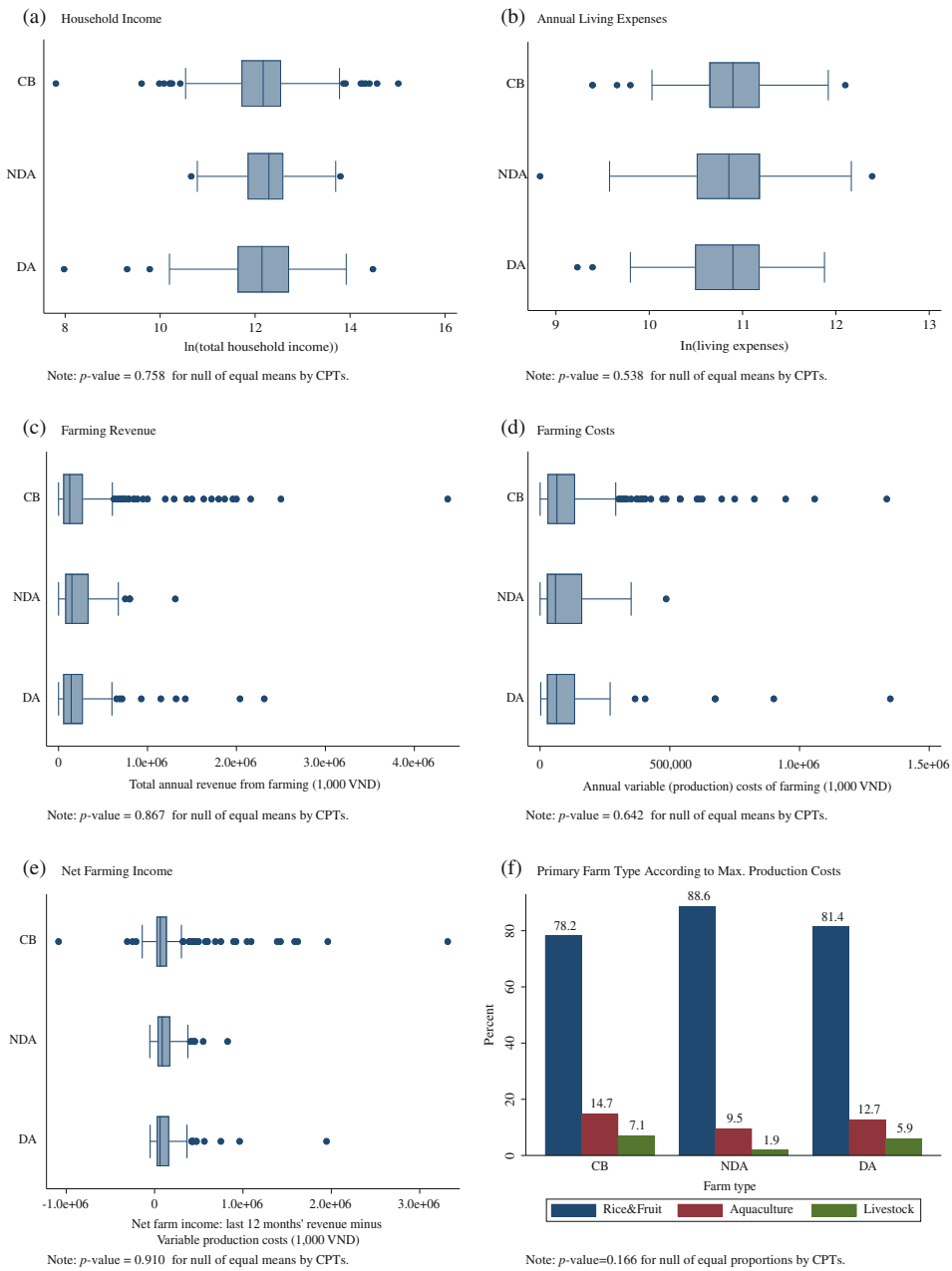
App. Figure 4. Descriptive Statistics of Householdsby CPTs



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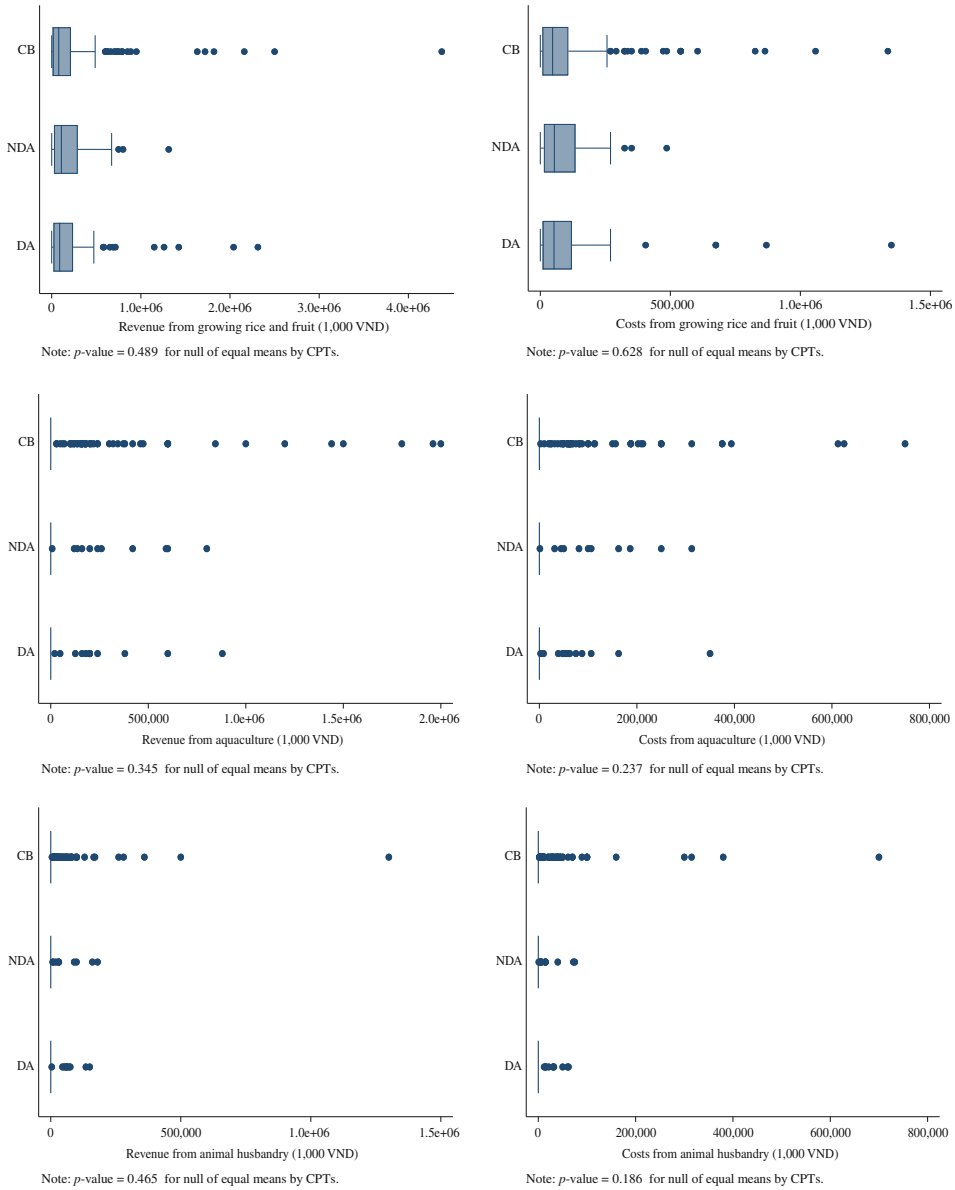
App. Figure 5. Farming Revenue and Variable Production Costs by CPTs



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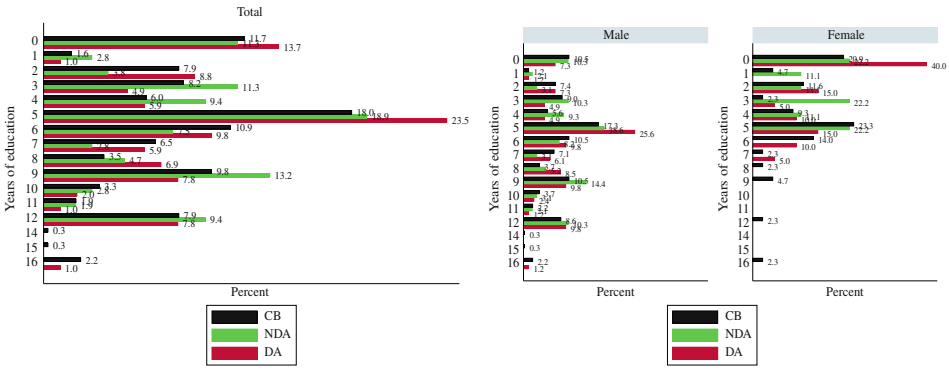
App. Figure 6. Years of Education by CPTs



Note: The data do not reject the null hypothesis of equal mean years of education across the three CPTs (p-value = 0.695.)

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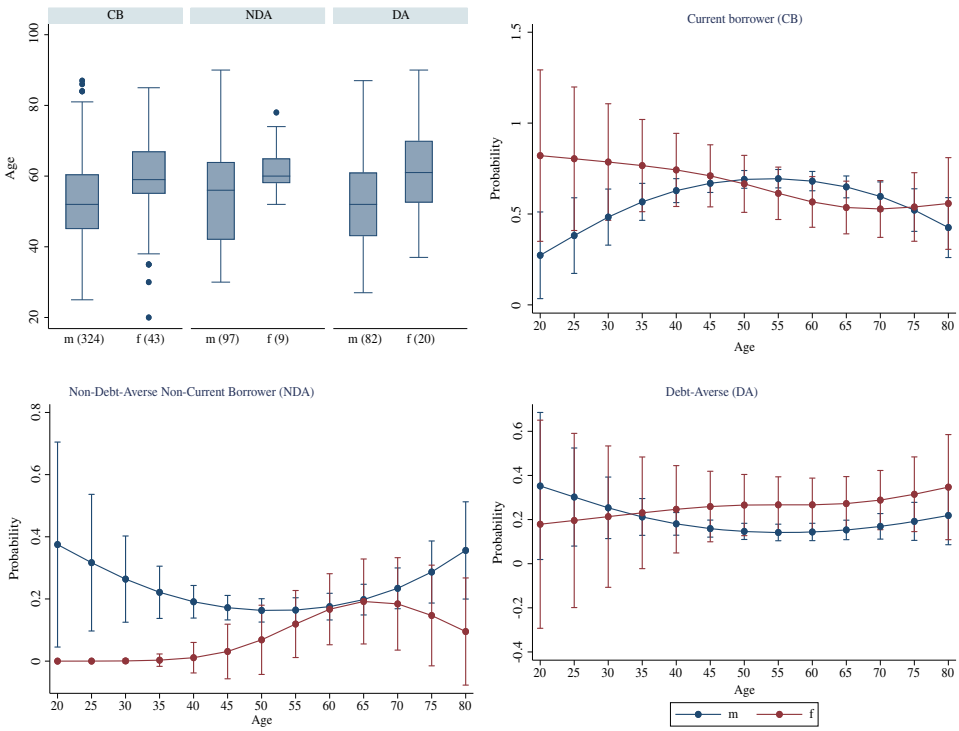
App. Figure 7. Age Distribution among CPTs and the Probabilities of Borrower Status by Age.



Note: CPTs = credit preference types.

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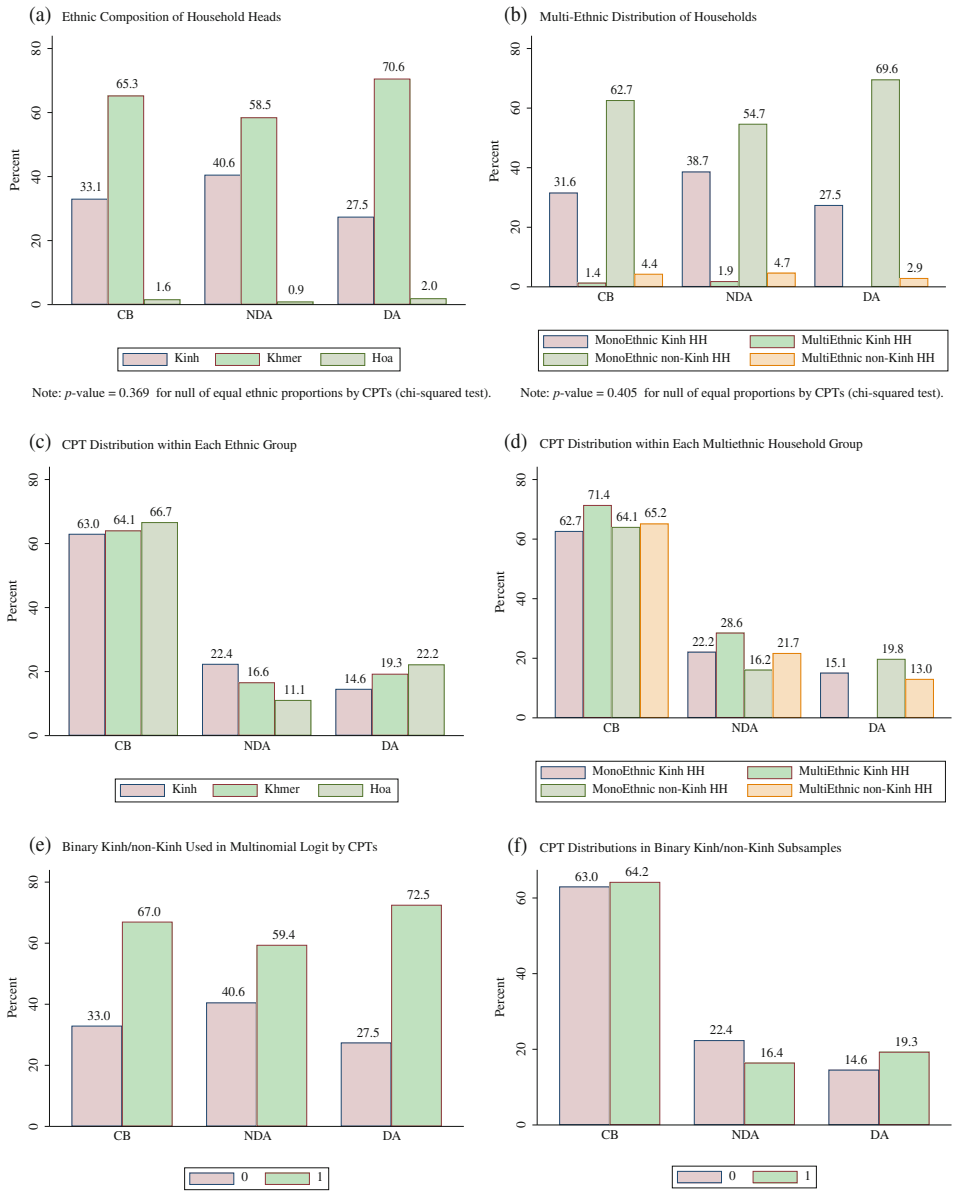
App. Figure 8. Ethnic Composition by CPTs



Note: p-value = 0.369 for null of equal ethnic proportions by CPTs (chi-squared test).

Note: p-value = 0.405 for null of equal proportions by CPTs (chi-squared test).

Note: p-value = 0.129 for null of equal proportions by CPTs (chi-squared test).

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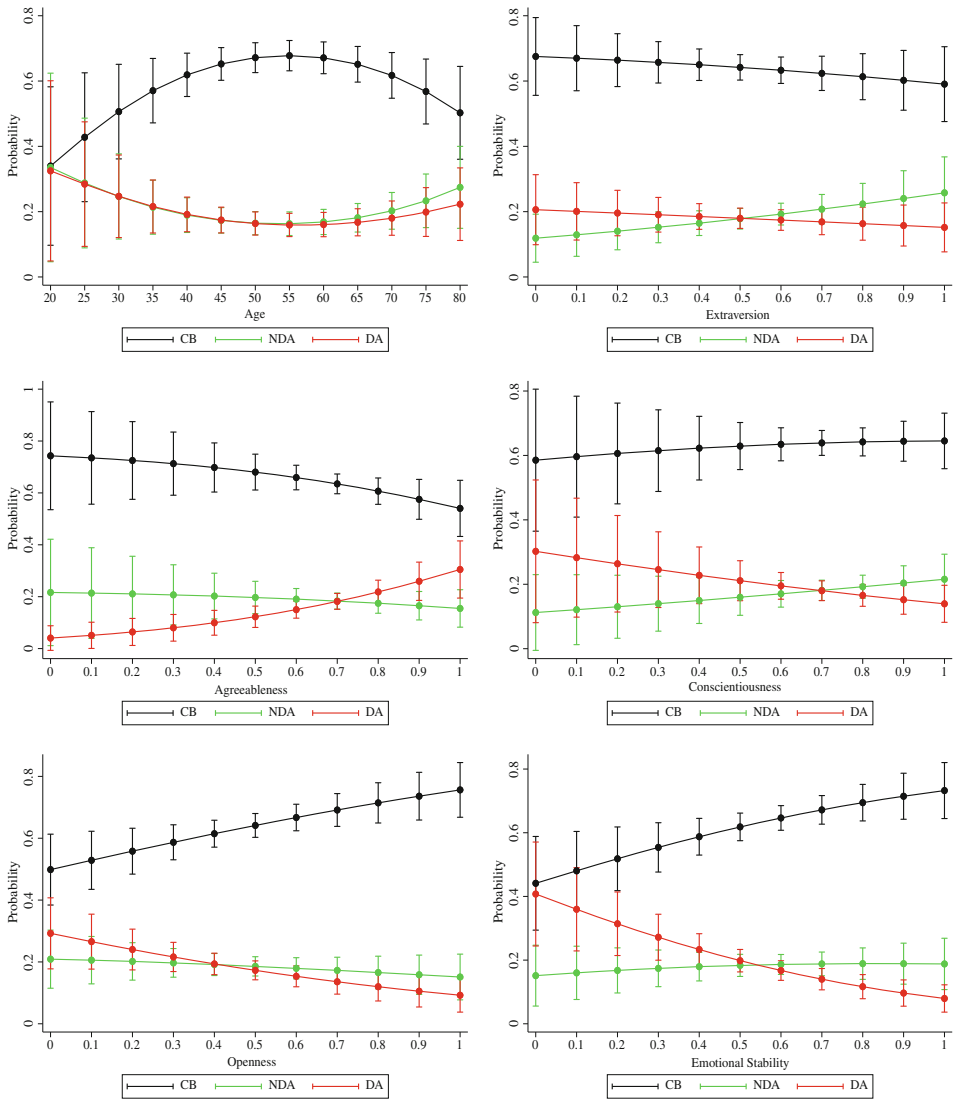
App. Figure 9. Predicted Probabilities of CPT Status by Big-Five Personalities



Note: CPTs = credit preference types, CB = current borrowers, NDA = non-debt averse, DA = debt averse. The data do not reject the null hypothesis of equal mean years of education across the three CBS (p-value = 0.695).
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