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**Adoption of Inclusive Insurance Contracts:  
An Empirical Study in Guatemala**

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## Abstract

This paper examines the role played by financial capabilities in an individual's decision to purchase an inclusive insurance product in Guatemala. We elaborated and conducted a survey of samples of both non-insured individuals and clients of Seguros Universales, one of the principal inclusive insurance providers in Guatemala. Our results show that personality traits and time preferences determine an individual's decision to hold an insurance contract. We also find evidence that certain combinations related to health habits and non-cognitive characteristics can have an impact on such a decision. We argue that having a better insight into what determines the adoption of inclusive insurance contracts at an individual level could shed light on how to overcome—at least partially—barriers to the demand of such insurance.

**JEL Codes:** C83, D14, D91, G22, G41, I13, I22.

**Keywords:** inclusive insurance, financial capabilities, personality traits, cognitive characteristics, preferences, health habits.

## Resumen

Este documento examina el papel que desempeñan las capacidades financieras en la decisión de un individuo de comprar un producto de seguro inclusivo en Guatemala. Elaboramos y realizamos una encuesta de muestras de individuos no asegurados y clientes de Seguros Universales, uno de los principales proveedores de seguros inclusivos en Guatemala. Nuestros resultados muestran que los rasgos de personalidad y las preferencias de tiempo determinan la decisión de un individuo de tener un contrato de seguro. También encontramos evidencia de que ciertas combinaciones relacionadas con hábitos de salud y características no cognitivas pueden tener un impacto en tal decisión. Argumentamos que tener una mejor comprensión de lo que determina la adopción de contratos de seguro inclusivos a nivel individual podría arrojar luz sobre cómo superar, al menos parcialmente, las barreras a la demanda de dicho seguro.

**Palabras claves:** seguro inclusivo, capacidades financieras, rasgos de personalidad, características cognitivas, preferencias, hábitos de salud



## Introduction

This paper examines the role played by financial capabilities -- associated with preferences, financial education, numerical abilities and personality traits -- in an individual's decision to purchase an inclusive insurance product. To accomplish this goal, a survey was conducted with two groups: a sample of non-insured individuals in Guatemala, and a sample of clients of Seguros Universales, one of the country's private inclusive insurance providers. We argue that having a better insight into what determines the adoption of inclusive insurance contracts at an individual level might shed light on how to overcome—at least partially—barriers to the demand of such insurance (Di Giannatale and Roa, 2019).

Several initiatives have been undertaken over the last few decades to promote the adoption of insurance products among vulnerable populations in developing countries; these have been mainly microinsurance and social insurance programs. Since the 1990s, microinsurance, characterized by low premiums and low caps coverage, has had demonstrable benefits for people with low income (Cheston, 2018). Today, these products are part of wider trends such as *inclusive insurance* or *mass insurance* that expand the market to all those who have not been served by traditional insurance, including the lower middle class, but with an emphasis on serving vulnerable and low-income populations. These products are characterized by very low costs and premiums, simple characteristics, basic coverage, small payouts, easy physical access,

simple claims mechanisms, and no requirement of previous checks (Access to Insurance Initiative, 2015; Cheston, 2018). In the present study, we use the term inclusive or massive insurance to denote such products.

Although inclusive insurance products have become a valuable tool to help vulnerable individuals manage risk, the use of these products is still low. Informal risk-sharing mechanisms and more basic financial products such as savings accounts remain critical devices for risk management in poor communities (Global Microscope, 2016; Karlan and Murdoch, 2010). The issue of the design and adoption of insurance contracts is of the utmost relevance in developing economies, since the majority of people in such countries do not have a stable, regular income and people are therefore more exposed to financial risks related to large and unexpected expenses: costs stemming from sudden illness, crop failures, natural disasters, or income loss due to the death of a wage earner (Karlan and Morduch, 2010; Demirguc-Kunt et al., 2017). Although low-income households commonly share risks within their family or community through informal risk-sharing arrangements, formal insurance products can pool risk over a much larger population, affording households broader coverage. The Insurance Development Forum has compiled ample evidence on the role of insurance in addressing natural disasters and developing resilience (Cheston, 2018). Moreover, Bhamra and Uppal (2019) demonstrate the detrimental effects of familiarity biases when households make financial decisions not only on the wealth of the households themselves, but also on the growth rate of countries.

In Latin American countries, there have been several interventions aimed at stimulating the adoption of inclusive insurance contracts, including the creation of new products, reduction of commissions, and improvements of regulatory frameworks. Coverage levels, however, remain very low; in 2016, only about 8.2% of the population had one or more microinsurance products (The World Map of Microinsurance, 2017). In the case of Guatemala, the coverage rate is even lower, at about 5.74%. This country's main challenges are similar to those of other developing economies: lack of client knowledge, limited insurer knowledge, limited distribution channels, and ambiguous rules and regulations (The World Map of Microinsurance, 2015). Guatemalan insurers report a "lack of insurance culture" among the population as a



major challenge. Financial education might help to raise awareness about insurance among Guatemalans with low income levels, as insurers perceive this lack of awareness to be the root of high levels of cancelations and low rates of renewals. In addition, insurers need to diversify and renew their distribution channels to respond to the needs of Guatemalans with low income levels. As in other Latin American countries, the main inclusive insurance distribution channels in Guatemala are traditional financial institutions (“insurance banks”), such as microfinance institutions.

Public healthcare supply in Guatemala is also limited in scope. According to The World Bank Development Indicators (World Development Indicators, 2018), as of 2015, public health expenditure only represented 1.8% of the country’s GDP, far below averages for both Latin America and the Caribbean (LAC) and the world (3.8% and 5.9%, respectively). As a source of funding, public health expenditure only accounted for one third of total health expenditure; this is the lowest proportion among LAC countries, and one of the lowest worldwide. Moreover, Guatemala has a highly fragmented health system that consists of several public institutions that coexist with poorly regulated private institutions (Avila et al., 2015). This context might explain the exclusion problem in the public health system, which mainly affects vulnerable groups of the population (PAHO/WHO, 2016).

In this paper, we contribute to the literature of inclusive insurance by analyzing the relationship between inclusive insurance contract adoption and various other considerations: health habits, financial education, personality traits, numerical abilities, time and risk preferences, and sociodemographic characteristics. Our results support conclusions drawn in related literature, namely that non-cognitive abilities, such as personality traits and time preferences, determine an individual’s decision to acquire an inclusive insurance contract. Furthermore, we find evidence that certain combinations related to health habits and non-cognitive characteristics have an impact on such a decision.

This paper is organized as follows. In the first section, we review relevant literature on determinants of insurance demand. In the second section, we present our unit of analysis and explain our empirical methodology, and in the third section, we

show the descriptive statistics analysis of our sample is presented. In the fourth section, we present our empirical model and our econometric results, and finally in the fifth section, we outline our principal conclusions and discuss our main results.

## **LITERATURE**

Relative to traditional insurance, the field of inclusive insurance is relatively new. Eling et al. (2014) review the literature on microinsurance demand and highlight the key factors affecting this demand: price, wealth, risk aversion, non-performance risk, trust and peer effects, religion, financial literacy, informal risk sharing, quality of service, risk exposure, age, and gender. They discuss the evidence of how each of these factors influences demand, both within the microinsurance market and the market for traditional insurance.<sup>1</sup> The findings of their paper are as follows: (i) in microinsurance markets the influence of risk aversion is negative, the main reason being that customers do not trust microinsurance providers; (ii) price is negatively related with both types of insurance demand; (iii) wealth and income are positively related with insurance, but lack of resources does not seem to explain low use of microinsurance products; (iv) the effect of informal channels of insurance on formal microinsurance demand is ambiguous.

In the context of vulnerable individuals in developing economies, some articles show that if potential clients are unsure of the characteristics of the microinsurance product they tend not to buy it, or not to renew it if they have already bought it (Giné et al., 2008; Plateau and Ugarte, 2013; Takahashi et al., 2016). They show that excess of information and product complexity constitute important barriers in purchasing insurance products. This problem is particularly severe among individuals in poverty who have little financial education.

Financial education is an element that has been shown to be a determinant in financial decision-making (Lusardi and Mitchell, 2014). Furthermore, some studies suggest that financial education seems to be more relevant in making complex financial

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<sup>1</sup> With this term we mean the insurance demand of moderate to high income levels, such as those that predominate in developed economies where there is a widespread use of insurance products.

decisions (Christelis et al., 2010; Van Rooij et al., 2011). In the case of insurance for vulnerable populations with low levels of education, given that insurance decision-making might entail difficulties that are different from those of other financial decisions, we should expect financial education to play an important role.

Proceeding from the assumption that it is difficult for low-income individuals to make insurance decisions, Zimmerman et al. (2016) implemented a randomized experiment to evaluate the effects of “packaging” two financial products, a credit and a crop insurance, in a Colombian microfinance institution. The fact that the product was new and little known among the participants might have played some role in its low use. In addition, some clients after some months could no longer recall the characteristics of the insurance product, leading the authors to suggest a policy of reminders and financial education.

Cognitive characteristics constitute another element that has been posited as a relevant determinant of financial decisions (Cole and Shastry, 2009; McArdle et al., 2009; Christelis et al., 2010; Grinblatt et al., 2011; Agarwal and Mazumder, 2013). From these articles, it can be deduced that numerical abilities are strongly related to healthy financial decision-making. In the case of insurance decisions, again, the decision-making process implies a higher level of difficulty than choosing savings products. It is thus to be expected that numerical abilities play an important role in deciding whether to buy an insurance product, and which product to buy.

In this regard, Fang et al. (2008), in the context of Medigap and Medicare programs in the USA, find that differences in individuals' cognitive abilities and income levels contribute more than risk aversion both to the decision to obtain an insurance plan. The authors suggest that individuals with higher cognitive abilities: i) can better assess the effects and the costs of various insurance plans; ii) tend to research costs of various insurance plans; and iii) could have more information about their health risks and therefore decide to buy an insurance plan. In relation to the issue of the difficulty of making insurance decisions too, Handel and Kolstad (2015) emphasize that it is difficult for individuals both to understand the characteristics of complex insurance

contracts and to bear the time costs and hassle<sup>2</sup> of claiming payments from the insurance company. They conclude that education, resources and cognitive abilities are mainly responsible for determining the selection of an insurance plan.

Non-cognitive abilities can also play a key role in explaining economic behaviors and lifetime results such as educational attainment, income in adult life, and health and criminal records (Borghans et al., 2011; Almlund et al., 2011). The term non-cognitive abilities, as used in economic literature, encompasses characteristics such as personality traits, soft skills, socio-emotional abilities, and time and risk preferences (Humphries and Kosse, 2017). Psychologists usually measure personality traits by using self-reported surveys or observer reports. They have sketched a relatively commonly accepted taxonomy of personality traits known as the 'Big Five': Openness to Experience, Conscientiousness, Extraversion, Agreeableness and Neuroticism. Our empirical methodology is based on this schema.

The relationship between personality traits and financial decisions has been explored in various recent articles. Diligence or grit, with its associated traits of self-control and tendency to plan, has been observed to be strongly related to healthy financial decision-making, such as saving for retirement, repaying debts on time, among others (Klinger et al., 2013a, b; McCarthy, 2011; Kaufmann, 2012; Jamshidinavid et al., 2012; Di Giannatale et al., 2015; Kausel et al., 2016; Roa et al., 2018). On the other hand, there is wide empirical evidence in the field of psychology demonstrating that people tend to be unrealistically optimistic about the probability of suffering losses (Weinstein, 1980; Weinstein and Klein, 1996). People who are unrealistically optimistic will be less inclined to purchase insurance, and even if they do, they may well take fewer precautions (Rutter et al., 1998; Meza and Webb, 2001). Hence, we gather from the preceding lines, that personality characteristics might impact insurance decisions.

Some of the papers in the personality traits literature also discuss the relationship between character skills and the preference parameters used by economists (Rustichini, 2009; Almlund et al., 2011; Becker et al., 2012, Burks et al., 2015). Although many measures of personality and preference seem conceptually

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<sup>2</sup> The nonmonetary effort and inconvenience a customer incurs in setting up, maintaining, or disposing of a product or service.

related in general, the links are not yet obvious and more research into this issue is necessary. Nevertheless, some evidence of relationships between preferences and personality traits have been found in the literature. Given that risk attitude is the type of preference that determines insurance decisions, according to the classic insurance theory; we will report in the following lines some of the findings in this regard. Borghans et al. (2009) and Rustichini et al. (2016) report that higher level of neuroticism is associated with a lower disposition towards taking risk. On the other hand, Becker et al. (2012) find statistically significant relationships between risk preferences and openness to experience and agreeableness.

Risk aversion in specific domains has also been studied. Based on Webber et al. (2002), risk preferences have been considered to vary according to the perceived risk of specific activities. For instance, Hanoch et al. (2006) find evidence that individuals are risk averse when making financial decisions while risk-loving when making health related decisions. Albeit the health aspect of insurance decisions is relevant to our study, we stick to the financial aspect of those decisions. It must be noted that Dohmen et al. (2018) analyze the challenges of deriving causal relationships between cognition and decision making under uncertainty. They underline the emerging empirical regularity of a positive relationship between measures of cognitive ability and measured risk aversion.

To the best of our knowledge, there has been no exploration of the relationship between personality traits and the decision to purchase an insurance product. So, we consider that the novelty of the present paper is that we explore the role that non-cognitive abilities associated with optimism, diligence, neuroticism, and time and risk preferences in the micro-insurance purchase decision. Also, to be consistent with the finding that cognitive abilities impacts the individuals' insurance decisions, we include cognitive abilities into our analysis. In the next section, we provide more details about our sample and the characteristics of the individuals.

## **UNIT OF ANALYSIS AND METHODOLOGY**

### **Unit of Analysis**

Our empirical methodology is based on a face-to-face survey, carried out by the Guatemalan market research firm Elephant Marketing Insight between September 6<sup>th</sup> and 19<sup>th</sup>, 2017, on a sample of individuals living in Guatemala City. The surveyed individuals were men and women who were at least 18 years old, and who either had or did not have an insurance plan with Seguros Universales, a Guatemalan insurance company. The questionnaires were completed using tablets, and the location was monitored through GPS. The average duration of the questionnaire was 20 minutes. In total, 701 questionnaires were completed; 346 (355) of the questionnaires were from people who had (did not have) an insurance plan with this company at that moment, with an error margin of  $\pm 6.9$  percentage points and a confidence level of 95%. The surveyed sample has a gender distribution of 48% / 52% between female and male respondents, respectively, and an age distribution as follows: 27% of respondents between 18-24 years old, 31% between 25-34, 23% between 35-44, 13% between 45-54, and 5% 55 years old or above. For the empirical exercise we present below, post-stratification weights will be considered to adjust these sampling gender-age deviations to the real population distribution.

The insured individuals were approached when they attended a clinic sponsored by Seguros Universales. In these clinics, all clients who have health and life insurance contracts are treated<sup>3</sup>. It should be noted that the insured individuals of our sample are actually not only holding an insurance product, they are using it; so, in our empirical exercise we will use sampling weights for correcting the fact that insured people were surveyed inside the clinics and they are probably familiar with the product.

Individuals who did not have an insurance plan were approached in their homes or in shopping centers. All the questionnaires (insured and non-insured individuals) were completed in the urban and peri-urban areas of Guatemala City, in order that the two samples be drawn from the medium and low strata. These strata account for the

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<sup>3</sup> Although individuals from other insurance companies could be treated in these clinics, the vast majority of them are clients of Seguros Universales.

densest concentration of both vulnerable people and potential clients of inclusive insurance in Guatemala. According to a socioeconomic study<sup>4</sup> in urban areas of Guatemala in 2013, 45,1 % of the urban population in Guatemala City belongs to the medium stratum with a monthly average income between 25,600 and 11,900 quetzales.<sup>5</sup> Meanwhile, 51,2 % of the urban population in Guatemala City belongs to the low stratum and its monthly average income is between 7,200 and 3,400 quetzales. We therefore aim to compare two samples that are not systematically different from each other.

The Guatemalan insurance market is composed of 27 companies: 2 state-owned companies (CHN seguros and CHN Finanzas); 16 private companies; and 9 Credit Surety companies. This market has the lowest penetration level in Central America—approximately 1.2% of GDP (Asociación Guatemalteca de Instituciones de Seguros 2017)—which means there is scope for this sector to grow. The highest volumes of issued premiums are registered in damages, health and hospitalization, and life. Collective life and health and hospitalization coverage are, in general, the most important inclusive insurance products. The total number of people with inclusive insurance in Guatemala is around 945,200 (Global Microscope 2017). Two private companies stand out in this market: Banrural and Seguros Columnas. These two companies are members of large consolidated financial groups that offer savings, credit and insurance products. Meanwhile, Seguros Universales, which exclusively offers insurance products, has a significant participation in the market for inclusive insurance products.

Seguros Universales was founded in 1962 and manages a portfolio that includes several types of insurance products: home, damages, business, educational, medical, life, car, and others. Most of the insured individuals surveyed had a package that combines both life and medical insurance products. These plans are considered as

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<sup>4</sup> “Estudio de niveles socioeconómicos de Guatemala”, Dichter & Neira, GSI Analytics, Pro Datos, Soporte y Unimer (2013). As far as we know, this is the unique rigorous study of socioeconomic strata in Guatemala.

<sup>5</sup> The quetzal is the monetary unit of Guatemala and the exchange rate at the end of the 2018 was 7.73695 quetzals to one US dollar.

inclusive or massive insurance products and are mainly commercialized by microfinance institutions<sup>6</sup>. The range of prices of the insurance products covered in the survey is between 110 and 360 quetzals, and the vast majority of the insured people surveyed own the lowest priced insurance product. Nevertheless, because detailed price information for each respondent was not provided, we left price information outside our empirical approach.<sup>7</sup>

Currently, Seguros Universales has commercialization agreements for their inclusive insurance products with important microfinance institutions, cooperatives, and associations. Approximately 60,000 clients of Seguros Universales and their distribution channels (a total that constitutes around 6.4% of the local insurance market, and of which 40% are women) hold inclusive insurance products. We assumed that the inclusive insurance products under study were representative of the typical inclusive or massive insurance product in Guatemala. Due to the size of the samples, however, we should be cautious when generalizing the results derived from them to the potential population of inclusive insurance in Guatemala. As generally happens, the main obstacle was the high cost of bigger sample sizes.

## Measures

Our survey included a total of 70 questions, and was designed so that indicators could be calculated *ex-post* to measure the main variables of our study.<sup>8</sup>

### *Insurance decisions*

We constructed a dichotomous variable which takes the value of 1 if an individual reports having purchased an insurance plan in general, and 0 otherwise (Question 1).

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<sup>6</sup> The decision to purchase inclusive or massive insurance products in Guatemala is voluntary, and it is not tied to another product or service offered by the financial institution that commercialize the insurance product (Regulations for the massive commercialization of insurance. Resolution JM-1-2011, Article 11. Superintendencia de Bancos Guatemala). The insured individuals of our sample therefore should not be microcredit clients. In contrast, the commercialization of microinsurance in this country is generally tied to a microcredit product (The World Map of Microinsurance 2017).

<sup>7</sup> In addition, we considered that it was not an important concern due to the potential lack of price variability across insured people. A better proxy to capture the affordability dimension could be household income itself, included as an explanatory variable in our empirical exercise.

<sup>8</sup> The questionnaire can be found in the Appendix.



Consistent with the structure of our sample, 49% of the individuals reported holding an insurance plan while 51% reported being uninsured.

Of the surveyed individuals that acknowledge having an insurance product, 89.4% reported having medical or life insurance products or both, of which 52.1% reported having medical coverage and 37.2% reported having life insurance products. Only 37.7% responded to having both types of coverage but, as mentioned above, Seguros Universales informed us that these products are always offered jointly, so it seems to be the case that individuals might not know which kind of products they hold. This hypothesis is supported by the fact that people who reported holding both life and medical insurance are significantly more aware of the services included in their coverage plan than are people who report only having one of these insurance products. Meanwhile, no more than 4% of the individuals report having another type of insurance plan. Notably, almost 94% of the insured group are willing to continue paying for their current insurance packages.

### *Personality Traits*

#### *Grit*

Diligence or grit, a sub-facet of Conscientiousness, constitutes a key element in explaining good financial behaviors (Roa et al., 2018). To measure it, we used the Short Grit Scale or *Grit-S* developed by Duckworth and Quinn (2009). Section III of the survey reports the eight questions included in this scale. These are divided into two groups: Passion for Long-term Goals (Questions 22, 24, 26, and 27), and Perseverance of Effort (Questions 23, 25, 28, and 29). We sum the scores for each answer and divide the result by 8 to obtain an individual's grit indicator. *Grit-S* is a continuous variable with a maximum value of 5 (extremely gritty) and minimum of 1 (not at all gritty).

#### *Optimism*

To compute the optimism indicator, we followed the Revised Life Oriented Test or LOT-R (Scheier et al., 1994). This indicator measures how optimistic an individual is in terms of positive expectations about the future. It is a simple average of the questions included

in Section IV of the survey<sup>9</sup>, barring questions 31, 34, 35, and 37. These last questions are used as distractors, which also serve the purpose of measuring other personality traits such as neuroticism (Questions 31, 35 and 37) and agreeableness (Question 34) (Caprara et al., 1993; Soto and John, 2009; Almund et al., 2011).

#### *Neuroticism and Agreeableness*

A measure of neuroticism, which is the opposite of the emotional stability - another one of the Big-five personality traits (Goldberg, 1990) - is also computed. In this sense, according to Soto and John (2009), neuroticism could be proxied through survey questions related to anxiety and depression. We believe Questions 31, 35 and 37 are related with these facets. Thus, we compute average score of these questions. In a similar vein, we also consider Question 34 as a proxy of agreeableness, since it is associated with being friendly, one of the categories positively related with agreeableness, according with the tabulation of Norman (1967), portrayed in Goldberg (1990).

#### *Financial knowledge and numerical abilities*

To capture information on financial knowledge, we chose a question (Question 41) related to the concept of inflation<sup>10</sup> (Lusardi and Mitchell, 2014) and constructed a binary indicator. This dichotomous variable takes the value of 1 if the individual answered the question correctly, and 0 if not. On average, surveyed individuals show a low level of financial knowledge: only 23.4% of the individuals answered this question correctly, whereas 71.9% responded incorrectly, and the remaining 3.6% said they do not know (3.4%) or did not respond (0.2%).

The survey also includes a question related to the calculation of interest rates (Question 42) that seeks to measure numerical ability: it is the only one that explicitly

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<sup>9</sup> After rescaling the result of each question whose score was negatively related with the degree of optimism, so they could be interpreted in the same way of the positively-related questions. A similar adjustment was done to questions regarding neuroticism as well.

<sup>10</sup> In order to measure financial knowledge, a question related to compound interest was included in the survey (Question 43), following the example of related literature (Lusardi and Mitchell, 2014). But a measurement error was detected in this question, and it was removed from the analysis.

requires a calculation (Roa et al., 2018). A low percentage of surveyed individuals answered the interest question correctly—less than a quarter of the total sample. The survey also included a question with a simple division (Question 40) to measure numerical abilities, but it was not considered because most of the population answered it correctly.

### *Time and Risk Preferences*

As an indicator of time preferences, we used the first principal component of Questions 19 and 20. The first of these is usually regarded as a measure of short-run preferences (1-2 months) and the second one a measure of medium-run preferences (13-14 months). The answers to both questions show a high positive correlation coefficient (60.5%), and as a result the principal component represents 80.3% of the joint variability. Alongside this, we constructed dichotomous variables for each of them, in which the value 1 means that the individual chose the medium-run option, and 0 otherwise.

To elicit risk preferences, we included a question (Question 21) in the survey that is commonly used to this end in related literature (Donkers et al., 2001; Weber et al., 2002; Dohmen et al., 2011). There are two ways of constructing the indicator: firstly, as a percentage of the maximum amount that the individual chooses to invest in the lottery; and secondly, as a dichotomous variable that takes the value 1 if the individual chooses to invest half or more of the maximum amount that can be invested, and 0 otherwise. Within the econometric exercises both measures of risk preferences were used.

### *Sociodemographic Variables*

The survey includes questions intended to obtain information about the sociodemographic characteristics of individuals in the sample (Questions 44 to 55). All variables constructed from the answers to these questions are non-ordinal categorical variables, except for gender (binary) and number of siblings (ordinal and discrete). The

values of the age variable are classified into five groups: 18-24 years old, 25-34 years old, 35-44 years old, 45-54 years old, and 55 or more years old.

The level of income variable is classified into seven groups based on reported household income in quetzals: Level 1 if income is lower than 800; Level 2 if income belongs to [800, 1,600); Level 3 if income belongs to [1,600, 3,200); Level 4 if income belongs to [3,200, 6,400); Level 5 if income belongs to [6,400, 12,800); Level 6 if income belongs to [12,800, 25,600); and finally, Level 7 if income is 25,600 or more. In Guatemala, 20% of the employed population with the lowest level of income earns on average 292 quetzals every month; the next quintile earns 842, the third quintile 1,539, the fourth quintile 2,659, and the fifth 5,947. The population of Guatemala averages a monthly income of 2,230 (ENEI 2 2017). The levels depicted on the survey were drawn to have a broader spectrum of the distribution of income on Guatemala.

### *Health Habits*

The survey also includes questions related to the physical condition of the surveyed individuals: we took height and weight measurements (Questions 15 and 16), allowing us to calculate individuals' Body Mass Index (BMI) and then classify them according to the obesity guidelines suggested by the World Health Organization (WHO)<sup>11</sup>. In our sample, most of the surveyed individuals are of normal weight (45.3%) according to the WHO criteria, followed by those who are overweight (35.8%), obese (14.1%), and underweight (2.9%). Besides this, the survey includes questions (Questions 17 and 18) related to individuals' smoking and eating habits. From the survey results it can be said that 60% of the individuals consume vegetables three or more times a week, whereas 78.8% of the surveyed individuals reported not having smoked in the last 30 days. These variables could be informative about the *ex-post* risk level of individuals. The health habits indicators show low levels of correlation among them, as shown in the upper panel of Table 1.

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<sup>11</sup> The Body Mass Index (BMI) is a simple index calculated using the following formula:  $BMI = \text{Weight}/\text{Height}^2$ . According to WHO, a person is overweight if his/her BMI is equal to or greater than 25 kg/m<sup>2</sup> and obese if his/her BMI is equal to or greater than 30 kg/m<sup>2</sup>. [http://apps.who.int/bmi/index.jsp?introPage=intro\\_3.html](http://apps.who.int/bmi/index.jsp?introPage=intro_3.html).

**Table 1.** Correlation Matrix between the Body Mass Index and Health Habits Indicators

<b>Correlation Matrix</b>	<b>BMI</b>	<b>Smoking Frequency in the Previous 30 days</b>	<b>Vegetable Consumption Frequency in the Previous week</b>
BMI	1		
Days on which Respondent Smoked in the Previous 30 days	-0.0504	1	
Frequency of Vegetable Consumption in the Previous 30 days	-0.0771 <sup>/a</sup>	-0.0206	1

Source: Data from Survey. /a:  $p < 0.10$

#### *Technological Sophistication*

The survey includes questions that seek to gain knowledge about individuals' sources of information—technology, social networks and radio (Section VII). This information was taken to be useful when measuring individuals' technological sophistication, a good proxy of other sociodemographic variables such as income and education.

We propose a joint indicator of knowledge and use of technology as an information source, which can be understood as an index of technological sophistication. To construct it, we carried out a principal component analysis of indicators from the survey that account for: i) computing knowledge self-assessment (Question 61); ii) number of devices that can be used for online access (Question 63); iii) frequency of online access (Question 64); iv) number of social network accounts held (Question 68); and 5) ownership of a smartphone (Question 70). When we include all the variables, the first component accounts for 33.45% of joint variability, while by removing indicators related to the frequency of online access and the ownership of a smartphone, the first component accounts for 60.1% of joint variability between the remaining indicators (number of social networks used, number of devices, and computing knowledge self-assessment). We use this latter component as a composite indicator to capture technological sophistication in our empirical exercise. Of note is

the fact that the majority of individuals surveyed reported that they had the highest level of computing knowledge: 60% of the insured people and 57% of the uninsured ones.

## **DESCRIPTIVE STATISTICS**

When studying the possible links between an individual's decision to obtain an insurance contract and the variables detailed in the previous section, we first looked for and outlined empirical patterns, as will be detailed in this section<sup>12</sup>. Regarding personality traits (Table S1), we observe that more respondents with insurance had high grit scores than those without insurance: 17.3% of the former group had a score of between four and five points, while 11.8% of the latter group had a score inside that range. Likewise, 32.9% of the insured respondents are in the group with the highest optimism score (between 3-4 points), compared with 27.8% of the uninsured. On the other hand, insured people seem to be more neurotic, as only 16.3% of them had a score in the lowest group of the neuroticism measure, as opposed to 22.9% of uninsured people. Regarding the agreeableness score, the highest difference between insured and uninsured people is also in the group with the highest level: 79.3% of the former versus 74.2% of the latter.

Regarding time preferences, the proportion of insured people who are patient (41.9%) is higher than uninsured people, who reported the same time preference (34.8%), whereas there is a slight difference regarding risk preferences between insured and uninsured people. Regarding numerical abilities (Table S1), there is a gap favoring insured respondents: 26.2% of them got a correct answer versus only 18.2% of uninsured respondents. However, we do not find a correlation between answering the inflation question correctly, and the decision to own an insurance product.

Regarding sociodemographic variables (Table S2), with respect to gender, we found no relevant differences among the surveyed individuals in terms of insurance holding. With respect to educational attainment, there is a significant difference

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<sup>12</sup> Tables S1–S4 are in the Appendix.

between insured people who have completed university studies or even a postgraduate program (17.22% and 3.8%, respectively) compared to the proportion of uninsured people with a similar level (6.9% and 1.1%, respectively). In addition, 12.7% of uninsured people have undertaken college studies without finishing them, compared with 3.9% of insured people with the same educational level.

With respect to marital status, the proportion of insured respondents who are married (37.9%) is remarkably high relative to the proportion of uninsured people with the same status (26.1%), whereas 70.3% of uninsured people are single or in a free union, versus 55.6% of insured people. Also noteworthy is the fact that 65.5% of the insured people have socioeconomic individuals (younger or older people, or both) dependent on them, which is higher than the 42.9% of the uninsured who are in the same situation. There additionally seems to be a positive relation between size of monthly income and holding insurance, since almost two of every three insured respondents (63.8%) reported to be in the top four monthly income groups (i.e., from Q3, 200 upwards), while only 45.2% of the uninsured respondents belong to these groups<sup>13</sup>.

With respect to age, the highest proportion of people with insurance is distributed in the group of those between 25 and 34 years old (28.2%), followed by the group of those between 35 and 44 years old (19.4%); whereas at least four of every ten individuals without any insurance are in the youngest group (i.e., between 18 and 24 years old). The descriptive statistics also show an important gap with respect to employment situation. Specifically, 72% of insured people are in positions that require medium or high qualifications, or independent professionals. By contrast, 28.3% of the uninsured group is unemployed/out of the labor force, or work as homemakers, a figure

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<sup>13</sup> As it was mentioned all the questionnaires were completed in the urban and peri-urban areas of Guatemala City, in order that the two samples (insured and not insured individuals) belong to the medium and low strata, and were not systematically different from each other. Table S2 show that 95% of the sample belong to medium and low strata. Only 5% of our sample belong to high strata, and the mean difference test confirms that the differences between insured and not insured individuals of this stratum are not significant.

which is far higher than the 13.4% of the insured group who reported being in the same employment situation

Table S3 reports figures related to health habits and the body mass index, which could be viewed as an indicator of health stock. In this sense, almost eight of each ten respondents are non-smokers, and there are only some slight differences between insured and uninsured people with respect to the frequency of smoking during the month previous to the survey interview: 9.4% of uninsured people reported to have smoked from 1 to 9 days during the period, versus 6.6% of insured ones. On the other hand, 10.9% of the insured group reported to have smoked from 20 to 29 days, versus 9.3% of the uninsured group. Some slight differences can also be perceived when comparing insured and uninsured people regarding the frequency of vegetable consumption in the same period, with the uninsured group having a higher proportion that consumed vegetables twice a week (18.7% vs. 15.4%), but a lower proportion doing so on a daily basis (32.7% vs. 35.9%). Finally, Table S3 depicts groups of the body mass index (BMI) following the WHO criteria. Approximately six of each ten insured people are overweight (43.9%) or even obese (16.3%), whereas 48.2% of uninsured people have a normal BMI or are underweight.

With respect to technological sophistication, it can be observed from Table S4 that the insured group are more likely to have a larger number of social network (SN) accounts than the uninsured group: 45.8% of insured people have three or more SN accounts, versus 35.8% of uninsured people, and 21.5% of the latter group declared they did not use any SN, compared to 14.6% of insured people. Moreover, the proportion of insured people who have access to the Internet (86%) and use more than one device for getting online (54.4%) is higher than that of uninsured (78.8% and 39%, respectively). In addition, even though the vast majority of people has a smartphone (81.3%), this proportion is even higher within the group of insured people (90.9%). There are also substantial gaps between insured and uninsured groups regarding the proportion of people who access the Internet several times a day (74.3% versus 59.1%), the proportion who reported having a beginner level of knowledge about information technology (18.8% versus 29.2%), and the proportion who reported having an advanced level of this skill (17% versus 9.3%). Finally, the pattern found resembles the



positive relationship between insurance holding and the individual indicators just mentioned: 27.6% of insured individuals are in the highest quartile of technological sophistication, as opposed to approximately 60.7% of uninsured people who are below the median.

## ECONOMETRIC ANALYSIS

### Empirical Model

We estimate a linear probability model by OLS, based on the functional form derived from the Roy model of comparative advantage (Roy, 1951; Heckman et al., 2006). Our identification strategy relies on the assumption that personality traits and cognitive characteristics are exogenous to insurance decisions. Previous research has suggested that personality traits and cognition remain stable over an individual's adult life (Heckman et al., 2014). The model has the following expression:

$$Y_i = \alpha + PTRAITs'_i\beta + COG'_i\varphi + HEALTH'_i\vartheta + TECH'_i\delta + X'_i\theta + u_i \quad (1)$$

Where  $Y_i$  is the dependent variable with a binary outcome, measuring whether the  $i$ -individual has an inclusive insurance product or not.  $PTRAITs'_i$  is a vector that accounts for the set of regressors measuring different personality traits, such as conscientiousness, neuroticism, agreeableness, and optimism. We allow this vector to also include time and risk preferences indicators.  $COG'_i$  is a vector containing a set of regressors related to cognitive skills such as financial literacy and numeracy. We assume that cognitive and non-cognitive characteristics are complementary when it comes to explaining financial behavior, as does most related literature (Heckman et al., 2006; Almlund et al., 2011; Becker et al., 2012; Rustichini et al., 2016).  $HEALTH'_i$  is a vector that includes the body mass index and other indicators of health habits, such as smoking frequency,  $TECH_i$  is the indicator of technological sophistication and  $X'_i$  is a vector that comprises sociodemographic characteristics, including: gender, education, civil status, economic dependents, age group, monthly income group, and housing type.  $\beta, \varphi, \vartheta, \delta$  and  $\theta$  are the vectors parameters associated with personality traits, cognitive

characteristics, health habits, technological sophistication, and sociodemographic variables, respectively, and  $u_i$  is the stochastic residual which captures omitted variables and follows a binomial distribution.

Our empirical strategy to estimate the model depicted in equation (1) is to follow a linear probability model (LPM) based on the ordinary least squares (OLS) method, since we are interested in analyzing the average partial effects of the regressors on the probability of having insurance. Moreover, under the assumptions of random sampling and heteroskedasticity-robust matrix of error covariates, the LPM produces consistent and unbiased estimates of these average partial effects, with better properties than other binary outcome models such as logit or probit (Wooldridge, 2010).

To meet these assumptions, we need to address the potential selection biases of our dataset, stemming from the fact it is drawn from a household survey applied to a non-randomly selected sample. To do so, we first use sampling weights and stratification based on the inclusive insurance-holding share in Guatemala as of 2017 (Micro Insurance Network, 2017). The sampling weights account for: 1) the share of Seguros Universales in the local market of insured people; and 2) the share of insured people that actually use medical services (from the National Survey of Life Conditions in Guatemala, 2014), to correct for the fact that insured people were surveyed inside medical centers<sup>14</sup>. We then apply post-stratification weights regarding the population shares of each crossed gender-age group.

Finally, to retrieve information of some indicators with missing observations due to non-response (attrition), we apply a chained multiple imputation. We follow a Markov Chain Monte Carlo method to get 10 imputed values per missing observation<sup>15</sup> applied to the income group (61 observations), educational attainment (2 observations), and the body-mass index (8 observations).

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<sup>14</sup> We perform an additional robustness test dropping out weights considerations 1 and 2 when constructing the sampling weights. We find that all the estimated average partial effects preserved both their significance and direction, only changing in magnitudes. The output of this exercise is available upon request to the corresponding author (roa@cemla.org).

<sup>15</sup> Multiple imputation allows us to reduce the loss of efficiency which can be incurred simply by ignoring non-responses; the more imputed values we get, the less efficiency is lost. However, as shown by Rubin (1976), for the most common values of the fraction of missing information (normally less than 30%, as in our case), the gain in efficiency is very low beyond the fifth imputation. See Barceló (2006) for a broader explanation.

## Results

Table 2 reports linear regression model estimates for the probability of holding an inclusive insurance product. We show ten specifications, where specifications in columns (1) to (8) include: i) four variables from the vector of personality traits ( $PTRAITS'_i$ ) such as conscientiousness, neuroticism, as well as time and risk preferences variables;<sup>16</sup> ii) the index of technological sophistication ( $TECH_i$ ); and, iii) sociodemographic control dummies ( $X'_i$ ) accounting for gender (reference: female), education (reference group: only kindergarten education), civil status, economic dependents (reference group: no economic dependents), age group (reference group: 24 years old or less), monthly income group (reference group: less than Q800), employment status (reference group: only occasional works or an informal job), and housing type (reference group: people living in a family or third party property). In column (1) all of the three health-related indicators ( $HEALTH'_i$ ) - i.e., smoking and vegetable consumption frequencies, as well as the scale of the body mass index (BMI) - are included, whereas in columns (2) to (4) the specifications have only two of three of them, for all possible combinations. Meanwhile, column (5) incorporates the vector  $COG'_i$  indicators - i.e., financial literacy and numeracy indicators - to a specification similar to the one in column (1), whereas in columns (6) to (7), only one of these indicators is included. As an additional exercise, in column (8) these indicators in  $COG'_i$  are replaced by the compound index of financial capabilities, calculated as a PRIDIT score, which is an index that weights each question by its relative difficulty, measured as the ratio of correct to total answers, and how informative it is, measured by a principal component analysis (Brockett et al. 2002; Behrman et al. 2012). Finally, columns (9) and (10) resembles the specifications of columns 1 and 5, respectively, but excluding non-significant sociodemographic controls. In general, our results show a relatively sizeable goodness of fit compared with models of binary response.

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<sup>16</sup> Indicators of optimism and agreeableness were also included in preliminary specifications, as well as other sociodemographic controls, but none of them resulted to be significant and they tend to create multicollinearity problems (as measured by the tolerance and variance inflation factor tests). These preliminary estimates are available upon request to the corresponding author

**Table 2.** Linear Probability Model Estimates of Being Insured  
*Average Partial Effects*

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Conscientiousness	0.000598 /c	0.000561 /c	0.000617 /b	0.000586 /c	0.000622 /b	0.000632 /b	0.000584 /c	0.000587 /c	0.000894 /a	0.000916 /a
	(0.000306)	(0.000300)	(0.000300)	(0.000301)	(0.000309)	(0.000310)	(0.000304)	(0.000304)	(0.000277)	(0.000282)
Technological Sophistication	0.000265 /b	0.000262 /b	0.000279 /b	0.000272 /b	0.000259 /b	0.000270 /b	0.000253 /b	0.000254 /b	0.000339 /a	0.000325 /a
	(0.000123)	(0.000123)	(0.000121)	(0.000119)	(0.000124)	(0.000124)	(0.000124)	(0.000124)	(0.000110)	(0.000111)
Neuroticism	0.000322 /b	0.000318 /b	0.000295 /b	0.000320 /b	0.000316 /b	0.000307 /b	0.000331 /b	0.000332 /b	0.000275 /b	0.000264 /b
	(0.000131)	(0.000130)	(0.000126)	(0.000130)	(0.000133)	(0.000133)	(0.000132)	(0.000132)	(0.000125)	(0.000126)
Time preferences	0.000634 /b	0.000658 /b	0.000633 /b	0.000620 /b	0.000642 /b	0.000631 /b	0.000645 /b	0.000650 /b	0.000691 /b	0.000690 /b
	(0.000290)	(0.000283)	(0.000285)	(0.000286)	(0.000288)	(0.000290)	(0.000289)	(0.000288)	(0.000271)	(0.000270)
Risk preferences	-6.35e-06	2.89e-05	-2.00e-05	5.71e-06	2.33e-05	-2.69e-05	4.39e-05	2.36e-05	7.58e-05	0.000101
	(0.000275)	(0.000270)	(0.000274)	(0.000274)	(0.000279)	(0.000278)	(0.000277)	(0.000278)	(0.000244)	(0.000249)
Smoked (1 or 2 days)	-9.11e-05	-5.59e-05	-6.90e-05		-8.49e-05	-0.000145	-2.81e-05	-1.93e-05	-0.000164	-0.000167
	(0.000649)	(0.000638)	(0.000654)		(0.000649)	(0.000651)	(0.000647)	(0.000649)	(0.000566)	(0.000572)
Smoked (3 to 5 days)	-0.000198	-0.000131	-0.000147		-0.000181	-0.000214	-0.000164	-0.000139	-0.000228	-0.000218
	(0.000457)	(0.000447)	(0.000463)		(0.000461)	(0.000453)	(0.000466)	(0.000468)	(0.000434)	(0.000434)
Smoked (6 a 9 days)	-0.000587	-0.000505	-0.000587		-0.000630	-0.000491	-0.000730	-0.000709	-0.000462	-0.000478
	(0.000762)	(0.000728)	(0.000664)		(0.000796)	(0.000803)	(0.000754)	(0.000758)	(0.000534)	(0.000572)
Smoked (10 a 19 days)	-0.000873	-0.000485	-0.000679		-0.000831	-0.000938	-0.000764	-0.000751	-0.000735	-0.000737
	(0.000745)	(0.000604)	(0.000687)		(0.000758)	(0.000752)	(0.000753)	(0.000762)	(0.000680)	(0.000691)

Smoked (20 a 29 days)	-0.000216	-0.000256	-0.000202		-0.000251	-0.000238	-0.000226	-0.000197	-0.000201	-0.000253
	(0.000515)	(0.000505)	(0.000506)		(0.000516)	(0.000518)	(0.000513)	(0.000514)	(0.000448)	(0.000454)
Ate Vegetables (Once a week)	9.92e-05	-3.24e-05		5.51e-05	0.000226	0.000218	9.33e-05	8.43e-05	-0.000343	-0.000122
	(0.00108)	(0.00107)		(0.00108)	(0.00110)	(0.00109)	(0.00109)	(0.00109)	(0.00104)	(0.00105)
Ate Vegetables (Twice a week)	-0.000799	-0.000851		-0.000784	-0.000716	-0.000712	-0.000813	-0.000791	-0.000769	-0.000614
	(0.00105)	(0.00105)		(0.00105)	(0.00107)	(0.00106)	(0.00106)	(0.00105)	(0.000988)	(0.000998)
Ate Vegetables (Three times a week)	-0.000574	-0.000594		-0.000521	-0.000508	-0.000450	-0.000643	-0.000610	-0.000563	-0.000426
	(0.00101)	(0.00102)		(0.00100)	(0.00104)	(0.00102)	(0.00102)	(0.00101)	(0.000967)	(0.000982)
Ate Vegetables (Everyday)	-0.000303	-0.000338		-0.000262	-0.000267	-0.000222	-0.000355	-0.000305	-0.000474	-0.000379
	(0.00103)	(0.00104)		(0.00103)	(0.00105)	(0.00104)	(0.00105)	(0.00104)	(0.000985)	(0.000992)
BMI classification: Normal	-0.000969		-0.000816	-0.000689	-0.00105	-0.00102	-0.000990	-0.000966	-0.000837	-0.000926
	(0.000790)		(0.000739)	(0.000662)	(0.000791)	(0.000793)	(0.000789)	(0.000791)	(0.000715)	(0.000716)
BMI classification: Overweight	-0.000684		-0.000561	-0.000427	-0.000788	-0.000722	-0.000743	-0.000702	-0.000668	-0.000773
	(0.000795)		(0.000749)	(0.000680)	(0.000796)	(0.000796)	(0.000796)	(0.000796)	(0.000722)	(0.000721)
BMI classification: Obese	-0.000787		-0.000680	-0.000544	-0.000886	-0.000813	-0.000855	-0.000819	-0.000741	-0.000845
	(0.000848)		(0.000804)	(0.000762)	(0.000849)	(0.000849)	(0.000849)	(0.000848)	(0.000764)	(0.000764)
Financial Literacy					-0.000324	-0.000289				-0.000454
					(0.000339)	(0.000334)				(0.000332)
Numeracy					0.000525		0.000501			0.000555
					(0.000395)		(0.000390)			(0.000353)

Financial Capabilities								0.000130		
								(0.000125)		
Socioeconomically depending group: only younger in age	0.00163 /a	0.00162 /a	0.00162 /a	0.00162 /a	0.00164 /a	0.00161 /a	0.00166 /a	0.00167 /a	0.00150 /a	0.00152 /a
	(0.000366)	(0.000365)	(0.000361)	(0.000365)	(0.000369)	(0.000368)	(0.000369)	(0.000371)	(0.000343)	(0.000342)
Socioeconomically depending group: only older adults	0.000776	0.000849 /c	0.000792 /c	0.000814 /c	0.000846 /c	0.000785 /c	0.000834 /c	0.000799 /c	0.000943 /b	0.00103 /b
	(0.000478)	(0.000472)	(0.000480)	(0.000470)	(0.000479)	(0.000475)	(0.000483)	(0.000482)	(0.000464)	(0.000462)
Socioeconomically depending group: both younger in age older adults	0.00156 /a	0.00163 /a	0.00160 /a	0.00158 /a	0.00157 /a	0.00156 /a	0.00158 /a	0.00156 /a	0.00155 /a	0.00155 /a
	(0.000551)	(0.000536)	(0.000539)	(0.000543)	(0.000547)	(0.000552)	(0.000547)	(0.000550)	(0.000503)	(0.000500)
Equal or most than Q800, less than Q1,600	0.000886	0.000940	0.000860	0.000827	0.000897	0.000836	0.000950	0.000902	0.000679	0.000673
	(0.000731)	(0.000716)	(0.000708)	(0.000707)	(0.000744)	(0.000748)	(0.000728)	(0.000715)	(0.000558)	(0.000566)
Equal or most than Q1,600, less than Q3,200	0.000998	0.00106	0.000925	0.000948	0.000991	0.000958	0.00103	0.00101	0.000757	0.000730
	(0.000723)	(0.000708)	(0.000700)	(0.000700)	(0.000730)	(0.000739)	(0.000715)	(0.000705)	(0.000546)	(0.000551)
Equal or most than Q3,200, less than Q6,400	0.00163 /b	0.00165 /b	0.00158 /b	0.00156 /b	0.00163 /b	0.00160 /b	0.00166 /b	0.00163 /b	0.00146 /a	0.00143 /b
	(0.000760)	(0.000745)	(0.000743)	(0.000734)	(0.000766)	(0.000774)	(0.000753)	(0.000744)	(0.000559)	(0.000562)
Equal or most than Q6,400, less than Q12,800	0.00166 /b	0.00169 /b	0.00157 /b	0.00156 /b	0.00164 /b	0.00164 /b	0.00166 /b	0.00164 /b	0.00162 /b	0.00157 /b
	(0.000799)	(0.000780)	(0.000779)	(0.000777)	(0.000801)	(0.000811)	(0.000790)	(0.000783)	(0.000641)	(0.000646)
Equal or most than Q12,800, less than Q25,600	0.00274 /b	0.00282 /b	0.00254 /c	0.00262 /b	0.00281 /b	0.00274 /b	0.00281 /b	0.00273 /b	0.00253 /b	0.00258 /b
	(0.00134)	(0.00132)	(0.00132)	(0.00129)	(0.00136)	(0.00135)	(0.00135)	(0.00133)	(0.00119)	(0.00120)
Q25,600 and above	0.00265	0.00260	0.00260	0.00267	0.00263	0.00268	0.00260	0.00264	0.00315	0.00304
	(0.00297)	(0.00295)	(0.00295)	(0.00297)	(0.00299)	(0.00299)	(0.00297)	(0.00297)	(0.00294)	(0.00298)

Age: 25 to 34 years	2.79e-05	2.86e-05	1.62e-05	-2.21e-05	6.70e-05	4.69e-05	4.50e-05	4.03e-05	0.000185	0.000220
	(0.000352)	(0.000340)	(0.000342)	(0.000338)	(0.000353)	(0.000352)	(0.000353)	(0.000353)	(0.000326)	(0.000326)
Age: 35 to 44 years	-0.000396	-0.000347	-0.000296	-0.000356	-0.000323	-0.000353	-0.000373	-0.000395	4.07e-05	0.000104
	(0.000431)	(0.000416)	(0.000417)	(0.000421)	(0.000435)	(0.000433)	(0.000432)	(0.000430)	(0.000385)	(0.000386)
Age: 45 to 54 years	-0.000753 /c	-0.000700	-0.000592	-0.000725 /c	-0.000712	-0.000707	-0.000763 /c	-0.000770 /c	-0.000218	-0.000189
	(0.000446)	(0.000434)	(0.000427)	(0.000434)	(0.000448)	(0.000448)	(0.000446)	(0.000445)	(0.000372)	(0.000377)
Age: 55 years or more	0.000527	0.000611	0.000730	0.000607	0.000775	0.000696	0.000583	0.000530	0.00102 /c	0.00133 /b
	(0.000722)	(0.000728)	(0.000684)	(0.000706)	(0.000787)	(0.000777)	(0.000725)	(0.000722)	(0.000599)	(0.000664)
Own housing	0.000953 /b	0.000941 /b	0.000909 /b	0.000902 /b	0.000962 /b	0.000941 /b	0.000975 /b	0.000952 /b	0.000914 /b	0.000946 /b
	(0.000453)	(0.000448)	(0.000450)	(0.000447)	(0.000459)	(0.000456)	(0.000456)	(0.000454)	(0.000416)	(0.000423)
Rent housing	0.000918 /c	0.000986 /b	0.000964 /b	0.000905 /c	0.000939 /c	0.000922 /c	0.000933 /c	0.000903 /c	0.000918 /b	0.000964 /b
	(0.000485)	(0.000479)	(0.000485)	(0.000480)	(0.000489)	(0.000486)	(0.000488)	(0.000486)	(0.000450)	(0.000455)
Laborer, day laborer, domestic servant with contract	0.000314	0.000194	0.000147	0.000339	0.000229	0.000328	0.000218	0.000239		
	(0.000843)	(0.000746)	(0.000783)	(0.000805)	(0.000863)	(0.000848)	(0.000857)	(0.000850)		
Qualified laborer, junior foreman, micro- entrepreneur	-0.000411	-0.000451	-0.000508	-0.000405	-0.000501	-0.000366	-0.000545	-0.000539		
	(0.000825)	(0.000733)	(0.000775)	(0.000789)	(0.000847)	(0.000832)	(0.000840)	(0.000834)		
Mid-level administrative employee, salesperson, secretary, section head, specialized technical, independent professional, primary or secondary teacher	0.000472	0.000443	0.000350	0.000479	0.000383	0.000497	0.000360	0.000372		
	(0.000746)	(0.000645)	(0.000688)	(0.000708)	(0.000764)	(0.000751)	(0.000759)	(0.000754)		

Mid-level executive, general manager of a medium or small enterprise, independent professional of traditional careers	0.000417	0.000360	0.000274	0.000420	0.000328	0.000417	0.000332	0.000328		
	(0.000912)	(0.000823)	(0.000857)	(0.000869)	(0.000920)	(0.000915)	(0.000916)	(0.000911)		
Senior executive or Director of a large companies, owners of medium and large companies, independent professionals of great prestige	0.000517	0.000446	0.000388	0.000539	0.000249	0.000529	0.000248	0.000300		
	(0.00170)	(0.00169)	(0.00167)	(0.00169)	(0.00173)	(0.00170)	(0.00173)	(0.00170)		
Housewife, unemployed, does not work	-0.000367	-0.000389	-0.000405	-0.000334	-0.000467	-0.000326	-0.000506	-0.000482		
	(0.000722)	(0.000629)	(0.000670)	(0.000687)	(0.000741)	(0.000728)	(0.000736)	(0.000729)		
Female	3.99e-05	5.34e-05	6.56e-05	0.000132	8.31e-05	1.65e-05	0.000106	7.77e-05		
	(0.000305)	(0.000303)	(0.000304)	(0.000269)	(0.000305)	(0.000303)	(0.000306)	(0.000306)		
Incomplete Primary Education	0.000559	0.000447	0.000239	0.000522	0.000676	0.000652	0.000571	0.000442		
	(0.00134)	(0.00122)	(0.00130)	(0.00113)	(0.00135)	(0.00135)	(0.00134)	(0.00133)		
Complete Primary Education	0.000901	0.000779	0.000358	0.000914	0.000944	0.000886	0.000958	0.000918		
	(0.00111)	(0.00100)	(0.00103)	(0.000888)	(0.00111)	(0.00111)	(0.00111)	(0.00111)		
Incomplete High School Education	-0.000307	-0.000334	-0.000724	-0.000310	-0.000218	-0.000259	-0.000274	-0.000374		
	(0.000958)	(0.000822)	(0.000902)	(0.000725)	(0.000956)	(0.000959)	(0.000955)	(0.000952)		
Complete High School Education	0.000188	0.000114	-0.000244	0.000183	0.000192	0.000220	0.000158	8.24e-05		
	(0.00102)	(0.000901)	(0.000954)	(0.000780)	(0.00102)	(0.00102)	(0.00102)	(0.00102)		
Incomplete Technical Education	-0.000476	-0.000532	-0.000819	-0.000387	-0.000457	-0.000462	-0.000473	-0.000533		
	(0.00111)	(0.000982)	(0.00103)	(0.000886)	(0.00112)	(0.00111)	(0.00112)	(0.00111)		



Complete Technical Education	0.000253	0.000208	-0.000246	0.000246	0.000323	0.000255	0.000318	0.000247		
	(0.00104)	(0.000931)	(0.000975)	(0.000798)	(0.00104)	(0.00104)	(0.00104)	(0.00104)		
Incomplete University Education	0.000119	8.51e-05	-0.000310	0.000138	0.000103	0.000151	6.92e-05	2.00e-05		
	(0.00104)	(0.000908)	(0.000984)	(0.000769)	(0.00104)	(0.00104)	(0.00104)	(0.00104)		
Complete University Education	0.00145	0.00142	0.000928	0.00144	0.00137	0.00145	0.00137	0.00136		
	(0.00122)	(0.00114)	(0.00115)	(0.00100)	(0.00123)	(0.00123)	(0.00123)	(0.00123)		
Masters/Doctoral Education	0.00259	0.00241	0.00184	0.00262	0.00267	0.00272	0.00253	0.00245		
	(0.00293)	(0.00288)	(0.00291)	(0.00301)	(0.00292)	(0.00293)	(0.00292)	(0.00292)		
Constant	-0.00344	-0.00411 /b	-0.00348 /c	-0.00372 /c	-0.00354	-0.00354	-0.00342	-0.00326	-0.00407 /b	-0.00425 /b
	(0.00236)	(0.00203)	(0.00200)	(0.00222)	(0.00237)	(0.00237)	(0.00236)	(0.00234)	(0.00176)	(0.00177)
<i>N</i>	701	701	701	701	701	701	701	701	701	701
R-squared	0.203	0.202	0.200	0.199	0.204	0.203	0.204	0.203	0.156	0.159
Adj_R_squared	0.144	0.147	0.146	0.146	0.143	0.143	0.144	0.143	0.116	0.116

Robust standard errors in parentheses, /a:  $p < 0.01$ , /b:  $p < 0.05$ , /c:  $p < 0.1$ . Weighted estimation for two strata (having insurance and don't having insurance). Poststratification weights based on the share of each gender-age groups of total adult population (15 years old onwards) in Guatemala as of 2016. Survey non-response was adjusted using 10 multiple imputations for the following variables (number of imputed observations): Monthly income (61), Education (2), and Body Mass Index (8). Non-significant regressors in any of the specifications are not displayed (see footnote 14). Other controls included in each specification: Socioeconomically depending groups (young people / elder people/ both / none). Monthly income groups and housing status.

The evidence presented in Table 2 indicates that the degree of conscientiousness is positively and significantly related to the likelihood of holding an inclusive insurance product in Guatemala, and this result is robust across all the specifications, in spite of having some differences regarding to the magnitude of the coefficients. Interestingly, our findings also suggest that people with a higher neuroticism score are also significantly more likely to own an inclusive insurance product, and this result is also robust for the different specifications, with similar magnitudes of the coefficients. Moreover, we find a significant and robust evidence suggesting that having a preference for the medium run increases the probability of having an inclusive insurance product, in a similar magnitude across different specifications, unlike risk preferences, which resulted to be non-significant to affect the probability of being insured.

Furthermore, technological sophistication resulted to be positively and significantly related to the probability of holding an inclusive insurance product, and this result is robust and has similar magnitudes for the whole set of specifications. This means that individuals who enjoy both a better understanding of and a greater access to technology are more likely to hold an inclusive insurance product in Guatemala.

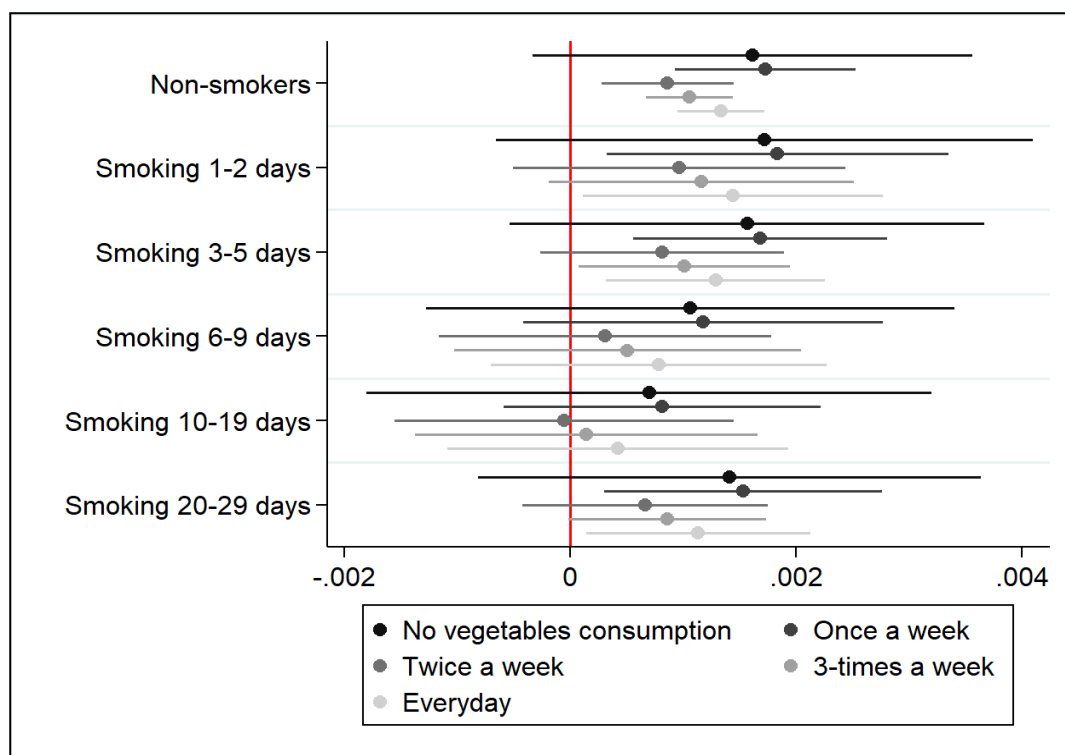
However, controls of financial knowledge and numerical abilities are found to have a non-significant effect in all of the specifications where both or one of them is included -i.e., columns (5), (6), (7), and (10) - neither the composite indicator of financial capabilities included in column (8).

As for the sociodemographic controls, monthly income has a significant and positive effect on the probability of having inclusive insurance, starting from the group with a monthly income of between Q3,200 and Q6,400. Interestingly, this effect increases in magnitude as income increases, up until the second highest group, from Q12,800 to Q25,000, and this result is robust in all the specifications. Other sociodemographic characteristics that resulted to affect positively and significantly the likelihood of holding an inclusive insurance product are: having economic dependents - excepting the group that has only older adults as dependents in the first specification- and people that own or rent their house (as opposed to subletting a room from a family member or third person). These findings are also robust across the specifications. For the rest of the sociodemographic controls we find no strong evidence on effects

associated with gender, civil status, education or age groups, although significant coefficients on the latter were found for some groups some specifications.

Regarding health habits, we find no evidence that the frequency of smoking or consuming vegetables, and the level of body mass index, have significant average partial effects on the probability of having an inclusive insurance product in Guatemala, when these former variables are considered individually. Nevertheless, to assess the strength of this conclusion, we exploit the attributes of the linear probability model regressions to examine the heterogeneity of groups by health-related indicators through the marginal effects of combinations between these groups over the probability of holding an inclusive insurance product. In this regard, Figure 1 shows the marginal effect coefficients resulting of combining groups of smoking and vegetable consumption frequencies. This figure shows significant and positive marginal effects from people who do not smoke and eat vegetables once a week or above, regarding that the confidence intervals of the coefficients for these groups lie on the positive region of the plot. On the other hand, people who smoked during 20 to 29 in the previous month to the survey and eat vegetables once a week are significantly more likely to have an inclusive insurance product, whereas a similar result is found when combining this same group of smokers with people who consumes vegetables on a daily basis. The significant effects found in both extreme categories, people who do not smoked and frequent smokers, might be reflecting non-linear effects in the probability of have an inclusive insurance product.

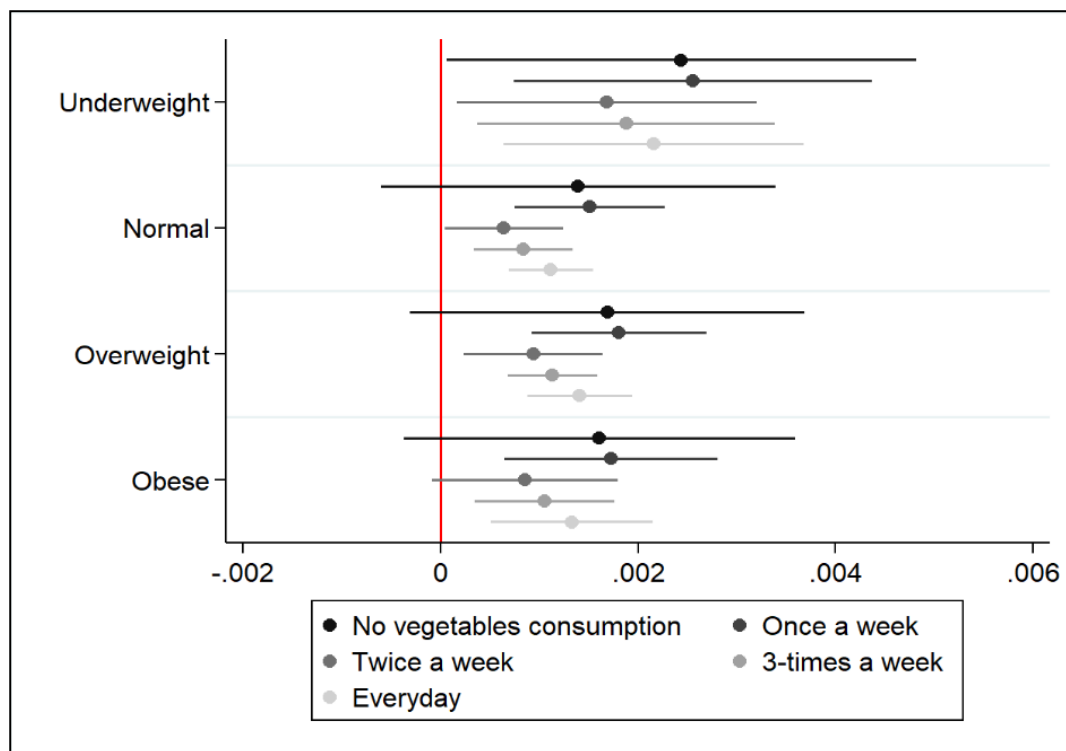
**Figure 1.** Effects of Interactions between Smoking and Vegetables Consumption Habits on the Estimates of Being Insured  
*Marginal effects by group from specification (1) on Table 2*



*Note:* Round markers account for punctual marginal effects, while horizontal lines represent confidence intervals at 95% of significance.

Figure 2 presents the marginal effect coefficients for combinations of BMI scales and vegetables consumption. This figure shows that the marginal effects on the probability of being insured tend to be positive and significant across groups, excluding only people who do not eat vegetables and have a normal weight, or are overweighted or obese. Furthermore, the marginal effects are slightly higher in magnitude for people underweight with a relatively slow consumption of vegetables, i.e., people who eat vegetables once a week at best.

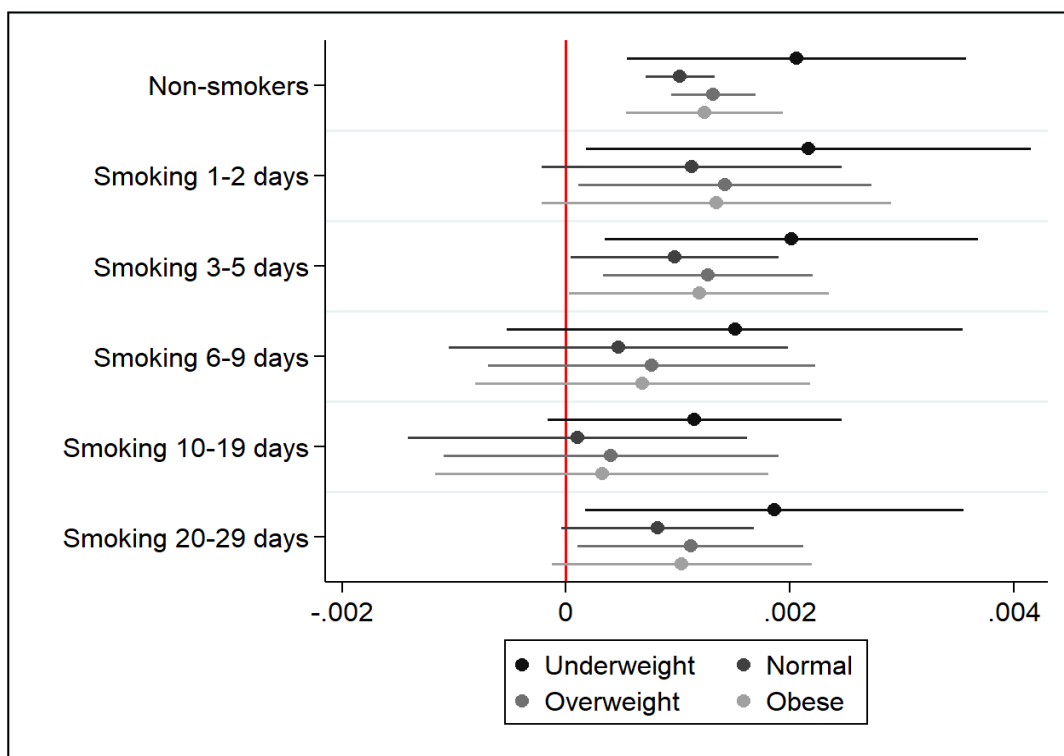
**Figure 2.** Effects of Interactions between Levels of Body Mass Index and Vegetables Consumption Habits on the Estimates of Being Insured  
*Marginal effects by group from specification (1) on Table 2*



*Note:* Round markers account for punctual marginal effects, while horizontal lines represent confidence intervals at 95% of significance.

In Figure 3, marginal effect coefficients from combinations of groups by smoking habits and BMI are depicted. In this plot positive and significant marginal effects can be observed for non-smokers for all BMI scales, underweight people that smoked over 1-2 days, 3-5 days, and 20-29 days, and overweighed people that smoked in these three latter frequencies.

**Figure 3.** Effects of Interactions between Smoking Frequency and Levels of the Body Mass Index on the Estimates of Being Insured  
*Marginal effects by group from specification (1) on Table 2*

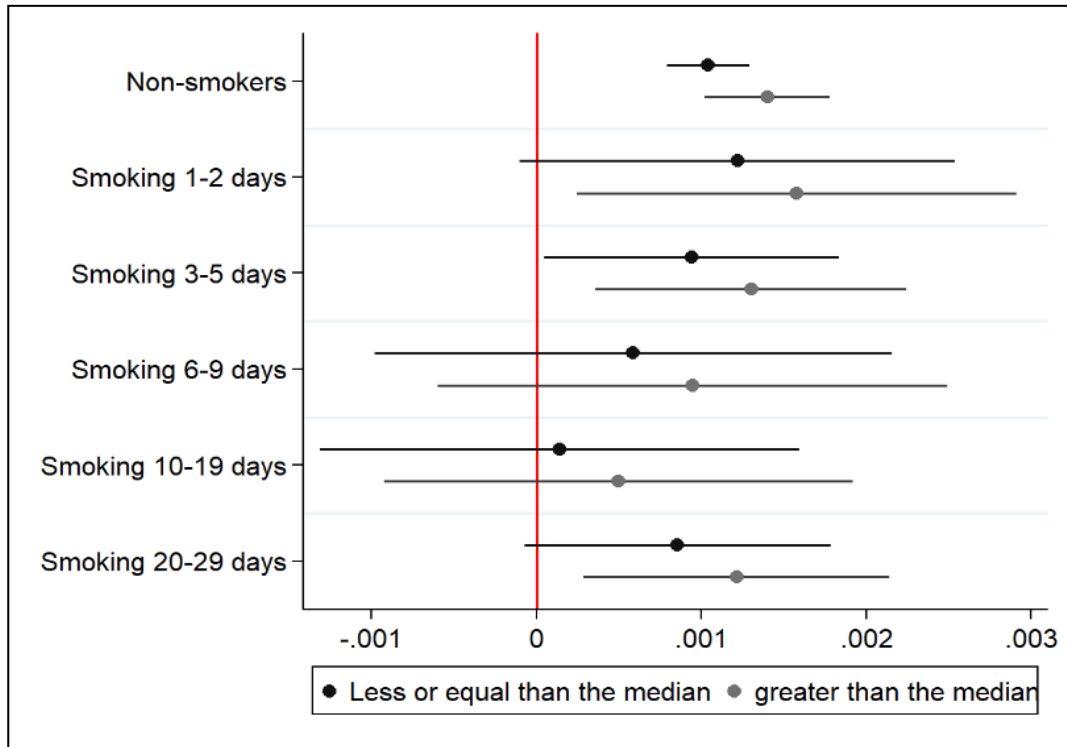


*Note:* Round markers account for punctual marginal effects, while horizontal lines represent confidence intervals at 95% of significance

Another interesting result arises when examining the marginal effects for combinations of the conscientiousness score and health related indicators. In this sense, we find evidence that having a conscientiousness score greater than the median significantly increases the probability of having inclusive insurance for groups with a smoking frequency of 1-2 days and 20-29 days. On the other hand, the pattern found on the average partial effect of conscientiousness does not hold when considering its marginal effect for the group of people that smoked between 6-9 days, neither for the group that smoked between 10-19 days (see Figure 4).

**Figure 4.** Effects of Interactions between Smoking Frequency and Conscientiousness on the Estimates of Being Insured

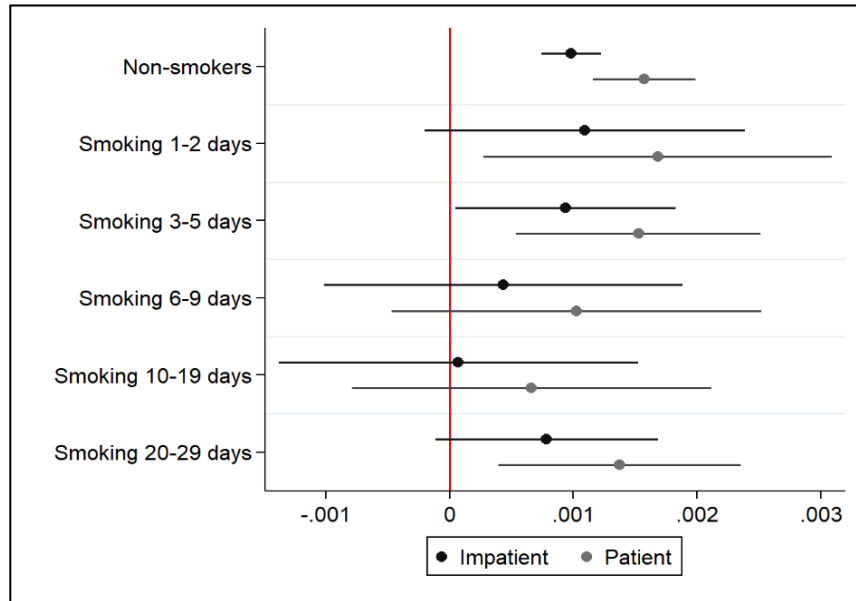
*Marginal effects by group from specification (1) on Table 2, but replacing the continuous score of Conscientiousness with a dummy indicator to separate the sample by the median.*



*Note:* Round markers account for punctual marginal effects, while horizontal lines represent confidence intervals at 95% of significance.

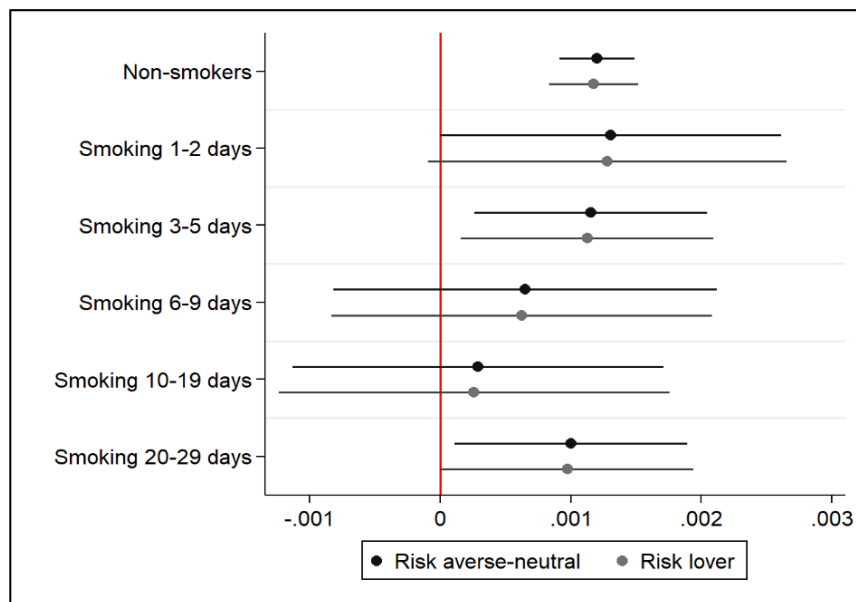
Finally, marginal effects analysis by the combination of smoking habits and other regressors also revealed evidence of a positive and significant effect on the probability of having an inclusive insurance product. For instance, the marginal effect is positive and significant for high-frequency smokers (i.e., people smoking during 20 to 29 days) when they are: 1) patient, according to the time-preferences indicator (see Figure 5); 2) risk averse or neutral, according to the risk-preferences indicator (see Figure 6); and, 3) male (see Figure 7).

**Figure 5.** Effects of Interactions between Smoking Frequency and Time Preferences on the Estimates of Being Insured  
*Marginal effects by group from specification (1) on Table 2.*



*Note:* Round markers account for punctual marginal effects, while horizontal lines represent confidence intervals at 95% of significance.

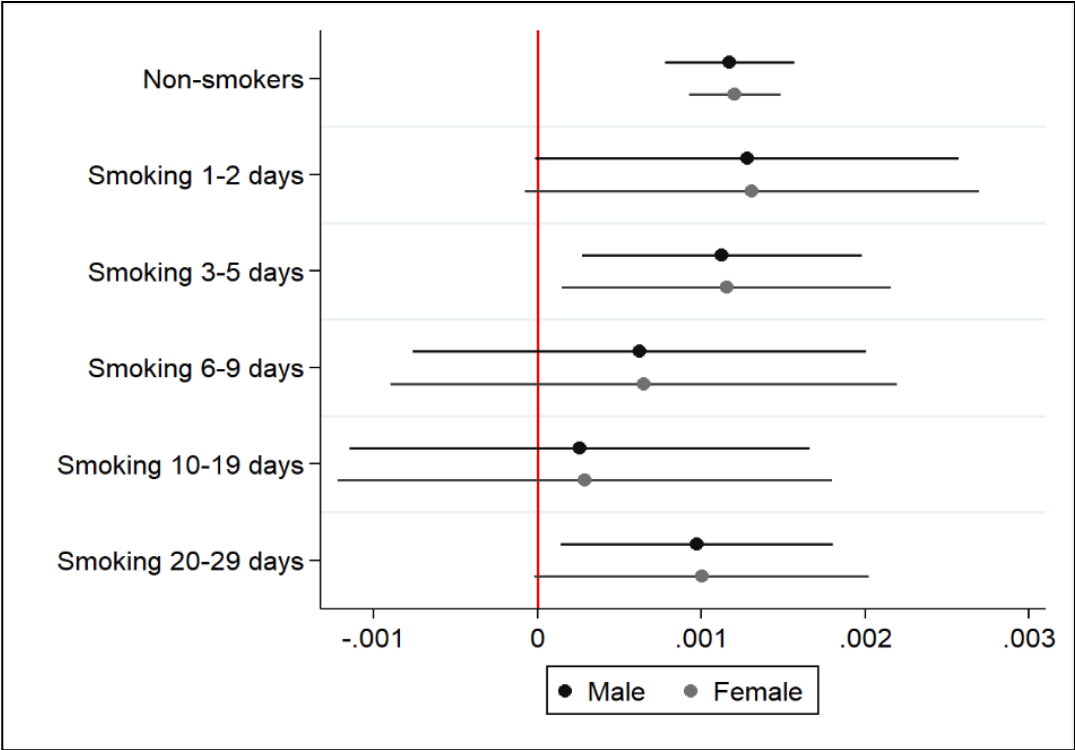
**Figure 6.** Effects of Interactions between Smoking Frequency and Risk Preferences on the Estimates of Being Insured  
*Marginal effects by group from specification (1) on Table 2.*



*Note:* Round markers account for punctual marginal effects, while horizontal lines represent confidence intervals at 95% of significance.



**Figure 7.** Effects of Interactions between Smoking Frequency and Gender on the Estimates of Being Insured  
*Marginal effects by group from specification (1) on Table 2.*



*Note:* Round markers account for punctual marginal effects, while horizontal lines represent confidence intervals at 95% of significance.

## Discussion Of The Results And Conclusions

The main findings of the paper are as follows. Firstly, a grittier and more neurotic individual tends to have a higher probability of holding an inclusive insurance product in Guatemala. The grit result is consistent with related findings that more diligent individuals make more sophisticated and desirable financial decisions (Eskreis-Winkler et al., 2014; Roa et al., 2018). We consider the neuroticism result particularly interesting, because evidence has been found that higher levels of this trait are linked with risk aversion (Rustichini et al., 2016). Although the potential relationship between personality traits and preferences is outside the scope of this paper, our result supports the idea that a person with higher neuroticism levels might have more difficulty handling situations with uncertain outcomes, and for this reason may decide to invest in an insurance product.

In our study, we find that an individual who shows more patience in the medium run slightly has a higher probability of having an inclusive insurance product. If we consider the time preference and grit results together, the issue of the relationship between personality traits and preferences reappears in the forum, because it might be possible that a grittier individual is less impulsive in making decisions and consequently more patient. Nevertheless, risk aversion does not seem to explain the decision of an individual to buy an inclusive insurance product which is in contradiction with the established literature on insurance decisions.

In our sample, numerical abilities and financial literacy, as measured by knowledge of the inflation concept, play no role in financial decisions. Surveys assessing financial literacy and cognition usually pose a more complete series of questions. Relatedly, we find evidence that individuals with better understanding of technology are more likely to own an inclusive insurance product in our sample.

The previous findings lead us to conclude that to gain a better understanding on what motivates vulnerable people to hold an inclusive insurance product implies improving instruments to measure risk aversion, cognition, and personality traits. Several studies argue that it is important to measure risk and time preferences, based

on incentivized lab/field experiments, to complement survey measures of economic preferences (Becker et al., 2012; Burks et al., 2015; Dohmen et al., 2018). Also, it is of relevance to understand the relationship between preferences, cognitive and personality characteristics (Dohmen et al., 2018).

Last but not less important, although we did not find a significant effect of health habits on the probability of holding inclusive insurance, an assessment of the marginal effects of combinations between these habits in first place, as well as a subsequent analysis combining smoking habits with some other controls, yield some significant results. In particular, the marginal effects on the probability of being insured estimated for people who smoked with the highest frequency (20-29 days) are significant and positive when they eat vegetables once a week or every day. In addition, for this group of frequent smokers, being underweight or overweight positively affects their probability of being insured, as well as being male. Finally, when examining heterogeneous pattern regarding combinations of groups by personality traits and health-related indicators, having a score of conscientiousness greater than the median, or being time-patient, or risk-neutral or adverse people also increase the probability of having an inclusive insurance product for the category of frequent smokers (20-29 days).

We would like to conclude by remarking that the results in this paper provide a line for future research that combines new personality and cognition theories with traditional insurance theory —namely sociodemographic variables and economic preferences. Although we should be cautious when generalizing our results (due to the size of the samples considered in our study), this approach will help in the analysis of individuals' general attitudes towards health and the financial decisions they make in this regard. It might help to stimulate the adoption of inclusive insurance products among vulnerable populations in developing countries.

# Appendix

## SURVEY QUESTIONNAIRE

Good day, my name is \_\_\_\_\_ from Elephant Marketing Insight, a company dedicated to investigating market behavior.

At this time, we are conducting a simple survey regarding insurance plans: “would you be willing to spare a few minutes to help us?”. The information that you give us is confidential and will only be used for our general statistics. Your name, date of birth, and other personal information will never be published. Do you agree to participate?

Yes → Continue                      NO → Thank the caller and end conversation

### SECTION I. TENURE AND USE OF INSURANCE

For the following questions please select the answer that best reflects your reality. There are no right or wrong answers. We only want to know your opinion. Mark with an X the obtained respons.

**1. Do you have a form of insurance?**

Yes.....1 → Continue    No.....2 → Go to question 14

**2. What type of insurance do you have?**

- Debtor’s Life .....1
- Life .....2
- Protection from harms to business .....3
- Student Insurance .....4
- Migrant insurance .....5
- Agricultural insurance .....6
- Health insurance .....7
- Other .....8      Specify:\_\_\_\_\_

**3. Which of the following sources of information influence you most when deciding to buy your product (ANSWER MULTIPLE)**

- |  |   |   |    |
|--|---|---|----|
| Advertisements put out by the producer<br>.....                          | 1 | My own past experience .....                                | 9  |
| Articles/Publications in news sources .....                              | 2 | Financial institution’s webpage .....                       | 10 |
| Counseling from my workplace .....                                       | 3 | Internet advertisement.....                                 | 11 |
| Advice of friends and family members (not<br>working in finance) .....   | 4 | Radio advertisement.....                                    | 12 |
| Advice of friends and family members<br>(working in finance) .....       | 5 | TV Advertisement .....                                      | 13 |
| A personal contact/person I speak to at a<br>financial institution ..... | 6 | Recommendation of an independent<br>financial advisor ..... | 14 |
| Information from the financial institution by<br>postal mail.....        | 7 | Other sources<br>(Specify_____)                             | 15 |

Information from the financial institution by telephone..... 8
<b>4. Do you know what your insurance covers?</b> Yes.....1                      No.....2    More or less, partially .....3
<b>5. Do you know what additional or complementary services your insurance offers?</b>  Yes.....1 → Continue    No.....2 → o to question 9  Preventative medicine consultations.....1 Cytologies.....2 Odontology .....3 Clinical laboratory tests .....4 Home assistance.....5 Coupons or discounts .....6 Over-the-phone assistance .....7 Deals with pharmacies.....8 Deals with gyms .....9 Deals with other establishments.....10 Other.....11    Specify: _____
<b>6. Have you used any of these extra services offered by your insurance?</b> Yes.....1 → o to question 8                      No .....2 → Continue
<b>7. What is the principle reason that you have not used these extra services?</b> I am not interested in using these services .....1 I can't miss work .....2 I don't have time .....3 I don't have money.....4 They are far from the doctors office.....5 Ignorance/ Didn't know.....6 Other: Specify: _____
<b>8. Would you prefer to:</b>  Keep these.....1                      Eliminate these.....2
<b>9. Would you be interested in continuing to pay for your current insurance?</b> Yes.....1 → o to question 11                      No.....2 → Continue
<b>10. Why do you no longer want to pay for your insurance?</b> Price increasement.....1 It does not meet my needs.....2 I can't afford to keep paying .....3 I'm not satisfied with the service.....4 There have been changes to the policy .....5 I'm going to change my company .....6 Other: (Specify) _____

<p><b>11. Have you suffered any serious accident in the last 12 months?</b>  Yes.....1 → Continue                      No.....2 → Go to question 13</p>
<p><b>12. Was the accident's coverage rejected by your insurance?</b>  Yes.....1                      No.....2</p>
<p><b>13. How would you rate your insurance policy? → Pasa a la pregunta 15</b>  Excellent .....1  Good .....2  Average.....3  Bad.....4</p>
<p><b>ONLY FOR PEOPLE WHO ANSWERED "NO" TO QUESTION 1</b></p> <p><b>14. Please mention the main reasons that you do not have insurance.</b>  I haven't heard about any insurance product.....1  I have heard about this insurance product, but I am not interested.....2  I have heard about this insurance product, but I find it quite difficult to understand.....3  Insurance is too costly .....4  I already possess a form of security through another entity .....5  I didn't think that the product would offer me any sort of benefit.....6  I had insurance with another entity and it was a bad experience, so I don't want to get a new insurance.....7  A family member has a plan and I am covered under it.....8  Other..... Specify: _____</p>
<p><b>SECTION II. HABITS AND PREFERENCES</b></p> <p>The following questions are aimed at better understanding the subject's habits.</p>
<p><b>15. What is your weight in pounds?.....</b></p>
<p><b>16. What is your height in meters?.....</b></p>
<p><b>17. Over the past 30 days, how many days did you smoke cigarrates?</b>  0 days.....1  1 or 2 days.....2  3 to 5 days.....3  6 to 9 days..... 4  10 to 19 días..... 5  20 to 29 days.....6</p>
<p><b>18. Over the last 30 days, how many times did you eat vegetables like lettuce, tomato, carrots, or zucchini?</b>  Never.....1  Once a week.....2  Twice a week .....3  Three times a week .....4  Every day of the week.....5</p>

- 19. Let's assume you get Q1000 from participation in a Cuchubal<sup>17</sup>, and you can choose between the following two types of payment. Which one would you choose?**  
 Q1,000 in one month.....1  
 Q1,100 in two months.....2
- 20. Let's assume you get Q1000 from participation in a Rosca. and you can choose between the following two types of payment. Which one would you choose?**  
 Q1,000 in one year and a month.....1  
 Q1,100 in one year and two months.....2
- 21. Let's assume you get Q1000 from participation in a Cuchubal. and you are offered the possibility of participating in the following game, where you flip a coin. You can put down any amount of the money that you just won. If your coin lands on tails, you win 3x what you initially bet. But If it lands on head, you lose the invested money. How much of your new Q1000 will you bet on the game?**  
  
 I will put in \_\_\_\_\_

**SECTION III. GRIT**

Now I will read a series of statements. Please respond each of them by indicating if they are very much like you (Number 1), mostly like you (Number 2), somewhat like you (Number 3), not much like you (Number 4), or not like you at all (Number 5). Remember to be honest, there are no right or wrong answers.

**22. New ideas and projects sometimes distract me from previous ones.**

- Very much like me .....1  
 Mostly like me .....2  
 Somewhat like me .....3  
 Not much like me .....4  
 Not like me at all .....5

**23. Setbacks don't discourage me:**

- Very much like me .....1  
 Mostly like me .....2  
 Somewhat like me .....3  
 Not much like me .....4  
 Not like me at all .....5

**24. I have been obsessed with a certain idea or project for a short time but later lost interest:**

- Very much like me .....1  
 Mostly like me .....2  
 Somewhat like me .....3  
 Not much like me .....4  
 Not like me at all .....5

<sup>17</sup> A "Cuchubal" is an informal mechanism of rotating savings and credit groups or associations, better known as "ROSCAS".

**25. I am a hard worker:**

- Very much like me .....1
- Mostly like me .....2
- Somewhat like me .....3
- Not much like me .....4
- Not like me at all .....5

**26. I often set a goal but later choose to pursue a different one:**

- Very much like me .....1
- Mostly like me .....2
- Somewhat like me .....3
- Not much like me .....4
- Not like me at all .....5

**27. I have difficulty maintaining my focus on projects that take more than a few months to complete:**

- Very much like me .....1
- Mostly like me .....2
- Somewhat like me .....3
- Not much like me .....4
- Not like me at all .....5

**28. I finish whatever I begin:**

- Very much like me .....1
- Mostly like me .....2
- Somewhat like me .....3
- Not much like me .....4
- Not like me at all .....5

**29. I am diligent:**

- Very much like me .....1
- Mostly like me .....2
- Somewhat like me .....3
- Not much like me .....4
- Not like me at all .....5

**SECTION IV. OPTIMISM**

Now, I will read another series of statements. Select a number after each statement to represent your agreement with how the statement reflects you. Number 5 signifies “Strongly Agree”, Number 4 “Agree”, Number 3 “Neutral”, Number 2 “Disagree”, Number 1 “Strongly Disagree”. Remember, there are no correct answers.

**30. In uncertain times, I usually expect the best.**

- 1: Strongly disagree.....1
- 2: Disagree.....2
- 3: Neutral.....3



<p>4: Agree.....4 5: Strongly agree.....5</p>
<p><b>31. It is easy for me to relax.</b> 1: Strongly disagree.....1 2: Disagree.....2 3: Neutral.....3 4: Agree.....4 5: Strongly agree.....5</p>
<p><b>32. If something can go wrong for me, it will.</b> 1: Strongly disagree.....1 2: Disagree.....2 3: Neutral.....3 4: Agree.....4 5: Strongly agree.....5</p>
<p><b>33. I'm always optimistic about my future.</b> 1: Strongly disagree.....1 2: Disagree.....2 3: Neutral.....3 4: Agree.....4 5: Strongly agree.....5</p>
<p><b>34. I enjoy my friends a lot.</b> 1: Strongly disagree.....1 2: Disagree.....2 3: Neutral.....3 4: Agree.....4 5: Strongly agree.....5</p>
<p><b>35. It's important for me to keep busy.</b> 1: Strongly disagree.....1 2: Disagree.....2 3: Neutral.....3 4: Agree.....4 5: Strongly agree.....5</p>
<p><b>36. I hardly ever expect things to go my way.</b> 1: Strongly disagree.....1 2: Disagree.....2 3: Neutral.....3 4: Agree.....4 5: Strongly agree.....5</p>

<p><b>37. I don't get upset too easily.</b></p> <p>1: Strongly disagree.....1  2: Disagree.....2  3: Neutral.....3  4: Agree.....4  5: Strongly agree.....5</p>
<p><b>38. I rarely count on good things happening to me.</b></p> <p>1: Strongly disagree.....1  2: Disagree.....2  3: Neutral.....3  4: Agree.....4  5: Strongly agree.....5</p>
<p><b>39. Overall, I expect more good things to happen to me than bad.</b></p> <p>1: Strongly disagree.....1  2: Disagree.....2  3: Neutral.....3  4: Agree.....4  5: Strongly agree.....5</p>
<p><b>SECTION V. NUMERICAL ABILITIES</b></p> <p>Through the following questions we want to know how familiar you are with some financial concepts.</p>
<p><b>40. Imagine that 5 brothers are given a gift of Q1000. If the brothers have to share the money equally, how much does each brother get?</b></p> <p>Write down response numerically:_____1  Don't know .....2  Refused .....3</p>
<p><b>41. Now imagine that the brothers have to wait for one year to get their share of the Q1000, and the inflation rate is 2% annually. In one year's time will they be able to buy:</b></p> <p>More with their share of the money than they could today .....1  The same amount .....2  Less than they could buy today .....3  It depends on the types of things they want to buy.....4  Don't know .....2  Refused .....3</p>
<p><b>42. Suppose you put Q1,000 into a savings account with a guaranteed interest rate of 2% per year. You don't make any further payments into this account and you don't withdraw any money. How much would be in the account at the end of the first year, once interest payment is made?</b></p> <p>Write down response numerically:_____1  Don't know .....2  Refused .....3</p>

**43. And with the same interest rate per year, how much would be in the account at the end of five years?**

- More than Q1,100.....1
- Exactly Q1,100 .....2
- Less than Q1,100.....3
- It is impossible to tell from the information given.....4
- Don't know.....5
- Refused.....6

**SECTION VI. SOCIODEMOGRAPHIC CHARACTERISTICS**

**44. What is your gender? (do not ask, note for observation)**

- Male.....1      Female.....2

**45. How many siblings do you have?**

Number: \_\_\_\_\_

**46. What is your level of education?**

- No level of education.....1
- Pre-school.....2
- Elementary-Middle, incomplete.....3
- Elementary-Middle, complete.....4
- High School, incomplete,.....5
- High school, complete.....6
- Trade school, incomplete .....7
- Trade school, complete.....8
- University, incomplete .....9
- University, complete .....10
- Masters/Doctorate .....11
- No response .....12

**47. What is your current civil status?**

- Single.....1
- Civil union.....2
- Married.....3
- Divorced.....4
- Widowed.....5

**48. How many of the following groups depend economically on you?**

- Younger in age .....1  
How many? \_\_\_\_\_ None \_\_\_\_\_
- Older adults .....2  
How many? \_\_\_\_\_ None \_\_\_\_\_

**49. What is the educational level of your mother?**

- No education at all.....1
- Pre-school.....2
- Elementary-Middle, incomplete.....3
- Elementary-Middle, complete.....4
- High School, incomplete,.....5
- High school, complete.....6
- Technical education, incomplete .....7
- Technical education, complete.....8
- University, incomplete .....9
- University, complete .....10
- Masters/Doctorate .....11
- No response .....12

**50. What is the educational level of your father?**

- No education at all.....1
- Pre-school.....2
- Elementary-Middle, incomplete.....3
- Elementary-Middle, complete.....4
- High School, incomplete,.....5
- High school, complete.....6
- Technical education, incomplete .....7
- Technical education, complete.....8
- University, incomplete .....9
- University, complete .....10
- Masters/Doctorate .....11
- No response .....12

**51. In what area or municipality do you currently reside?**

- Amatitlán.....1
- Chinautla.....2
- Chuarrancho.....3
- Ciudad de uatemala .....4
- Fraijanes.....5
- Mixco.....6
- Palencia.....7
- San José del olfo .....8
- San José Pinula.....9
- San Juan Sacatepéquez.....10
- San Miguel Petapa.....11
- San Pedro Ayampuc.....12
- San Pedro Sacatepéquez.....13
- San Raymundo.....14
- Santa Catarina Pinula.....15
- Villa Canales.....16
- Villa Canales.....17
- Other .....18 Specify: \_\_\_\_\_

**52. What type of housing to you live in?**

- Your own home.....1
- A rental home .....2
- A family member or third party's home .....3

**53. Can you tell me what range of income your household falls under?**

- Less than Q800.....1
- Equal or most than Q800, less than Q1,600.....2
- Equal or most than Q1,600, less than Q3,200.....3
- Equal or most than Q3,200, less than Q6,400.....4
- Equal or most than Q6,400, less than Q12,800.....5
- Equal or most than Q12,800, less than Q25,600.....6
- Q25,600 and above.....7
- No response.....8

**54. What's your age?**

- 18 to 24 years.....1
- 25 to 34 years.....2
- 35 to 44 years.....3
- 45 to 54 years.....4
- 55 years or more.....5

**55. What is your profession or title?**

- Occasional work/ informal jobs.....1  
(Washing, toilet work, occasional domestic work, "pololos", car care, among others)
- Labourer, day labourer, domestic servant with contract .....2
- Qualified labourer, junior foreman, micro-entrepreneur (kiosks, taxis, retail, traveling).....3
- Mid-level administrative employee, salesperson, secretary, section head, specialized technical, independent professional (accountant, systems analyst, designer, musician), primary or secondary teacher .....4
- Mid-level executive (manager, sub-manager), general manager of a medium or small enterprise. Independent professional of traditional careers (lawyer, doctor, architect, engineer, agronomist).....5
- Senior executive (general manager) of a large enterprise. Directors of large companies, entrepreneurs owners of medium and large companies, independent professionals of great prestige .....6
- Housewife, Unemployed, does not perform any type of work or job .....7

**SECTION VII. USE OF NETWORKS, TECHNOLOGY, AND RADIO**

Please answer the following questions.

**56. Do you listen to the radio?**

- Yes.....1 → Continue
- No.....2 → o to question 61

**57. How often do you listen to the radio?**

- Monday to Friday.....1
- Every Day.....2

<p>Saturday and Sunday.....3  Occasionally .....4  Hardly ever.....5  Never.....6</p>
<p><b>58. What device do you use to get it?</b>  Conventional (old-school) radio.....1  Computer .....2  Cellphone.....3  Car radio .....4  Other.....5 Specify:_____</p>
<p><b>59. What stations do you listen to?</b>  Write it down:_____ Something else:_____</p>
<p><b>60. What type of programs do you tend to listen to?</b>  News.....1  Health.....2  Religious or meditative .....3  Entertainment .....4  Music.....5  Other (Specify): .....6</p>
<p><b>61. What level of knowledge do you think to have on computer science in general?</b>  None .....1  Elementary.....2  Medium.....3  Advanced.....4  Expert.....5</p>
<p><b>62. Do you have access to the internet?</b>  Yes.....1 → Continue No.....2 → o to question 69</p>
<p><b>63. What device do you use to access the internet?</b>  Your own tablet .....1  Your own computer .....2  Internet Café .....3  Your own cellphone.....4  Other.....5</p>
<p><b>64. How often do you use the internet?</b>  Several times a day.....1  Once a day.....2  Once a week.....3  Hardly ever.....4  Never.....5</p>
<p><b>65. What is your purpose when using the internet?</b>  To check my email.....1</p>

<p>To visit social networks.....2</p> <p>To research.....3</p> <p>To communicate with others .....4</p> <p>To meet new people.....5</p> <p>Other.....6</p>
<p><b>66. What do you normally look at/ use on the internet?</b></p> <p>Videos.....1</p> <p>Music.....2</p> <p>Podcasts.....3</p> <p>News.....4</p> <p>Email.....5</p> <p>Social media.....6</p> <p>Apps (applications).....7</p> <p>Other.....8</p>
<p><b>67. How often do you download apps?</b></p> <p>Once a week.....1</p> <p>Once a month.....2</p> <p>Once every three months .....3</p> <p>Once every six months .....4</p> <p>Once a year .....5</p> <p>I never download apps.....6</p>
<p><b>68. What social networks do you use?</b></p> <p>Facebook.....1</p> <p>oogle .....2</p> <p>Instagram.....3</p> <p>LinkedIn.....4</p> <p>Pinterest.....5</p> <p>Twitter.....6</p> <p>Snapchat.....7</p> <p>Tuenti.....8</p> <p>Badoo.....9</p> <p>Flickr.....10</p> <p>Foursquare.....11</p> <p>ChatHispano / IRH Hispano.....12</p> <p>None.....13</p> <p>Other..... Specify: _____</p>
<p><b>69. Do you have a cell phone?</b></p> <p>Yes.....1 → Continue      No.....2 → Finish</p>
<p><b>70. Is it a smartphone?</b></p> <p>Yes.....1      No.....2</p>

THANK SUBJECT AND FINISH

NAME OF QUESTIONER: \_\_\_\_\_

## SUPPORTING INFORMATION

**Table S1.** Preferences, numerical abilities, financial knowledge and personality traits

	With Insurance	Without Insurance	Total
	Freq. (%)	Freq. (%)	Freq. (%)
<b>Risk Preferences</b>			
Risk Averse	60.16	59.53	59.53
Risk Lover	39.84	40.47	40.47
<b>Time Preferences</b>			
Impatient	58.09 <sup>/c</sup>	65.19	65.18
Patient	41.91 <sup>/c</sup>	34.81	34.82
<b>Numerical Abilities</b>			
Incorrect	40.15	34.54	34.55
Correct	26.23 <sup>/b</sup>	18.19	18.20
Don't Know/ No response	33.63 <sup>/a</sup>	47.26	47.25
<b>Financial Education</b>			
Incorrect	71.66	71.87	71.87
Correct	24.29	24.76	24.76
Don't Know/ No response	4.05	3.37	3.37
<b>Diligence Score</b>			
Equal or less than 3	9.55 <sup>/b</sup>	15.72	15.71
More than 3; equal or less than 4	73.11	72.51	72.51
More than 4; equal or less than 5	17.34 <sup>/b</sup>	11.77	11.77
<b>Quartiles of Optimism Score</b>			
Equal or less than 1	0.41	1.22	1.21
More than 1; equal or less than 2	13.76 <sup>/c</sup>	19.58	19.58
More than 2; equal or less than 3	52.90	51.42	51.42
More than 3; equal or less than 4	32.94	27.78	27.79
<b>Quartiles of Neurotism Score</b>			
Equal or less than 1	16.29 <sup>/b</sup>	22.85	22.84
More than 1; equal or less than 2	43.37	41.77	41.78
More than 2; equal or less than 3	36.26	30.59	30.59
More than 3; equal or less than 4	4.07	4.79	4.79
<b>Agreeableness Score</b>			
0	1.49 <sup>/c</sup>	3.67	3.67
1	0.41 <sup>/b</sup>	2.39	2.38
2	5.45	7.20	7.20



3	13.34	12.56	12.56
4	79.31	74.18	74.19

Note: Weighted percentages following the criteria outlined in Section 3.1. Superscripts in the frequencies of the insured group indicate that the difference regarding to the frequencies of the uninsured group are statistically significant based on the Wald F-test of mean differences (/a:  $p < 0.01$ , /b:  $p < 0.05$ , /c:  $p < 0.1$ ).

**Table S2.** Socio-demographic characteristics

	With insurance	Without Insurance	Total
	Freq. (%)	Freq. (%)	Freq. (%)
<b>Gender</b>			
Male	47.40	48.73	48.73
Female	52.60	51.27	51.27
<b>Number of siblings</b>			
Zero	2.68	3.83	3.83
One	12.74	12.25	12.25
Two	25.44	23.16	23.16
Three	22.36	19.88	19.88
Four to six	27.70	30.43	30.43
More than six	9.08	10.45	10.44
<b>Educational level</b>			
Preschool	0.00	0.21	0.21
Elementary-Middle, incomplete	0.57	0.77	0.77
Elementary-Middle, complete	4.39	5.30	5.30
High school, incomplete	3.93 <sup>/a</sup>	12.62	12.61
High school, complete	29.72	28.90	28.90
Trade school, incomplete	0.21 <sup>/a</sup>	3.09	3.08
Trade school, complete	16.02	16.32	16.32
University, incomplete	23.93	24.66	24.66
University, complete	17.22 <sup>/a</sup>	6.88	6.89
Master/Doctorate, complete	3.82 <sup>/b</sup>	1.05	1.06
No response	0.20	0.19	0.19
<b>Marital status</b>			
Single	48.07 <sup>/a</sup>	59.42	59.41
Free union	7.53	10.83	10.82
Married	37.90 <sup>/a</sup>	26.10	26.11

Divorced	2.69	1.55	1.55
Widowed	3.82	2.11	2.11
<b>Groups that socioeconomically depend on you</b>			
Only younger-in-age individuals	36.41/ <sup>a</sup>	22.91	22.93
Only older people	16.22	11.90	11.90
Both younger-in-age and older people	12.85/ <sup>b</sup>	8.10	8.10
None	34.52/ <sup>a</sup>	57.09	57.07
<b>Monthly income</b>			
Less than Q800	0.63	1.87	1.87
From Q800 and less than Q1,600	6.52/ <sup>b</sup>	12.72	12.71
From Q1,600 and less than Q3,200	20.26/ <sup>a</sup>	30.19	30.18
From Q3,200 and less than Q6,400	32.94	27.82	27.83
From Q6,400 and less than Q12,800	20.02/ <sup>b</sup>	13.25	13.26
From Q12,800 and less than Q25,600	9.11/ <sup>a</sup>	3.60	3.61
More than Q25,600	1.75	0.50	0.50
No response	8.77	10.04	10.04
<b>Age group</b>			
18-24 years old (y.o.)	27.63/ <sup>a</sup>	41.05	41.03
25-34 y.o.	28.15/ <sup>c</sup>	21.94	21.94
35-44 y.o.	19.39/ <sup>b</sup>	14.25	14.26
45-54 y.o.	10.41	10.43	10.43
55 y.o. or more	14.42	12.34	12.34
<b>Employment status</b>			
Occasional work/ informal jobs	0.29	1.50	1.50
Laborer, day laborer, domestic servant with contract	3.17	4.26	4.26
Qualified laborer, junior foreman, micro-entrepreneur	10.94/ <sup>b</sup>	16.37	16.37
Mid-range administrative employee, salesperson, secretary, section head, specialized technical, independent professional (accountant, systems analyst, designer, musician), primary or secondary teacher	55.02/ <sup>a</sup>	39.53	39.55
Mid-range executive, general manager of a SME, independent professional from traditional careers	11.58	7.91	7.92

Director/ Senior executive in large companies, owners of large and medium companies, independent professionals with outstanding achievements	5.57 <sup>/b</sup>	2.08	2.09
Housewife, unemployed, not performing any job	13.43 <sup>/a</sup>	28.34	28.32

*Note:* Weighted percentages following the criteria outlined in Section 3.1. Superscripts in the frequencies of the insured group indicate that the difference regarding to the frequencies of the uninsured group are statistically significant based on the Wald F-test of mean differences (/a:  $p < 0.01$ , /b:  $p < 0.05$ , /c:  $p < 0.1$ ).

**Table S3.** Health habits and Body Mass Index

	<b>With insurance</b>	<b>Without Insurance</b>	<b>Total</b>
	<b>Freq. (%)</b>	<b>Freq. (%)</b>	<b>Freq. (%)</b>
<b>Days that Smoked in the Previous 30 days</b>			
None	80.38	78.84	78.84
1 or 2	3.3	3.43	3.43
3 to 5	2.84	4.33	4.33
6 to 9	0.45 <sup>/c</sup>	1.59	1.59
10 to 19	2.15	2.52	2.52
20 to 29	10.88	9.29	9.3
<b>Frequency of Vegetable Consumption in the Previous 30 days</b>			
None	1.21	1.06	1.07
Once a week	10.54	10.31	10.31
Twice a week	15.38	18.65	18.64
Three times a week	37.02	37.32	37.32
Every day of the week	35.85	32.66	32.66
<b>Body Mass Index (World Health Organization's categories)</b>			
Underweight	2.54	2.93	2.93
Normal	36.86	45.3	45.29
Overweight	43.91 <sup>/b</sup>	35.81	35.82
Obese	16.28 <sup>/c</sup>	14.12	14.12
No response	0.41 <sup>/c</sup>	1.84	1.84

*Note:* Weighted percentages following the criteria outlined in Section 3.1. Superscripts in the frequencies of the insured group indicate that the difference regarding to the frequencies of the uninsured group are statistically significant based on the Wald F-test of mean differences (/a:  $p < 0.01$ , /b:  $p < 0.05$ , /c:  $p < 0.1$ ).

**Table S4.** Indicators of technological sophistication

	<b>With Insurace</b>	<b>Without Insurance</b>	<b>Total</b>
	<b>Freq. (%)</b>	<b>Freq. (%)</b>	<b>Freq. (%)</b>
<b>Number of social networks</b>			
Not using social networks	14.60/ <sup>c</sup>	21.45	21.45
One social network	12.54	14.41	14.40
Two	27.11	28.42	28.42
Three	23.29	22.21	22.21
Four	14.38/ <sup>b</sup>	8.29	8.29
Five or more	8.08	5.23	5.23
<b>Number of devices for accessing to Internet</b>			
Not having access to Internet	13.96/ <sup>b</sup>	21.24	21.23
One device	31.69/ <sup>b</sup>	39.78	39.77
Two	43.92/ <sup>a</sup>	31.60	31.62
Three	9.59	7.00	7.00
Four	0.84	0.38	0.38
<b>Having a smartphone</b>			
Yes	90.93/ <sup>b</sup>	81.28	81.29
No	6.76/ <sup>b</sup>	12.59	12.59
No response	2.31/ <sup>b</sup>	6.13	6.12
<b>How often the respondent access to Internet</b>			
Several times a day	74.25/ <sup>a</sup>	59.05	59.07
Once a day	8.58/ <sup>b</sup>	12.87	12.86
Once a week	2.64/ <sup>b</sup>	6.21	6.21
Almost never	0.57	0.62	0.62
Not having access to Internet	13.96/ <sup>b</sup>	21.24	21.23
<b>Computing self-reported knowledge</b>			
Null or none	2.45	2.88	2.88
Beginner	18.79/ <sup>a</sup>	29.19	29.18
Medium level	58.31	56.21	56.21
Advanced	17.04/ <sup>a</sup>	9.27	9.28
Expert	3.41	2.45	2.45
<b>Highest value of technification index by quartiles</b>			
1st quartile (lower level)	22.51/ <sup>a</sup>	36.68	36.67
2nd quartile	26.09	24.03	24.03
3rd quartile	23.84	21.78	21.78
4th quartile (higher level)	27.55/ <sup>a</sup>	17.50	17.52

*Note:* Weighted percentages following the criteria outlined in Section 3.1. Superscripts in the frequencies of the insured group indicate that the difference regarding to the frequencies of the uninsured group are statistically significant based on the Wald F-test of mean differences (*/a: p < 0.01, /b: p < 0.05, /c: p < 0.1*).

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