TRENDS AND APPLICATIONS

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Identifying Non-Adopter Consumer Segments: An Empirical Study on Earthquake Insurance Adoption in Turkey

In recent years, steadily climbing natural disaster losses have increased the need to promote new financial risk transfer mechanisms, including insurance, as a mitigation tool to build resilient communities to recover faster after disaster occurrence. However, while the societal need for such policies is high, demand for natural disaster insurance typically is still low. While there is ample research on positive adoption decisions, reasons for non-adoption has not yet received the attention it deserves. Using the case of earthquake insurance in Turkey, this study investigates how public policy makers and insurance companies can differentiate non-adopter segments and consequently develop targeted strategies to stimulate the uptake of disaster insurance. Our study develops a non-adopter typology consisting of four segments—state reliant positivist, dependers, adversaries, and uninformed loners. Differences among segments provide policy makers and insurance companies with meaningful insights to design and consequently introduce affordable natural disaster insurance to the market.

The recent rise in frequency and severity of natural disasters has amplified the importance of natural disaster insurance for economic wellbeing of both countries and individuals (e.g., the Indian tsunami in 2004; the Hurricane Katrina in New Orleans in 2005; the earthquake in China in 2008, and most recently the Hurricane Irma in the United States and Caribbean). As such events are becoming increasingly common, the burden on

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governments to support citizens becomes too costly. For example, the 1994 Northridge Earthquake in California has cost society approximately 50 billion dollars, the Sichuan Earthquake in 2008 even amounting up to $148 billion. Therefore, insurance companies have started offering natural disaster insurance tailored to such events, either as an individual company or in partnership with a government (Mahul 2013). Despite its increased necessity, consumers typically seem to resist adopting natural disaster insurance. For example, despite the fact that nearly all parts of the country are within a high-risk zone and major earthquakes such as the one in Van province in Eastern Turkey are causing large damages and costing many lives, the number of individuals that have adopted earthquake insurance is still not, and will not be any time soon, be meeting the targets of 60% ownership set by the government. As the first example of Public Private Partnership in a developing market, the Turkish Catastrophe Insurance Pool (TCIP, i.e., Doğal afet sigortaları kurumu [DASK] in Turkish) was initiated on September 2000 following the devastating 1999 Marmara Earthquake, and became one of the largest insurance pools in the world. The main aim of the TCIP is to transfer the national risk to worldwide risk by sharing pools under the management of the international reinsurance companies. To date, however, there are still many consumers who have not purchased the insurance, despites its mandatory nature.

While previous research has often studied adopters versus non-adopters, this is typically approached as a dichotomous empirical investigation. Different forms of non-adoption segments are not well-studied (Claudy, Garcia, and O'Driscoll 2015; Lee, Kwon, and Schumann 2005). However, describing all non-adopters as a homogeneous population may be inaccurate and inappropriate. Therefore, the main research question investigated in this paper is to understand *which factors drive membership of a specific consumer non-adopter segment*. An initial investigation of segmentation studies in the field of consumer resistance as well as disaster insurance seems to support this differential approach (see Table 1). Consumer resistance research is used as a point of departure, as this stream of literature specifically investigates consumers' decision *not* to adopt as distinctly different from a positive adoption decision.

As Table 1 illustrates, there are indeed few studies that investigate difference between non-adopters in the consumer resistance literature, and there are no segmentation studies on non-adopter segments available in the disaster insurance literature. The notion that "innovation resistance varies in degree" was first suggested by Ram and Sheth (1989). The authors discuss how resistance can vary from a more passive form of resistance (inertia)

TABLE 1
Overview Resistance Segmentation Studies (in Chronological Order)

Source	Context: Resistance or Adoption	Method/Sample	Unit of Analysis	Segmentation	Findings
Disaster insurance literature					
Baumann and Sims (1978)	Adoption flood insurance	Empirical	Both adopters and non-adopters	No	Significant: previous experience of flood damage, social class, and personality (internal/external locus of control) Not significant: age, marital status, family size, belief in protection, expectations regarding future floods, attitude toward disaster relief
Palm and Hodgson (1992)	Adoption earthquake insurance	Empirical	Both adopters and non-adopters	No	Significant: perceived risk Not Significant: spatially geophysical risk, income, equity in the home, age of the head of household, or other socioeconomic characteristics
Browne and Hoyt (2000)	Adoption flood insurance at state level	Empirical	Adopters # and value of insurance buy	No	Significant: income, price (−), the level of flood losses in the state during the prior year, disaster relief, mortgages (−) Not significant: mitigation
Raschkya and Weck-Hannemann (2007)	Adoption natural disaster insurance	Conceptual	Not applicable	No	Charity hazard was discussed as a barrier. However, it is only discussed as an expectation from the government aid
Lo (2013)	Adoption flood insurance	Empirical	Both adopters, non-adopters	No	Significant: perceived social expectations Not significant: perceived risk, income

TABLE 1
Continued

Source	Context: Resistance or Adoption	Method/Sample	Unit of Analysis	Segmentation	Findings
Antwi-Boasiako (2017)	Adoption natural disaster insurance	Empirical	Both adopters and non-adopters	No	Significant: locus of control (+), knowing a victim (−) Not significant: the value of the building (wealth), length of occupancy, level of education, risk perception, being a victim of a disaster
Consumer resistance literature					
Sheth (1981)	Resistance	Conceptual	Not applicable	No	Habit or satisfaction with an existing behavior and perceived risks
Ram and Sheth (1989)	Resistance	Conceptual	Not applicable	No	Functional barriers (usage, value and risk) Psychological barriers (tradition and image)
Szmigin and Foxall (1998)	Resistance to retail payment systems	Qualitative	Non-adopters	No	Resistance to an innovation can take the form of outright rejection, postponement or opposition.
Lee, Kwon, and Schumann (2005)	Non-adopter segments for Internet banking	Empirical	Both adopters and non-adopters	Yes (a-priori)	Segments: adopters, persistent non-adopters, prospect adopters Perceived attributes of technology-based services, perceived risk, compatibility, experience
Laukkanen et al. (2007)	Resistance to mobile banking by mature consumers	Empirical	Both adopters and non-adopters	No	Functional barriers: usage, value, risk Psychological barriers: tradition and image Value barrier is the most intense barrier. Risk and image barrier are the most intense for mature ones.

TABLE 1
Continued

Source	Context: Resistance or Adoption	Method/Sample	Unit of Analysis	Segmentation	Findings
Garcia, Bardhi and Friedrich (2007)	Resistance to screw-cap wine closures	Qualitative	Both adopters, non-adopters	No	The role of vertical and horizontal cooperation as marketing strategies for resistant innovations
Laukkanen, Sinkkonen and Laukkanen (2008)	Resistance to Internet banking	Empirical	Non-adopters	Yes (a-priori)	Segments: rejection, postponement and opposition Barriers: usage, value, risk, tradition and image Risk is the most intense barrier, then tradition and image (i.e., psychological barriers)
Kleijnen, Lee, and Wetzels (2009)	Resistance to new products: food, domestic appliances and electronics	Qualitative	Non-adopters	Yes (a-priori)	Segments: rejection, postponement and opposition Antecedents: risk (physical, functional, economic, social), traditions and norms, usage pattern, perceived image
Laukkanen, Sinkkonen and Laukkanen (2009)	Resistance to internet banking	Empirical	Non-adopters	Yes (a-priori)	Segments: non-resistors, functional resistors, psychological resistors and dual resistors. Barriers: usage, value, risk, tradition and image
Laukkanen and Kiviniemi (2010)	Resistance to mobile banking	Empirical	Both adopters and non-adopters	No	Barriers: usage, value, risk, tradition and image Information\guidance decreased the most usage barrier, followed by image, value and risk barriers. No effect on tradition barrier

TABLE 1
Continued

Source	Context: Resistance or Adoption	Method/Sample	Unit of Analysis	Segmentation	Findings
Wiedmann et al. 2011	Resistance to natural gas vehicles in the automotive sector	Empirical	Not specified	Yes (post-hoc)	Segments: Status-oriented skeptics, ecology-minded non-drivers, performance-oriented traditionalists, risk-averse drivers
				Cluster analysis	Barriers: financial, technological performance, infrastructural performance, physical, time, social, psychological risk
Talke and Heidenreich, (2014)	Active and passive resistance	Conceptual	Not applicable	Not applicable	Segments of passive resistance: low, cognitive, situational dual passive resistance. Active resistance: no segment was specified
Claudy, Garcia, and O'Driscoll (2015)	Resistance to micro wind turbines/car sharing	Empirical	Non-adopters	No	Reasons for adoption: benefits Reasons against adoption: barriers (e.g., value, risk, usage)
Laukkanen (2016)	Resistance to internet and mobile banking	Empirical	Both adopters, non-adopters	Yes (a-priori)	Segments: adopters, postponers, rejecters Barriers: usage, values, risk, tradition, image
Mani and Chouk (2017)	Resistance to smart products	Empirical	Both adopters, non-adopters	No	Innovation characteristics (uselessness, novelty, price, intrusiveness) Consumer characteristics (privacy concerns, dependence, self-efficacy)
Current study	Non-adopter segments of earthquake insurance	Empirical	Non-adopters	Yes (post-hoc)	Segments: state-reliant positivists, dependers, adversaries, uninformed loners
				Latent class model	Factors driving non-adoption: risk avoidance, trust in others, attitude insurance, price, knowledge, image insurance company, trust insurance company

to more active resistance. Other studies have followed this idea of varying forms of resistance, distinguishing for example postponement, rejection, and opposition (e.g., Kleijnen, Lee, and Wetzels 2009; Laukkanen, Sinkkonen and Laukkanen 2008; Szmigin and Foxall 1998), or simply passive versus active resistance (Talke and Heidenreich 2014). Those that have investigated such differences, typically have used only ad-hoc segmentation to identify resistance segments (Kleijnen, Lee, and Wetzels 2009; Laukkanen, Sinkkonen and Laukkanen 2008, 2009). Despite limited investigation of different segments, theory does suggest that differences between non-adopters are likely to exist and are meaningful to consider in terms of strategy development. Not all drivers of consumer resistance (i.e., non-adoption) impact the different types of resistance in the same degree. Kleijnen, Lee, and Wetzels (2009) provide a detailed overview of these potential differences in their literature overview and through qualitative interviews uncover that consumers indeed revealed different reasons for distinctive types of resistance when looking at product innovations. Additional studies have conceptualized different drivers to lead to different types of resistance, but empirical support is lacking. Hence, a more fundamental understanding of the different drivers as well as an empirical investigation of these differences is called for in order to move beyond dichotomous segmentation (i.e., adopters versus non-adopters) as well as to provide a more fine-grained understanding of what drives this non-adoption.

For this purpose, we first theoretically recognize a spectrum of factors that are currently recognized in the resistance and natural disaster literature. Across studies, several factors are identified that relate to other the innovation, its provider or the intended adopter. In a similar vein, Table 2 provides a detailed overview of the factors included in our study, which are related to the insurance itself (attitude, price, and knowledge), the insurance company (trust and image) and the consumer (risk avoidance and trust in others). These insights are not only theoretically meaningful, but also particularly relevant for public policy; understanding how these factors lead to different non-adoption segments can be used to guide policymakers in the implementation of regulations and provision of incentives to foster innovative insurance market development relevant to society as a whole and which are typically known to have slow take-off times.

METHOD

Sample

In total, 802 respondents were surveyed face-to-face based on simple random sampling of addresses provided by the Turkish Statistical

TABLE 2
Overview of Factors that Drive Non-Adoption of Disaster Insurance

Driver	Motivation	Literature Stream: Resistance	Literature Stream: Insurance	Sources
Risk avoidance	Particularly perceptions of risk vary greatly between different types of resistance. Protection motivation theory also suggests that motivation toward protection to a large extent is driven by costs-benefit analysis where risk perceptions play an important role. Specifically, in the context of insurance, findings indicate that the more risk averse an individual the higher the amount insured.	x	x	Kleijnen, Lee, and Wetzels (2009); Antwi-Boasiako (2017); Browne and Hoyt (2000); Mossin (1968); Palm and Hodgson (1992); Park, Borde, and Choi (2002); Schlesinger (2000); Schwarcz (2010)
Trust in others (i.e., charity hazard)	We specifically focus on charity hazard as a maladaptive coping mechanism, i.e., consumers externalizing the solution to the problem to their environment, relying on others to help them cope, even when this is not realistic. Consumers rely on various others, ranging from friends, family, and community, to nonprofit organizations or government emergency program. Insurance literature recognizes this as the so-called "charity hazard." Few studies explicitly investigate the charity hazard effect on earthquake insurance demand and the results are rather ambiguous.		x	Browne and Hoyt (2000); Gurenko et al. (2006); Raschkya and Weck-Hannemann (2007); Slovic et al. (2004)

TABLE 2
Continued

Driver	Motivation	Literature Stream: Resistance	Literature Stream: Insurance	Sources
General attitude toward insurance	While insurance typically tends to be classified as unsought products that consumers spend little time thinking about, recent developments have certainly changed that. Some consumers simply look less favorable upon insurance as a category, and tend to insure the bare minimum of what is required. Such consumers are particularly likely to resist new types of insurance as well.		x	De Bettignies, Lépineux, and Tan (2006); Pomerantz, Chaiken, and Tordesillas (1995)
Price	Price is related to economic value consumers perceive, which is frequently discussed as a factor influencing resistance. If the price barrier would be overcome, such consumers would often be inclined to adopt. This is often not the case for those that reject or oppose. These segments tend to be less sensitive to price, as the rejection or opposition are likely to be driven by fundamental issues.	x	x	Kleijnen, Lee, and Wetzels (2009); Laukkanen, Sinkkonen and Laukkanen (2008, 2009); Ram and Sheth (1989); Shoemaker and Shoaf (1975); Browne and Hoyt (2000); Mani and Chouk (2017)
Knowledge	By using their knowledge, consumers start to understand the benefits of innovations and how to effectively use them. Protection motivation theory also suggests that by obtaining knowledge, consumers are better able to determine to which extend to newly proposed coping strategy (i.e., adopting the insurance) is effective. At the same time, learning more could also become a burden as consumers perceive information overload, creating cognitive distance from the learning process and in fact stimulating resistance.	x	x	Herbig and Day (1992); Herbig and Kramer (1994); Hirschman (1987); Oreg (2006); Ram and Sheth (1989); Tunner Jr., Day, and Crask (1989)

TABLE 2
Continued

Driver	Motivation	Literature Stream: Resistance	Literature Stream: Insurance	Sources
Trust in insurance company	Insurance companies are often believed to project overly positivistic scenarios as to what consumers can expect from their services. A significant number of consumers do not even trust insurance companies to actually compensate them in case of an event that would warrant compensation. Even worse, a number of malpractices in recent years have made consumers wary of new insurance offerings, making the trust in the insurance company an important resistance factor.	x		Bearden and Shimp 1982; Chen and Mau (2009); De Bettignies, Lépineux, and Tan (2006); Kleijnen, Lee, and Wetzels (2009)
Image insurance company	Image pertains to a set of impressions consumers have of a certain company and their overall brand evaluation as such. It serves as an extrinsic cue that consumers use as a signal to base their decisions on. Especially in recent years, the insurance industry has been heavily criticized for being too profit-focused and less concerned with their so-called "duty of care." The public debates on insurance companies, their exorbitant profits, management bonuses, and seeming lack of sensitivity to discussions on public welfare have caused strong negative reactions by the public.	x	x	Blackford (2014); Bolkenstein et al. (2014); Kim and Lavack (1996); Ram and Sheth (1989); Venard and Hanafi (2008)

Institute. Respondents consisted of inhabitants of six different regions of Ankara which have different socio-economic characteristics. Despite the fact that this insurance is compulsory by law, the numbers indeed showed insufficient take-off, with only 36% (285 respondents) actually owning an earthquake insurance. Only non-adopters (517 respondents, 55.5% women, with an average age of 39) were included in the latent class analysis, as the focus of our study is to distinguish non-adoption segments.

Measures

The survey contained previously developed 5-point Likert scales (Table 3) and some sociodemographics (age, gender, income, and education). To measure trust-in-other variables, respondents were asked to rank seven alternatives, including state, family, relatives, charity, friends, none, and fate. When coding, the alternative ranked first, was coded with seven, so that a higher mean implied more importance and vice versa. In case an alternative was not ranked, a zero was assigned. Seven trust-in-other variables were created for each alternative with this way. Three additional questions were included to inspect the relationship with the latent class cluster solution. These questions were (1) "ownership of any insurance," (2) "purchase intention of TCIP," and (3) whether they want to purchase TCIP if they have more income. We also measured experience with disasters (Browne and Hoyt 2000; Palm and Hodgson 1992) to control for its effects. However, we did not include this variable in our final analysis, because there were few respondents (23) with such an experience.

Latent Class Cluster Analysis

Latent class cluster analysis (LCA) is a model-based clustering where individuals are assumed to belong to one of K latent classes, with the number of classes and their sizes unknown a priori (Vermunt and Magidson 2005). In this approach, the assumption is that consumers belonging to the same latent class are similar in the sense that their observed scores come from the same probability distributions. Advantages of this method over traditional ad-hoc clustering method are (1) the possibility of including variables of different scales within the same model, (2) the convenience due to statistical model selection criteria and probability-based classification, (3) the possibility of classifying new cases with scoring equation, and (4) the simultaneous estimation of segments and covariate effects on segments (for a more extensive discussion see Wedel and Kamakura 2000).

TABLE 3
Measurement Constructs, Scale Items, and CFA results

Contruct (Source), Cronbach's Alpha, Items	CR/VE[a]	λ	λ^a
Risk avoidance (Burton et al. 1998) $\alpha = .70$	.70/.45		
I do not take life risks		.57	.58
I do not take financial risks		.71	.71
I do not bet, gamble, play horse racing (deleted)		−.21	—
I have often concerns about myself and my family (deleted)		.19	—
Almost every day I experience a scary event (deleted)		.04	—
I do not like to take risks		.70	.70
Trust in others variables[b]: In case earthquake hit, who do you think will help you? Please rank the alternatives 1 (first) to 7 (last)			
1. Trust in others: state			
2. Trust in others: family			
3. Trust in others: relative			
4. Trust in others: charity			
5. Trust in others: friends			
6. Trust in others: none			
7. Trust in others: fate			
Attitude toward insurance (Ellen et al. 2000) $\alpha = .86$	.86/.51		
I think about insurance negatively (R)		.77	.77
I do not think good about insurance (R)		.76	.76
I think insurance is useful		.67	.67
I think it's irrational to get insurance (R)		.75	.75
I do not think it will make a difference whether you are insured or not (R)		.69	.69
I think it's important to be insured		.61	.61
Price (Sweeney and Soutar 2001) $\alpha = .80$	.81/.52		
Insurance policies are reasonably priced		.59	.59
Insurance policies offer value for money		.83	.83
Insurance is a good service for the money paid.		.83	.83
Buying an insurance is economical		.60	.60
Knowledge (Mangleburg and Bristol 1998) $\alpha = .83$	.84/.64		
I am a knowledgeable consumer about insurance		.90	.90
I know a lot about different types of insurance		.85	.85
I am usually well-informed about what is a reasonable price to pay for insurance		.63	.63
Trust in the insurance company (Tax et al. 1998) $\alpha = .79$	.81/.59		
I believe insurance companies cannot be relied upon to keep its promises (R)		.82	.81
I believe insurance companies are trustworthy		.88	.89
I find it necessary to be cautious in dealing with insurance companies(R) (deleted)		.35	-
Overall, I believe insurance companies are honest		.57	.57
Image insurance companies (Bruner II and Hensel 1992) $\alpha = .86$	.88/.71		
The impression I get from insurance companies is not good (R)		.61	.61
The impression I get from insurance companies is favorable		.94	.94
The impression I get from my insurance companies is satisfactory		.93	.93
Purchase intention in a future time: Yes/No/Not sure			
Purchase intention if more income available: Yes/No			
Own any insurance product: Yes/No			

α, cronbach's alpha; CR, construct reliability; R, reverse item; VE, average variance extracted.
[a]All factor loadings (λ, standardized) are significant at .05 level.
[b]Recoded as 1 indicating last, 7 indicating first and 0 indicating non-rated alternatives.

After deciding on the number of latent classes based on statistical criteria, indicators, and external variables, namely covariates and distal outcomes, can be examined regarding the latent class membership in three-step LCA, providing further understanding of the unobserved heterogeneity (Asparouhov and Muthén 2014; Vermunt 2010). Covariates are the external variables predicting the class membership. Distal outcomes (i.e., dependent) are the external variables that are predicted by the class membership.

To decide the final number of segments, multiple criteria were considered: Bayesian information criterion (BIC), consistent Akaike information criterion (CAIC), model parsimony, and easiness of interpretability of the segments. BIC is the most widely used one and is more effective for detecting correct models in LCA compared with other information criteria such as AIC (Vermunt and Magidson 2005). Internal stability of the segment solution is assessed using a split samples procedure.

RESULTS

Construct Validity

We conducted confirmatory factory analysis using LISREL 8.8 (Jöreskog and Sörbom 1999) to assess construct validity of multi-item scales. We assessed the measurement model fit with multiple criteria next to the chi-square statistics: root mean square error (RMSEA), comparative fit index (CFI), non-normed fit index (NNFI). All factor loadings, average variance extracted (VE), construct reliabilities (CRs) are reported in Table 3. After removing the non-significant item 3 in trust and items 3–5 in risk avoidance construct, the measurement model illustrated a good fit ($\chi^2(194) = 650.275$, $p < .000$, CFI = .946, NNFI = .936, RMSEA = .071) (Hair et al. 2006). Thirteen of the loadings met the .70 criteria and the remaining exceeded the .50 criteria (Hair et al. 2006). All CRs are above the .70 cut-off (Hair et al. 2006). Only one VE, namely risk avoidance (.45), was below the recommended cut-off. We maintained this item given that the CR was still acceptable (.70). Discriminant validity is also met with all VE estimates for two constructs were greater than the squared of the correlation between latent two constructs (Hair et al. 2006).

Latent Class Model Estimation Results

We employed the three-step LCA with Latent GOLD 5.1 (Vermunt and Magidson 2005). First, we decide the number of segments and then inspected the relationship between non-adoption segments and external

TABLE 4
Latent Class Model Estimates

	LL	BIC (LL)	AIC (LL)	CAIC (LL)	Npar	Class. Err.	ICL-BIC
Full sample ($N = 517$)							
1-Cluster	−7,670.3	15,690.5	15,452.6	15,746.5	56	.00	15,690.5
2-Cluster	−7,430.9	15,336.7	15,013.8	15,412.7	76	.05	15,481.5
3-Cluster	−7,239.1	15,078.0	14,670.2	15,174.0	96	.09	15,292.4
4-Cluster	−6,957.6	14,639.9	14,147.1	14,755.9	116	.06	14,806.3
5-Cluster	−6,853.1	14,555.9	13,978.2	14,691.9	136	.08	14,783.2
6-Cluster	−6,705.9	14,386.5	13,723.8	14,542.5	156	.08	14,599.9
Calibration ($N = 261$)							
1-Cluster	−3,816.1	7,910.3	7,732.1	7,960.3	50	.00	7,910.34
2-Cluster	−3,694.1	7,777.7	7,528.2	7,847.7	70	.07	7,852.86
3-Cluster	−3,596.4	7,693.7	7,372.9	7,783.7	90	.11	7,824.42
4-Cluster	−3,472.7	7,557.4	7,165.3	7,667.4	110	.08	7,669.67
5-Cluster	−3,430.2	7,583.7	7,120.3	7,713.7	130	.11	7,725.81
6-Cluster	−3,363.7	7,562.0	7,027.3	7,712.0	150	.08	7,677.43
Validation ($N = 256$)							
1-Cluster	−3,822.1	7,943.7	7,752.3	7,997.7	54	.00	7,943.72
2-Cluster	−3,667.4	7,745.2	7,482.8	7,819.2	74	.04	7,795.31
3-Cluster	−3,580.6	7,682.5	7,349.2	7,776.5	94	.07	7,769.10
4-Cluster	−3,448.1	7,528.3	7,124.1	7,642.3	114	.02	7,564.57
5-Cluster	−3,385.6	7,514.3	7,039.3	7,648.3	134	.07	7,600.93
6-Cluster	−3,328.4	7,510.8	6,964.8	7,664.8	154	.06	7,589.76

AIC, Akaike information criterion; BIC, Bayesian information criterion; CAIC, consistent Akaike information criterion; Class. Error, classification error; ICL-BIC: integrated completed likelihood criterion with BIC approximation; LL, loglikelihood; Npar, number of parameters.

variables. Among external variables, sociodemographics were covariates and ownership of any insurance, purchase intention of TCIP, purchase intention of TCIP when more income is available were used as distal outcomes.

The six models including one to six classes were analyzed by using the non-adoption drivers as indicators. Considering the BIC and the corresponding decreasing patterns, the most viable solution is that of four segments (Table 4). Figure 1 illustrates the BIC's decreasing pattern with an elbow at S = 4. The sizes of each segment were 249, 143, 81, and 44, respectively.

All indicators were significant (i.e., the *p*-value of the Wald statistic is below .05), indicating a significant contribution to the ability to discriminate between segments (Table 5). The R^2 displays how much variance of each indicator is explained by the model. The significant indicators in order of importance based on R^2 were trust in none ($R^2 = .69$), risk avoidance ($R^2 = .36$), image insurance company ($R^2 = .33$), attitude toward insurance ($R^2 = .30$), price ($R^2 = .28$), trust in state ($R^2 = .26$), trust in insurance

FIGURE 1
BIC Values for the Estimated Models

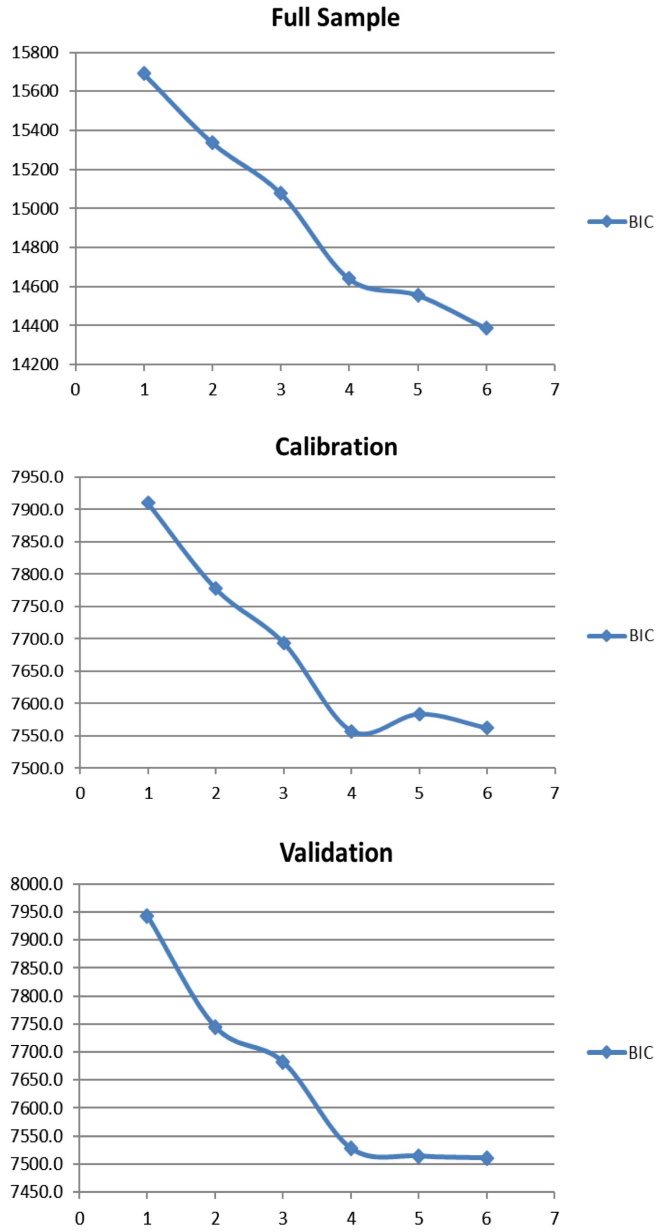


TABLE 5
Models for Indicators

Indicators (Drivers)	Segment 1	Segment 2	Segment 3	Segment 4	Wald	*p*-value	R^2
Attitude toward insurance	.08	.37	−.84	.39	48.21	.00	.30
Price	.43	.26	−.75	.06	97.24	.00	.28
Image insurance company	.51	.43	−.97	.03	132.50	.00	.33
Knowledge	.25	−.02	.25	−.48	17.04	.00	.04
Trust in insurance company	.46	.09	−.66	.11	48.96	.00	.18
Risk avoidance	−.46	.92	−.50	.04	685.82	.00	.36
Trust in state	.33	.22	.20	−.75	11.57	.01	.26
Trust in family	.04	.19	.07	−.30	36.15	.00	.14
Trust in relatives	.30	.45	.27	−1.02	239.64	.00	.14
Trust in charity	.38	.46	.30	−1.15	152.98	.00	.05
Trust in friends	.32	.42	.38	−1.13	241.20	.00	.08
Trust in none	−.70	−.66	−.60	1.96	54.69	.00	.69
Trust in fate	.70	.59	.76	−2.05	38.40	.00	.01

company ($R^2 = .18$), trust in family ($R^2 = .14$), relatives ($R^2 = .14$), trust in friends ($R^2 = .08$), trust in charity ($R^2 = .05$), knowledge ($R^2 = .04$), and trust in fate ($R^2 = .01$). Among covariates, age ($W = 16.00$, $p < .001$), gender ($W = 36.44$, $p < .001$), and education ($W = 12.74$, $p < .10$) significantly influenced the latent class segments, but income did not ($W = 4.34$, $p = .63$). Among distal outcomes, purchase intention when there is more income ($W = 29.11$, $p < .001$) and ownership of any insurance ($W = 11.43$, $p < .001$) were strongly significant; but purchase intention was marginally significant ($W = 13.60$, $p < .10$). In the next section, we describe each of the segments (using Tables 6–8 and Figures 2–4), which is the ultimate purpose of our study.

Description of Segments

Segment 1: State reliant positivists (47%). Respondents in this segment can be characterized by the highest level of trust ($M = 3.16$), a positive image of insurance companies and ($M = 3.54$), and the most positive price perception ($M = 3.65$) compared with other segments. Together with segment three, it is also most knowledgeable about insurance ($M = 3.10$). This favorable set of perceptions matches the highest percentage of purchase intention among all segments, as well as the highest number of respondents that are not sure yet (11% for both). Two factors that might drive the reasons for non-adopting so far might be the fact that this segment, together with segment three, is the least risk avoidant ($M = 3.62$). In addition, they put more trust in the state than any of the other segments ($M = 5.56$). Finally,

TABLE 6
Segment Profiles

Indicators Mean	Segment 1, 47%	Segment 2, 27%	Segment 3, 17%	Segment 4, 9%
Attitude toward insurance	4.23	4.52	3.31	4.53
Price	3.65	3.48	2.47	3.28
Image insurance company	3.54	3.45	2.06	3.06
Knowledge	3.10	2.84	3.10	2.38
Trust in the insurance company	3.16	2.79	2.05	2.81
Risk avoidance	3.62	5.00	3.58	4.12
Trust in state[a]	5.56	4.77	4.61	.06
Trust in family[a]	4.98	5.81	5.16	1.80
Trust in relatives[a]	2.93	3.84	2.70	.02
Trust in charity[a]	1.43	1.85	1.09	.01
Trust in friends[a]	1.94	2.48	2.21	.01
Trust in none[a]	.38	.44	.56	6.71
Trust in fate[a]	.22	.15	.29	.00

[a]Percentages for ordinal levels have not been presented here, but only means.

TABLE 7
Profiles for Distant Outcomes

Variables	Segment 1	Segment 2	Segment 3	Segment 4
Purchase intention TCIP				
Yes	.11	.05	.00	.05
No	.78	.90	.89	.93
Not sure	.11	.04	.11	.02
Purchase intention TCIP if more income				
Yes	.50	.66	.23	.59
No	.50	.34	.77	.41
Insurance ownership				
Yes	.55	.44	.33	.31
No	.45	.56	.67	.69

this segment can be described as the youngest (M = 35.84), relatively equal in terms of gender (53% women), and highly educated relative to other three segments (32%).

Segment 2: Dependers (27%). This segment can by characterized by a high level of risk avoidance (M = 5.00), which could imply these consumers are more prone to adopt insurance. Indeed, this segment, together with segment 4, also illustrates the most positive attitude to insurance ($M_{segment2} = 4.52$; $M_{segment4} = 4.53$) and a high purchase intention of TCIP in case of more income (66%). However, this segment also has an overwhelming amount of trust in their social network (family, M = 5.81; relatives, M = 3.84; friends, M = 2.48; and charity, M = 1.85). Rather than adoption the insurance, these consumers simply rely on their environment

TABLE 8
Profiles for Covariates

Covariates	Segment 1	Segment 2	Segment 3	Segment 4
Gender				
Female	.53	.78	.27	.64
Male	.47	.22	.73	.36
Age				
1 (midpoint: 22.80)	.25	.13	.18	.11
2 (midpoint: 30.08)	.26	.21	.18	.18
3 (midpoint: 36.42)	.17	.18	.17	.15
4 (midpoint: 44.76)	.17	.23	.22	.22
5 (midpoint: 58.73)	.15	.26	.26	.34
Mean	35.84	41.16	40.68	43.59
Education				
Low	.23	.42	.29	.40
Middle	.45	.45	.55	.30
High	.32	.13	.16	.30
Income				
Low	.65	.81	.69	.67
Middle	.19	.13	.16	.21
High	.16	.07	.15	.12

as a coping mechanism. This might be caused by a lack of means, given that this segment consists of mostly women (78%) with a mean age of 41.16 years and the lowest level of education (42%) among all segments.

Segment 3: Adversaries (17%). Segment 3 (together with one) is most knowledgeable about insurance (M = 3.10) and the least risk avoidant (M = 3.58). However, contrary to segment 1, this segment holds strongly negative perceptions about insurance on all levels, including its attitude (M = 3.31), price perceptions (M = 2.47), trust in the insurance companies (M = 2.05), and their image (M = 2.06). This segment has more trust in fate then any of the other segments ($M = .29$), but overall, its main characteristic seems to be a crushingly adverse predisposition toward insurance. This translates into the lowest values for purchase intention (0%), purchase intention when more income is available (23%) and the second lowest for ownership of any insurance (33%). This segment is mostly male (73%) with a mean age of 40.68 years.

Segment 4: Uninformed Loners (9%). This segment has the second highest purchase intention when income increases (59%), similar to segment two (66%). Strikingly however, these respondents do not rely in any way on others or fate as a coping mechanism (trust in state, M = .06; family, M = 1.80; relatives, M = .02; charity, M = .01; friends, M = .01; fate, M = .00). Their trust in none is exceptionally high (M = 6.71), implying that they are strongly self-reliant. Their attitude toward insurance is most

FIGURE 2
Profile Plot for the Four-Cluster Solution (Indicators)

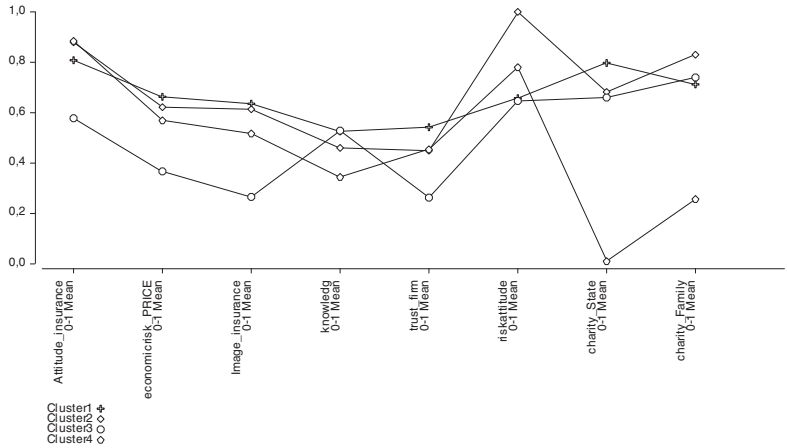
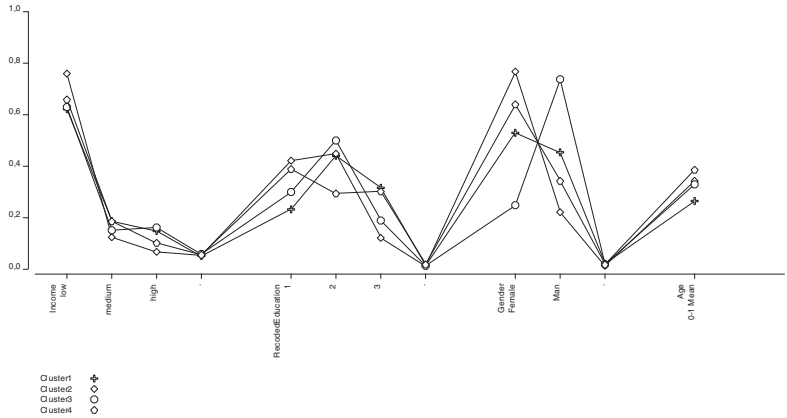


FIGURE 3
Profile Plot for Covariates

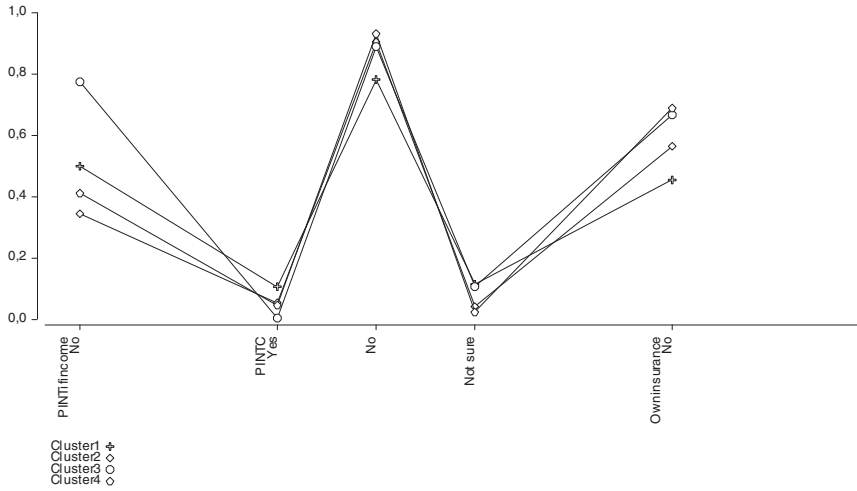


positive (together with segment 2; M = 4.53), but insurance ownership is the lowest (31%). In addition, these respondents are also the least knowledgeable about insurance (M = 2.38). The majority is women (64%) and it is the oldest segment with an average age of 43.59 years.

CONCLUSION

Empirical studies on differences in consumer non-adoption categories with regard to natural disaster insurance have been somewhat neglected

FIGURE 4
Profile Plot for Distal Outcomes



in the literature. Our study illustrates important differences between non-adopter groups, which should be considered by policy makers and insurance companies when developing their marketing strategy. Especially trust in others (in insurance literature also referred to as "charity hazard") was an important factor in differentiating the four segments. Interestingly, our study adds new insights into how the segments differ in which sources they trust. Segments 1–3 rely on the state, strong ties, and fate, respectively, whereas segment 4 has trust in none. This suggests, in line with earlier research in insurance, that social trust is a key predictor of whether or not a homeowner chooses to adopt risk-sharing measures or to buy insurance (Browne and Hoyt 2000; Siegrist and Cvetkovich 2000). However, even when willing, the increasing occurrence of events makes it impossible for governments, nonprofit initiatives, or even consumers' social networks to maintain previous levels of support. Unlike other events a consumer might insure (such as health and automobile), the event of a natural disaster does not impact one individual, but a society (and thus the social network) as a whole. As a result, the very people and networks consumers depend on for help, might be equally affected, a reality that needs to become more salient in consumers' minds.

In disaster insurance literature, risk has conflicting effects on adoption (Antwi-Boasiako 2017; Lo 2013; Palm and Hodgson 1992). In our non-adoption study, risk avoidance was an important factor to explain differences in non-adoption segments. Among the remaining factors, the

most important one is image, followed by attitude toward insurance, price, and trust in insurance companies. While an early study on natural disaster insurance in the United States (Kunreuther 1978) found that a lack of knowledge is an important factor in explaining the lack of adoption, we find that when looking at different segments, knowledge is far less important in determining the resistance segments than other factors. Finally, in line with Lin (2002) and Wedel and Kamakura (2000), our results confirm that sociodemographics are also relevant in an insurance context. The significant covariates to explain segment membership are—in the order of importance—gender, age, and education. Income did not explain differences in non-adoption segments in line with the findings of Browne and Hoyt (2000).

Based on our findings, we recommend following strategies for each segment to successfully market TCIP:

- *State reliant positivists*: This is the biggest segment. As perceptions are overall positive in this segment, it is important to deal with its inertia to purchase, which is mostly driven by a reliance on state. Communications should focus on changing this reliance and the implementation of nudges to buy in order to capitalize on the generally positive perceptions.
- *The dependers*: This segment heavily relies on others. This is likely to be an ineffective strategy in case of natural disasters, as their social network is often subjected to the same consequences of a disaster. Rather than focusing on their own risk, respondents in this segment should be made aware of the risk of their social network and community as a whole. Creating awareness about the potentially disastrous consequences of relying on strong ties as a coping strategy and the pressure this puts on their peers may help to overcome their initial lack of adoption. Recent TV advertisements of TCIP have started to focus on these aspects by asking consumers "where will you stay over/live if your house is damaged by an earthquake?" and giving examples of "uncomfortable, non-voluntary, long-term stay-overs with relatives after an earthquake."
- *Adversaries*: This segment might be the most difficult to target, as it exhibits a strong negative predisposition which is difficult to reform. Campaigns targeting this segment should developed more positive image and trust in insurance perceptions, as well as consider ways to create new salient attributes as a way to diminish the impact of strongly held existing beliefs. Unbiased, trustworthy information will be extremely important for these consumers; hence,

transparency will play an important role in developing meaningful campaigns and programs that will be accepted by the public.

- *Uninformed loners*: This segment might be the prospect segment because they are more self-reliant. This segment seemingly has not discovered insurance as a coping mechanism yet to deal with unexpected events. These consumers are positive about insurance but display a significant lack of knowledge. Educating consumers about disaster insurance might be a key enabler here, especially as a way to cope with such events independently of others, as this segment values their self-reliance highly. Disaster insurance needs to be positioned in the consumer's mindset as part of a toolset that allows them to be self-reliant.

In sum, our study offers governments, policy makers, and insurance companies to develop meaningful strategies to address the problematic uptake of disaster insurance.

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