

Long-term developments of EU household financial product portfolios

Abstract. This paper introduces a method for assessing changes in household financial product portfolios over longer periods in multiple countries. The method can be applied to previously collected cross sectional datasets. Given the lack of suitable longitudinal datasets, collected across multiple countries, this is an important quality of the introduced procedure. The procedure is based on a novel application of latent class analysis. Using this analysis technique we assess the developments in household financial product portfolios across 14 EU countries from 1969 to 2003, based on three disaggregate cross-sectional databases. Our findings show that in the 14 analyzed countries households acquired financial products for the satisfaction of more basic needs before higher order products, but have some differences in segmentation structures due to country-specificity in the rate of development. The paper discusses possible strategic reactions by internationally operating financial firms to the common trend across the EU countries and persisting differences between the 14 analyzed countries. Investigating a larger variation of countries would be interesting. Further research could also investigate the effects of country level variables on developments in household financial product portfolios. The latent class analysis approach proposed in the current paper can be used for such future studies.

Keywords: Cross-country segmentation, latent class analysis, financial services, long-term developments

1. Introduction

In many disciplines, empirical studies have been published on consumer financial product portfolios, e.g., economic psychology (Gunnarson and Wahlund 1997; Wärneryd 1999), statistics (Paas, Vermunt and Bijmolt 2007), operations research (Prinzie and Van den Poel 2006) and marketing (Bijmolt, Paas and Vermunt 2004; Kamakura, Ramaswami and Srivastava 1991). Insight into financial product portfolios is relevant for marketing activities such as segmentation and cross selling of products (Kamakura et al. 1991).

In internationalized markets insights into the cross-national similarities and differences between consumer financial product portfolios may reveal fruitful directions for international marketing strategy formulation (Bijmolt et al. 2004). Acting upon such similarities and dissimilarities, calls for the grouping and subsequent targeting of countries and consumers within countries, using cross-country segmentation techniques (Bijmolt et al. 2004). However, previously published empirical studies generally analyze cross-sections of household product portfolios in a single country. Only two previous studies analyzed cross-country data (Bijmolt et al. 2004; Paas 2001), but were based on a single cross section of consumer financial product portfolios.

For single country segmentation research, analysis of time dynamics has been accepted as a key element to be studied (Wedel and Kamakura 2000). A few papers analyzed longitudinal data on financial product portfolios for segmentation, see for example Paas et al. (2007) and Prinzie and Van den Poel (2006). However, dynamics in consumer segments across countries, based on financial product portfolios, has been ignored. Given the dynamic nature of international financial markets (Bijmolt et al. 2004) one may anticipate that international segmentation structures, representing household financial product portfolios, will change over time. Financial firms require insight into such changes and will have to react to trends that occur across countries.

Below we analyze disaggregate data on financial product ownership in 14 EU countries, collected in 1969, 1990 and 2003. At each time-point a different random sample of respondents was interviewed. The analysis provides insight into the long-term country level developments of segmentation structures based on the financial products that individuals own within in each of the 14 analyzed countries.

As for the organization of the paper, in the next section we discuss a theory that proposes consumers acquire financial product portfolios in a hierarchical order, i.e., products for satisfying basic needs before products for higher order needs. If this order is indeed followed across countries it can lead to similar segmentation structures across these countries. However, various country specific conditions are also discussed in the next section. These may influence this order for acquiring financial products and will consequently lead to country-specific segmentation structures. In the empirical study that is reported in sections 3, 4 and 5, we assess country specificity of segmentation structures based on financial product ownership by individual consumers. The paper is concluded with a discussion on the theoretical and managerial implications, section 6.

2. International segmentation of financial product portfolios

Theory on the development of financial product portfolios by consumers within a country would suggest similar segmentation structures of financial product portfolios would occur over countries. Financial product portfolios are considered to be the observable outcomes of the household lifecycle and the resulting savings needs (Kamakura et al. 1991). Concerning the latter, four hierarchically ordered saving motives have been studied extensively in the field of economic psychology (e.g., Gunnarson and Wahlund 1997; Wärneryd 1999). The most basic motive is cash management, involving short-term financial issues, such as direct payment for transactions. At the second level, the precautionary motive, households develop

a financial reserve for unexpected expenditures. This is followed by the down-payment motive at the third level, i.e., accumulation of financial deposits for buying a house, a car or durables. Fourth, wealth management incorporates enterprise and investing assets. The second construct, the lifecycle hypothesis and the related permanent income hypothesis (Browning and Lusardi 1996), assumes acquisitions result from household circumstances, such as household lifecycle phase and income. Young households require financial products for borrowing or investing small amounts of assets. Later in life, when income and assets increase, households require more sophisticated products for purposes such as speculation and asset accumulation.

Kamakura et al. (1991) argued that the lifecycle theory and the theory on saving needs are interrelated and lead to a common order of acquisition within populations, reflecting amounts of assets that are invested and the risk levels of the different products. Households in early life stages have higher priority for products related to basic motives in the saving motive hierarchy, involving fewer assets and relatively low risk levels. Products meeting higher order motives when households have more assets and financial knowledge. We conjecture that the tendency of households to acquire more basic financial products before products satisfying higher order needs may occur across countries. Thus, households in different countries should tend to own higher order products when they also own products relevant for the satisfaction of more basic needs, implying similar financial product-portfolios based segmentation structures occur across countries.

Contradicting expectations can, however, be forwarded, due to country-specific situational factors. Cultural factors may be particularly relevant herein, such as those captured through the well-known Hofstede dimensions (Hofstede 2001). Cross-country differences on the uncertainty avoidance dimension in Hofstede's model may be reflected in risk aversion of households in the financial market, resulting in country-specificity in the development of

household financial product portfolios. For example, in low uncertainty avoidance cultures the household may less often develop a financial buffer in safe assets, such as savings accounts, before investing in risky assets, such as shares. Differences between EU countries, the region addressed in our empirical study, on uncertainty avoidance and on the other Hofstede dimensions persist (De Mooij and Hofstede 2002).

Below we investigate whether similar segmentation structures occur across 14 different European countries or whether country-specificity applies. Also, we assess whether country specificity occurs in the rate at which consumer financial product portfolios develop. This rate may also be influenced by country-specific factors.

3. Model specification

In this paper Latent Class Analysis (LCA) is employed in a novel way. This technique has previously been applied for various purposes. For example, Moisiu (2004) used LCA for measuring poverty. More methodologically, Moors (2003) used LCA for diagnosing response style behavior and Van Den Wittenboer, Hox and De Leeuw (2000) for the assessment of respondent scalability. More akin to the application presented below, Bijmolt et al. (2004) used a multi-level extension of LCA for assessing financial product portfolios across countries at one point in time. Below, we employ the LCA approach that was previously suggested by Ter Hofstede et al. (1999), with some adjustments to facilitate the modeling of time specificity in the occurrence of segments. The LCA-model in Ter Hofstede et al. (1999) only facilitates for cross-country differences in segmentation structures.

To define the model, consider a sample of households denoted $i = 1, \dots, I$. For each household i it is recorded whether this person owns each product from a set denoted $k = 1, \dots, K$, where $Y_{ik} = 1$, if household i owns product k , otherwise $Y_{ik} = 0$. The complete product portfolio, of a household i , is represented in the vector \mathbf{Y}_i . We assume a limited number of

household segments, denoted $s = 1, \dots, S$, which are sometimes referred to as latent classes. The discrete latent variable X_i represents segment membership probabilities of household i . Each individual has values on a set of covariates denoted, $c = 1, \dots, C$. Z_{ic} represents the value of individual i on covariate c . The vector \mathbf{Z}_i represents the values of this individual on all C covariates.

The measurement part of the model connects latent class (segment) membership to the observed responses (product ownership indications). It is a standard latent class analysis (LCA) model for dichotomous response variables (Magidson and Vermunt 2004). The probability for a person to own a specific combination of products, \mathbf{Y}_i , given that household i belongs to segment s , takes on the following form:

$$P(\mathbf{Y}_i | X_i = s) = \prod_{k=1}^K (\pi_{ks})^{Y_{ik}} (1 - \pi_{ks})^{(1-Y_{ik})} \quad (1)$$

where π_{ks} denotes the probability to own product k conditional on membership of segment s . The multiplication over j at the right hand side of (1) indicates that the J product ownerships are treated as independent Bernoulli trials conditional on a household's latent class membership. This is the local independence assumption, which is crucial to LCA models, and which in our application implies that the latent class structure is assumed to capture the observed relationships in the product ownerships of all households in our data set, from different countries and different time points.

To capture country- or time specificity in segmentation structures the model allows for variation in the sizes of segments across times and countries. That is, each segment s may occur at each time and in each country, but the proportions of households in the segment may be country- and time specific. Such differences in segment sizes are captured through covariate effects. In the model covariates (\mathbf{Z}_i) are connected to ownership probabilities (\mathbf{Y}_i) via latent class membership, as follows:

$$P(\mathbf{Y}_i | \mathbf{Z}_i) = \sum_{s=1}^S [P(X_i = s | \mathbf{Z}_i) * P(\mathbf{Y}_i | X_i = s)]$$

(2)

We incorporate covariates for the respondent's country of residence (country), the year of the interview (time) and an interaction term between country and time (country x time). The covariate effect of the respondent's country of residence, on segment membership probabilities, implies that country-specificity in the occurrence of each segment s is modelled, ranging from 0% to 100%. The time covariate models time-specificity in the occurrences of each segment s , ranging from 0% to 100%. As a third covariate we incorporated an interaction effect between time and country. This interaction implies that the proportions of households in each segment s in each country at each time may vary between 0% and 100%. This captures country-specificity in segment size developments. Given these covariate effects, the model allows that a segment s occurs across all times and countries, but can also facilitate for occurrence of a segment s specific for one country at one time. The intermediate situations are also captured. Household-level demographic variables will also be included as covariates. Besides this, we incorporate interaction terms between demographics, on the one hand, and time or country, on the other hand. These capture time and country specificity of demographic effects.

The measurement part of the model and the covariate effects are reparameterized using log odds. Concerning the former, for each product k , $1 \leq k \leq K$, the S segment-specific product ownership probabilities are reparameterized through log-odds as:

$$\log \left[\frac{\pi_{ks}}{1 - \pi_{ks}} \right] = \beta_{k0} + \beta_{ks} , \text{ for } 1 \leq s \leq S ,$$

(3)

Since this involves $(S+1)$ parameters based on S probabilities only, for identification one may, for instance assume $\beta_{kS} = 0$ so that the log-odds for latent class S is β_{k0} . The log-odds for the other $(S-1)$ classes are then expressed as a difference from the log-odds for this base class.

For the covariate effects the linear model for the log of the ratio of the probability of being in latent class s relative to being in the reference class S takes on the following form:

$$\log \left[\frac{P(X_i = s | \mathbf{Z}_i)}{P(X_i = S | \mathbf{Z}_i)} \right] = \gamma_s + \sum_{c=1}^C \gamma_{sc} Z_{ic}, \text{ for } 1 \leq s \leq S-1$$

(4)

where γ_s denotes an intercept and γ_{sc} , $1 \leq c \leq C$, the slope for the c^{th} covariate. Because the distribution of the log of the ratio of the probabilities in (4) is well-known, significance of covariate effects can be tested (Vermunt and Magidson 2005).

Model parameters are estimated through maximum likelihood. Maximization of the likelihood function is realized by an EM algorithm implemented in Latent Gold 4.0 (Vermunt and Magidson 2005). As Cross-country household level data are generally based on national samples that are disproportional for the actual population size. Thus, we employ the reweighting procedure suggested by Ter Hofstede et al. (1999) in the parameter estimation.

4. Data and analysis

We analyze previously collected data from 1969, 1990 and 2003. Our method facilitates the use of such previously collected cross sectional data sets for assessing developments across countries. This is an important property, because availability of suitable longitudinal datasets is lacking for many applications (Steenkamp 2005).

The 1969 and 1990 data were collected for the EURODATA project of the Readers Digest Household Survey. The 1969 sample contains 24,180 respondents from 16 countries

and the 1990 sample 22,339 individuals from 17 countries. Respondents were 18 years or older and living in private households. The 2003 data, Eurobarometer 60.2, were collected by a consortium of market research agencies at request of the European Commission, Directorate-General Press and Communication, Opinion Polls. It covers the population (aged 15 years and over) of the 15 EU member states in 2003 and consists of 16,200 respondents. In all years interviews were face-to-face and in the appropriate national language.

The empirical study includes those countries that are represented at all three time-points. Also, respondents aged between 15 and 17 were excluded from the 2003 data set. This leads to a database with 51,674 respondents, aged 18 years and older, from Austria, Belgium, Denmark, Finland, France, West Germany, Great Britain (including Northern Ireland), Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain and Sweden. This covers all countries that joined the EU before the ten-country extension in 2004, except Greece and former East Germany.

Because we analyze financial product portfolios of individual households in 1969, 1990 and 2003, tracking country-level developments in household financial product portfolios is possible. A long time-span is analyzed, because effects of internationalization are expected to take place over longer periods (Craig and Douglas 2005). Also, financial product portfolios are developed over household lifecycles (Browning and Lusardi 1996; Wärneryd 1999). The disaggregate nature of the data set implies insight is provided into similarities and differences between consumers within the same country and also between consumers across countries (Bijmolt et al. 2004) and changes therein.

We analyze the following products: savings account, life insurance, bonds, investment trusts, and shares. Table 1 presents the time specific penetrations of the products, ranked according to decreasing risk levels, across all analyzed countries. Shares are the most risky assets, depending on highly volatile exchange values on the stock market. Investment trusts

concern a mix of different shares and corporate/government bonds. The latter are subjected to smaller value fluctuations. Next are the pure corporate/government bonds. Life insurances are less risky again. Like investment trusts these concern a mix of shares and bonds, but investments are over longer periods, in which values of bonds and shares usually increase. Also, life insurance policies have a guaranteed minimum pay-off. Least risky is the savings account.

INSERT TABLE 1 HERE

The database also includes three household level demographics: age of the main income earner, household income and marital status. Previous research has shown that these variables are of key importance for household financial product portfolios (Browning and Lusardi 1996; Paas et al. 2007; Wärneryd 1999). The demographics are used to profile the financial product portfolio based segments derived from the data set.

The data of all 51,674 respondents were simultaneously analyzed. Model estimates were obtained for increasing numbers of segments. To account for sub-optimal solutions, we estimated each model 50 times with different random starting values, retaining the best solution. Relative fit of alternative model specifications is evaluated using the minimum CAIC rule, which is suitable for large cross-country databases (Bijmolt et al. 2004).

5. Empirical results

5.1. Household Financial Product Portfolios

Based on the minimum CAIC rule a five-segment solution is most appropriate. The entropy measure for this solution is 0.83, implying that respondents can accurately be allocated to a single segment (Wedel and Kamakura 2000).

Table 2 presents segment-specific product penetrations. In the first segment, ‘passives’ (S1), penetrations of all products are close to zero. In the second segment, ‘savers’

(S2), only the savings account has a high penetration. In the third segment, ‘life-savers’ (S3), households own only the savings account and the life insurance. In the fourth segment, ‘bond investors’ (S4), we find households that generally own a savings account, a life insurance and bonds, and sometimes investment trusts and/or shares. In the fifth segment, i.e., ‘investment trust investors’ (S5), are the individuals owning savings accounts, life insurance and investment trusts. Sometimes they will own bonds and/or shares.

INSERT TABLE 2 HERE

The results that are presented in Table 2 suggest consumers start out with a savings account, because in each segment where the other four products have high penetrations the savings account is also commonly owned (Bijmolt et al. 2004; Paas et al. 2007). Next they acquire a life insurance, because this product always has high penetrations in segments where the bonds, investment trust and shares also are commonly owned. In S4 we find a high penetration for bonds and lower penetrations for investment trusts, while in segment 5 we find the opposite. This suggests that some consumers acquired bonds after a life insurance (S4), while others acquired the investment trusts after bonds (S5). Further explanation for this divergence will be provided below. Last, the investment product ‘shares’ has low penetrations in all segments, also in S4 and S5, suggesting this is the last product to be acquired.

We report a summary of the demographic covariate effects, instead of the lengthy tables. The main effect of income is significant ($p < 0.01$). The main effects of age and partner are insignificant ($p > 0.05$), as is the interaction country x income ($p > 0.05$). Interactions between age, income, partner, on the one hand, and time on the other hand are significant ($p < 0.01$). The interactions between age and partner, on the one hand, versus country, on the other hand, are also significant ($p < 0.01$). Significance of these interaction terms implies that most demographic effects are country and time specific. Further inspection shows country

and time specificity concerns magnitudes of effects, not the direction. Households with an income above the median are relatively often in the more active segments S4 and S5 across all times and countries. This overrepresentation in S4 and S5 also applies for households with a head of intermediate age (30 to 60) and for households in which the head has a partner. These findings are consistent with extant theory and extensive previous research on the effects of these demographic variables on the financial product portfolios that households have (Browning and Lusardi 1996; Wärneryd 1999). This consistency supports the validity of our empirical results.

5.2. Cross Country and Time-Specific Occurrence of the Segments

The three following covariates have significant impact on the occurrence of the five segments ($p < 0.01$): time, country and the time x country interaction. The two main effects imply segment sizes are country and time-specific. Significance of the interaction term implies that temporal developments in segment sizes are country-specific.

Table 3 presents the 42 segmentation structures in our model, one structure for each of the 14 countries in 1969, 1990 and 2003. General trends can be deduced from Table 3. In 1969 most EU households were passives (S1) and all countries had minorities of savers (S2), life-savers (S3) and/or bond investors (S4). Sizes of these minorities are, however, country specific, as are the segment sizes over countries in 1990 and 2003. In 1990 all countries were characterized by fewer passive households (S1). The most substantial increase concerns savers (S2). Thus, between 1969 and 1990 households across the 14 EU countries satisfied their most basic financial needs by acquiring saving accounts and, thereby, developed from S1 to S2. In 2003 we see a further decrease in proportions of passives (S1). In 2003 more European households were investment trust investors (S5) than previously. Country-

specificity applies for the rate at which this common trend is followed, as segment sizes are country-specific over the three analyzed time-points.

INSERT TABLE 3 HERE

An unexpected finding is that one segment becomes smaller over time and has almost disappeared in 2003, i.e., bond investors (S4), while another segment has appeared later in time, i.e., investment trust investors (S5). Thus, in 1969 investors would acquire bonds (S4); while in 2003 they were more inclined to acquire investment trusts (S5). Investing behavior seems to have changed over time, but it is always conducted after more basic saving needs have been attended to.

5.3. Clustering of Countries

To enhance interpretation of differences in developments of household financial product portfolios across countries, we subjected the 42 segmentation structures in Table 3 to an additional analysis, namely multi-level latent class analysis. Refer to Bijmolt et al. (2004) or Vermunt (2003) for a technical discussion.

We applied multi-level latent class analysis for clustering the 42 segmentation structures in Table 3 on the basis of the occurrence of the five segments, S1 to S5. If occurrences of these five segments is highly similar across a sub-set of countries, these countries will be allocated to the same country-by-time cluster. Contrarily, if two or more countries are characterized by dissimilar segmentation structures, they will be allocated to different country-by-time clusters. Note that segmentation structures of different time points can also be allocated to the same country-by-time cluster. For example, the segmentation structure of Ireland in 2003 is highly similar to the structure characterizing Denmark, GB, Netherlands, Western Germany and Sweden in 1990, see Table 3. Therefore, Ireland in 2003 is allocated to the same country-by-time cluster as Denmark, GB, Netherlands, Western

Germany and Sweden in 1990, see Table 4. This finding suggests that in 2003 Ireland is less advanced in terms of consumer financial product portfolios than Denmark, GB, Netherlands, Western Germany and Sweden.

The application of multilevel latent class analysis shows seven country-by-time clusters are appropriate. Table 4 reports the allocation of the 14 countries in 1969, 1990 and 2003 to these seven clusters. From Table 4 we deduce three main patterns of development. The first is followed by Denmark, GB, Western Germany and Sweden. In 1969 these countries are allocated to country-by-time cluster 2, proceeding to country-by-time cluster 5 in 1990, and then to country-by-time cluster 6 in 2003. Second, for Austria, Belgium, Finland, France and Luxembourg, the development is from country-by-time cluster 1 in 1969, to country-by-time cluster 4 in 1990 proceeding to country-by-time cluster 6 in 2003. Developments in a tenth country, the Netherlands, are a mix of these two sequences. In 1969 the segmentation structure in the Netherlands is consistent with those in country-by-time cluster 1, i.e., with Austria, Belgium, Finland, France and Luxembourg. Then in 1990 the Netherlands is in the country-by-time cluster 5, i.e., with Denmark, GB, Western Germany and Sweden. Then in 2003 the Netherlands is in country-by-time cluster 6, as all of the nine other previously discussed countries. Interestingly, all ten countries discussed so far are allocated to the same country-by-time cluster in 2003, i.e., country-by-time cluster 6. Despite the allocation of Sweden to this cluster 6 in 2003, this country is much further in the development than the other countries. In Sweden a very high proportion of households is allocated to S5, investment trust investors, see Table 3. This latter finding may be due to the Swedish pension scheme in which all citizens in paid employment are provided with the opportunity to allocate part of their savings to equity funds and other risk-bearing securities (Hedesström et al. 2004).

INSERT TABLE 4 HERE

The third main developmental pattern applies for the four remaining countries, Ireland, Italy, Portugal and Spain. They start out in country-by-time cluster 1, in 1969, except for Ireland, which is in country-by-time cluster 2 in that year. Then all of these four countries proceed to country-by-time cluster 3 in 1990. In 2003 Ireland, Spain and Portugal are allocated to country-by-time clusters to which most other countries were allocated in 1990, i.e., country-by-time cluster 4 or 5. Thus, the segmentation structures of these three countries are less advanced than those in the other countries. Ireland, Spain and Portugal have relatively low GDP's across the 1969 to 2003 period (GDP's were retrieved from www.cbs.nl). This may play a role, as income is an important determinant for the advancement of consumer financial product portfolios (Browning and Lusardi 1996; Paas et al. 2007; Wärneryd 1999). Uncertainty avoidance does not seem to play a role in this lag. Ireland is defined by a low level of uncertainty avoidance, while for Spain and Portugal this is high. Italy is an exceptional case in 2003; having a unique segmentation structure in which there is a relatively large presence of both the passive (S1) and the active segment (S5). In 2003 Italy is in country-by-time cluster 7, to which no other country is allocated at any of the three analyzed time points.

6. Discussion

Our findings suggest that households in the 14 analyzed EU countries generally acquire products according to increasing risk levels, i.e., less risky products are acquired before more risky products. Between 1969 and 1990 households in most analyzed countries were entering the financial market by acquiring a savings account, reflected in the decreasing proportion of passives (S1) and the increasing proportion of savers (S2). Between 1990 and 2003 households across the 14 studied countries diversified their financial product portfolios, by also acquiring other financial products. The largest increase in ownership concerned the life

insurance and not the more risky assets, i.e., bonds, investment trusts and shares. That is, the life insurance is commonly owned in two segments increasing in size between 1990 and 2003 (S3 and S5), while this only applies for one segment with regard to risky assets (S5). The pattern does not seem to be disturbed by differences between countries on, for example, GDP per capita, values of countries on the Hofstede dimension of uncertainty avoidance or cross-country differences in marketing activities. Otherwise we would have found segments in which higher order products have higher penetrations and not the more basic products.

Only one major change in the order for acquiring products occurs over time. In 1969 investors would become bond investors (S4), while in 2003 they were more likely to enter the investment trust investors segment (S5). The change of investing behavior may be supplier driven. Increasing availability of different types of investment trusts between 1969 and 2003 could explain the increase in S5 at the expense of S4. Nevertheless, this change only influenced the manner of conducting investing. In general, investing is conducted after acquiring the more basic products for asset accumulation, i.e., savings accounts and life insurances, across all countries and times. Also, we found shares are acquired later than the less risky bonds or investment trusts across all countries and times that we analyzed.

Although countries are developing along the same pattern, different rates of development have led to a larger number of segments in the 14 analyzed EU countries over time, two in 1969, three in 1990 and four in 2003 (see Table 4). Nevertheless, in 2003 we find that ten of the 14 countries can be allocated to the same country-cluster, which implies more convergence for 2003 than in 1990. The divergence concerns lagging countries with low GDP's over most of the 1969 to 2003 period, i.e., Ireland, Italy, Spain and Portugal. Contrarily, the Hofstede dimension of risk avoidance does not seem to be relevant for this development, as are other country specific factors, except for perhaps Sweden.

The reported results have managerial implications for financial firms in the EU. First, such firms will have to react to the remaining differences in household financial product portfolios across different EU countries. For the development of other potentially successful strategies they can employ a lead-lag analysis approach (Craig and Douglas 2005). That is, the proportion of investment trust investors (S5) is country specific, see Table 3. Market strategies towards S5 that have proven to be successful in the more advanced countries, such as Sweden, Denmark and The Netherlands, can later be applied in other EU countries. Also, marketing strategies that were successful in most analyzed EU countries in 1990 could in 2003 be applied to Spain, Portugal and Ireland. Second, we argue that the increasing diversification of household's financial product portfolios, reflected by the increasing size of the active segment (S5) across most countries, suggests financial firms in the EU are unlikely to be successful if they are positioned as mass marketing firms, concentrating on low pricing for more basic products. Instead financial firms should be positioned as advisors for households. The firms can support households in developing sophisticated financial product portfolios.

Evidently, our findings call for further research in other services or product markets. Other avenues for future research involve two important limitations of our study. First, we only studied 14 EU countries. Amongst these similar countries we already found substantial differences. Investigating a larger variation of countries would be interesting, particularly if developing countries or the new EU members (joining in 2004 or later) and also Greece would be included. Second, GDP seems to be related some interesting changes in segment sizes. Further research could aim to investigate the effects of other country level variables on developments in household financial product portfolios. The latent class analysis approach proposed in the current paper can be used in such further research.

References

- Bijmolt, T.H.A., Paas, L.J., Vermunt, J.K.: Country and household segmentation: Multi-level latent class analysis of financial product ownership. *Int J of Res in Mark*, 21, 323-340 (2004).
- Browning, M., Lusardi, A.: Household Savings: Micro Theories and Micro Facts. *J of Ec Lit*, 34, 1797-1855 (1996).
- Craig, C.S. and Douglas, S.P.: *Cross-country Marketing Research*, 3rd Ed. Wiley and Sons, Chichester (2005).
- De Mooij, M., Hofstede, G.: Convergence and divergence in household behavior: Implications for international retailing. *J of Ret*, 78, 61-69 (2002).
- Gunnarson, J., Wahlund, R.: Household financial strategies in Sweden: An exploratory study. *J of Ec Psych*, 18, 211-233 (1997).
- Hedesström, T.M., Svedsäter, H., Gärling, T.: Identifying heuristic choice rules in the Swedish premium pension scheme. *J of Beh Fin*, 5, 32-42 (2004).
- Hofstede, G.: *Cultures consequences: Comparing values, behaviors, institutions and organizations across nations* (second edition). Sage Publications, Thousand Oaks (2001).
- Kamakura, W.A., Ramaswami, S.N., Srivastava, R.K.: Applying latent trait analysis in the evaluation of prospect for cross-selling financial products. *Int J of Res in Mark*, 8, 329-349 (1991).
- Magidson, J., Vermunt, J.K.: Latent class models. In: D. Kaplan (ed.), *The sage handbook of quantitative methodology for the social sciences*, pp. 175-198. Sage Publications, Thousand Oakes (2004).
- Moisio, P.: A latent class application to the multidimensional measurement of poverty. *Q&Q*, 38, 703-717 (2004).

- Moors, G.: Diagnosing response style behaviour by means of a latent-class factor approach. Socio-demographic correlates of gender role attitudes and perceptions of ethnic discrimination re-examined. *Q&Q*, 37, 277-302, (2003).
- Paas, L.J.: Acquisition patterns of products facilitating financial transactions: A Cross-country investigation. *Int J of Bank Mark*, 19, 266-275 (2001).
- Paas, L.J., Vermunt, J.K., Bijmolt, T.H.A.: Discrete time, discrete state latent Markov modelling for assessing and predicting household acquisitions of financial products. *J of the Roy Stat Soc*, A170, 955-974 (2007).
- Prinzie, A., Poel, D. van den: Investigating purchasing patterns for financial services using Markov, MTD and MTDg models. *Eur J of Op Res*, 170, 710-734 (2006).
- Steenkamp, J.-B.E.M.: Moving out of the US silo: A call to arms for conducting cross-country marketing research. *J of Mark*, 69, 6-8 (2005).
- Ter Hofstede, F., Steenkamp, J.-B.E.M., Wedel, M.: Cross-country Market Segmentation Based on Household-Product Relations. *J of Mark Res*, 36, 1-17 (1999).
- Van Den Wittenboer, G., Hox, J.J., De Leeuw, E.D.: Latent class analysis of respondent scalability. *Q&Q*, 34, 177-191 (2000).
- Vermunt, J.K.: Multilevel Latent Class Models. *Soc Meth*, 33, 213-239 (2003).
- Vermunt, J.K., Magidson, J.: Technical Guide for Latent GOLD 4.0: Basic and Advanced. Statistical Innovations Inc., Belmont (2005).
- Wedel, M., Kamakura, W.A.: Market Segmentation: Conceptual and Methodological Foundations, 2nd Ed. Kluwer, Dordrecht (2000).
- Wärneryd, K.-E.: The Psychology of Saving: A Study of Economic Psychology. Edward Elgar Publishing, Northampton (1999).

TABLE 1:
Product penetrations over time and countries

Product	1969	1990	2003
<i>Investments</i>			
(1) Shares	0.05	0.09	0.17
(2) Investment trusts	0.04	0.03	0.15
(3) Bonds	0.12	0.06	0.08
<i>Long-term contractual saving</i>			
(4) Life Insurance	0.25	0.21	0.43
<i>Regular Saving</i>			
(5) Savings account	0.40	0.81	0.90

TABLE 2:
Segment-specific product penetrations

	Passives (S1)	Savers (S2)	Life savers (S3)	Bond investors (S4)	Investment trust investors (S5)
Shares	0.00	0.03	0.11	0.25	0.30
Investment trusts	0.00	0.00	0.01	0.08	0.77
Bonds	0.00	0.01	0.00	0.99	0.30
Life insurance	0.03	0.02	0.82	0.66	0.65
Savings account	0.00	0.97	0.95	0.95	0.99

TABLE 3
Time-specific allocation of countries to country-by-time clusters

Country	Passives (S1)	Savers (S2)	Life savers (S3)	Bond investors (S4)	Investment trust investors (S5)
Austria1969	0.62	0.13	0.18	0.05	0.02
Austria1990	0.14	0.58	0.24	0.02	0.02
Austria2003	0.03	0.3	0.4	0.01	0.14
Belgium1969	0.56	0.16	0.16	0.06	0.06
Belgium1990	0.16	0.58	0.18	0.02	0.06
Belgium2003	0.01	0.48	0.36	0.03	0.12
Denmark1969	0.52	0.08	0.08	0.33	0.00
Denmark1990	0.03	0.59	0.17	0.16	0.06
Denmark2003	0.02	0.26	0.39	0.09	0.24
Finland1969	0.48	0.11	0.23	0.01	0.18
Finland1990	0.03	0.73	0.18	0.03	0.02
Finland2003	0.08	0.42	0.32	0.00	0.18
France1969	0.55	0.24	0.16	0.04	0.02
France1990	0.07	0.72	0.20	0.01	0.00
France2003	0.02	0.54	0.30	0.00	0.14
GB1969	0.59	0.00	0.12	0.28	0.01
GB1990	0.08	0.48	0.34	0.04	0.06
GB2003	0.08	0.28	0.45	0.08	0.13
Ireland1969	0.69	0.03	0.12	0.17	0.00
Ireland1990	0.30	0.42	0.25	0.02	0.01
Ireland2003	0.16	0.28	0.46	0.05	0.04
Italy1969	0.76	0.16	0.06	0.02	0.00
Italy1990	0.37	0.50	0.05	0.07	0.02
Italy2003	0.19	0.42	0.15	0.06	0.19
Luxembourg1969	0.61	0.11	0.26	0.02	0.01
Luxembourg1990	0.11	0.68	0.20	0.01	0.00
Luxembourg2003	0.03	0.37	0.38	0.02	0.20
Netherlands1969	0.55	0.06	0.33	0.03	0.03
Netherlands1990	0.08	0.58	0.26	0.06	0.02
Netherlands2003	0.00	0.36	0.42	0.00	0.22
Portugal1969	0.88	0.11	0.02	0.00	0.00
Portugal1990	0.31	0.51	0.01	0.00	0.17
Portugal2003	0.17	0.58	0.22	0.02	0.01
Spain1969	0.73	0.14	0.11	0.00	0.02
Spain1990	0.28	0.67	0.03	0.01	0.00
Spain2003	0.09	0.58	0.25	0.00	0.08
Sweden1969	0.53	0.04	0.18	0.24	0.00
Sweden1990	0.06	0.58	0.20	0.16	0.00
Sweden2003	0.03	0.10	0.15	0.00	0.72
West-Germany1969	0.47	0.07	0.27	0.16	0.03
West-Germany1990	0.08	0.53	0.33	0.05	0.01
West-Germany2003	0.03	0.38	0.38	0.02	0.19

TABLE 4
Time-specific allocation of countries to consumer segments

Countries	1969	1990	2003
Denmark, GB, Western Germany, Sweden	2	5	6
Netherland	1	5	6
Austria, Belgium, Finland, France, Luxembourg	1	4	6
Ireland	2	3	5
Portugal, Spain	1	3	4
Italy	1	3	7