“Access to insurance for European SMEs: Patterns, clusters, and policy implications”

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ACCESS TO INSURANCE FOR EUROPEAN SMES: PATTERNS, CLUSTERS, AND POLICY IMPLICATIONS

Abstract

The study aims to explore the insurance profiles of SMEs and to identify access gaps across different firm categories, using the Ipsos European Public Affairs survey dataset, which consists of 8,187 SMEs from Europe. This dataset was analyzed using multiple correspondence analysis, cluster analysis, and discriminant analysis. Results show clear evidence of ownership concentration in a few insurance products: commercial motor (64.3% of SMEs own such an insurance), general liability (54.4%), and workers' compensation (46.1%). On the other hand, uptake is lowest for cyber insurance (15.3%), non-damage business interruption (14.5%), and commercial insurance with business interruption (20.3%); notably, 8.2% report no insurance product ownership. Furthermore, three behavioral clusters were identified: minimally insured (n = 3,604; mean 1.58 policies), moderately insured (n = 2,603; mean 5.22), and broadly insured (n = 1,980; mean 6.73). Also, portfolios exhibit structured "baskets" with frequent co-ownership of general liability and motor (40%). Findings document systematic, demography-linked disparities and actionable access gaps. The study concludes that persistent disparities in access are linked to firm size, age, and turnover, underscoring the need for tailored policy measures and market solutions to address inclusion gaps. The practical value of this study lies in providing evidence-based insights for insurers, regulators, and policymakers seeking to expand SME risk protection.

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INTRODUCTION

Micro, small, and medium enterprises (SMEs) constitute a fundamental pillar of both global and European economies. They represent the overwhelming majority of businesses and account for substantial shares of employment and value-added. Specifically, the United Nations (2023) reports that they account for 90% of businesses, 60 to 70% of employment, and 50% of GDP worldwide, while the World Bank reports that they generate seven out of ten formal jobs. In Europe, SMEs account for 99.8% of the total number of enterprises; they employ 64.4% of the total employees and produce 51.8% of the total value added (Di Bella et al., 2023). Yet, despite their critical economic role and exposure to a wide array of risks, the insurance behavior of SMEs remains a significantly under-investigated topic in academic literature. Unlike larger firms, whose insurance decisions have been studied through various theoretical and empirical lenses, SMEs are often treated as a residual category in research, frequently overlooked due to perceived data limitations or presumed simplicity in their decision-making.

This oversight is problematic. SMEs face distinct challenges in managing operational, financial, and emerging risks (e.g., cyber threats, climate events), and yet there is a lack of structured knowledge about how these businesses access and utilize insurance to mitigate such exposures. Existing regulatory and policy initiatives have similarly noted this gap. For instance, a 2022 position paper by the Insurance and Reinsurance Stakeholder Group of the European Insurance and Occupational Pensions Authority (IRSG-EIOPA, 2022) explicitly highlights the absence of comprehensive data on SME insurance coverage, describing it as a barrier to informed policy development.

The scientific problem underlying this study, therefore, lies in the insufficient understanding of how SMEs interact with the insurance market, particularly in terms of their product ownership patterns, access gaps, and segmentation based on firm characteristics. There is a need to move beyond anecdotal or single-country insights toward a more systematic, data-driven understanding of insurance behavior across the SME spectrum. Addressing this problem requires not only new data but also appropriate analytical tools that can uncover latent structures in insurance usage across diverse enterprises. This study responds to this problem by using the Ipsos European Public Affairs survey dataset and applying advanced machine learning techniques to explore the structure of insurance product ownership among SMEs. The goal is to provide an empirical depiction of SME insurance profiles, offering foundational insights into an area that remains largely opaque in both academic and policy discourse.

1. LITERATURE REVIEW

Research on the corporate demand for insurance has its theoretical roots in risk management and agency theory. Mayers and Smith (1982) laid the foundation by suggesting that firms transfer risk to insurers to reduce overall firm costs and enhance value, particularly when internal risk-bearing is inefficient. They later extended this work by linking insurance uptake to risky debt exposure (Mayers & Smith, 1987) and reinsurance demand (Mayers & Smith, 1990), identifying factors such as firm size, credit standing, and geographic concentration as key determinants. This general framework is expanded by researchers to integrate perspectives on tax incentives (Wakeman, 1980), agency conflicts (Jensen & Meckling, 1976; Fama, 1980), and financial contracting (Smith & Warner, 1979).

Empirical studies followed, confirming and refining these theoretical predictions in various country contexts. Yamori (1999), for instance, demonstrated that small Japanese firms purchase more insurance than large ones, though leverage and regulatory factors also played a role. However, the study found limited evidence for links between ownership structure or tax incentives and insurance decisions. Similar efforts by Davidson et al. (1992) and O'Sullivan (1997) examined U.S. and U.K. firms, respectively, but remained focused on large corporations. Regan and Hur (2007) analyzed Korean non-financial firms, while Hoyt and Khang (2000) and Zou and Adams (2006) extended this line of research to examine corporate property insurance and its determinants. All above mentioned studies share a common feature; they focused on large corporations.

Despite these developments at the large corporations' level, insurance decisions of micro, small, and medium enterprises (SMEs) remain vastly under-explored. However, SMEs and large corporations differ significantly at various levels. Torres and Julien (2005) were among the first to emphasize that SMEs are not merely scaled-down versions of large corporations but operate with distinctive managerial behaviors. This specificity affects financial decisions ranging from capital structure (Beck & Demirgüç-Kunt, 2006; Hall et al., 2004; Psillaki & Daskalakis, 2009) to investment choices (Danielsson & Scott, 2006; Ekanem & Smallbone, 2007; Lazaridis, 2004), and should, by extension, influence insurance behavior as well.

To date, the academic literature on SME insurance uptake is remarkably thin. Asai (2019) is a notable exception, using a dataset of 767 Japanese manufacturing SMEs to explore the demand for property liability insurance. His framework proposed that insurance demand increases with financial constraints, tax incentives, and creditworthiness, while firms at higher risk of bankruptcy may paradoxically be less likely to purchase coverage. The study also noted that firm size plays a role, with smaller enterprises more inclined to purchase insurance. Ricci and Santilli (2024) added another dimension by linking higher financial literacy among Italian entrepreneurs with a greater likelihood of purchasing business interruption insurance, suggesting that knowledge gaps may be just as important as financial ones in determining coverage levels. The behavioral dynamics of insurance demand have also begun to attract interest. Ding and Deng (2024), for example, examined how typhoon-related damage in China influences future insurance uptake. Their findings suggest that firms revise their risk perception not only based on direct experience but also through upstream and downstream connections, indicating that network effects, rather than isolated incidents, may shape firm-level insurance behavior. This contrasts with household behavior and adds complexity to how SMEs might view indirect risks.

Policy and regulatory bodies have similarly noted this data gap. The Insurance and Reinsurance Stakeholder Group (IRSG) of the European Insurance and Occupational Pensions Authority (EIOPA) emphasized the absence of detailed information on SME insurance access in the EU, arguing that this limits the ability to develop appropriate regulatory or market interventions (IRSG-EIOPA, 2022). While existing surveys like the Survey on the Access to Finance of Enterprises of the European Central Bank (ECB-SAFE) and the Investment Survey of the European Investment Bank (EIB-IS) offer insights into SME finance and investment, they omit insurance data, leaving a blind spot in understanding how SMEs manage risk exposure. Given the structural importance of SMEs, as recognized by the European Commission (Di Bella et al., 2023) and the World Bank (2021), a more targeted analysis of SME insurance needs is needed.

Methodologically, prior studies have often relied on limited sample sizes or focused on a single insurance product. Moreover, they rarely investigate the co-ownership of multiple insurance types or attempt to segment SMEs into typologies based on their insurance behaviors. Kumar et al. (2020) and Sarwary (2019) provide systematic reviews in the areas of capital structure and capital budgeting, but equivalent reviews in insurance research – particularly with a focus on SMEs – are lacking. This highlights a clear opportunity for multi-variable approaches, such as clustering and correspondence analysis, to provide a more granular understanding of insurance behavior.

Taken together, these findings underline a persistent empirical and theoretical gap in the literature: while corporate insurance decisions have been studied extensively in large firms, the SME segment remains under-researched due to data limitations and methodological constraints. Most existing studies offer narrow, country-specific insights and fail to account for the complex, multi-product insurance choices SMEs must make. This study seeks to address these gaps by analyzing a large dataset of SMEs in Europe, applying machine learning techniques to explore insurance product ownership patterns and access disparities. It aims to contribute new evidence to this underdeveloped field and support the development of more inclusive insurance policies for SMEs.

2. DATA AND METHODS

The IRSG-EIOPA (2022) position paper concludes that additional data is required to monitor SMEs' access to insurance. Following this, EIOPA commissioned Ipsos European Public Affairs to conduct a relevant survey. The dataset used in this study was thus formed by a survey conducted by Ipsos European Public Affairs at the request of the European Insurance and Occupational Pensions Authority. The survey was designed to capture European SMEs' access to insurance, including the most important insurance products that SMEs could buy.

Between 15 June and 1 July 2022, Ipsos European Public Affairs carried out a Flash Eurobarometer on SME trends in insurance services at the request of the European Insurance and Occupational Pensions Authority (EIOPA). This Flash Eurobarometer covers small and medium-sized enterprises, active in manufacturing (NACE category C), industry (NACE categories B, D, E, F), retail (NACE category G), services (NACE categories, H, I, J, L, M, N, R, S), and within the European Union. Interviews were conducted with individuals holding decision-making responsibilities (managing director, general manager, CEO, financial director), those leading commercial ac-

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tivities (commercial manager, sales manager, marketing manager), or a legal officer. All interviews were carried out via Computer-Assisted Telephone Interviewing (CATI).

The sample was selected from an international business database. Sampling targets were defined on both company size (using three different ranges: 1-9 employees, 10-49 employees, and 50-249 employees) and sectors (industry, manufacturing, retail, and services). These sampling targets were adjusted according to the country's universe, but were also justified in order to ensure that the sample was large enough in every cell.

Table 1 shows the main sample demographics; more than half of the sample consists of micro enterprises (4,406; 53.8%), while the rest are small (2,466; 30.1%) or medium (1,315; 16.1%) enterprises. Most of them operate for more than 10 years (5,815, 71.0%), while their total turnover is mainly allocated around €100k to €500k (1,731; 21.1%) and €500k to €10m (2,776; 33.9%).

Table 1. Sample demographics: age, total turnover, SME category

Respondents	N	%
Age		
1. Less than 1 year	85	1.0
2. Between 1 and 5 years	1,038	12.7
3. Between 6 and 10 years	1,242	15.2
4. More than 10 years	5,815	71.0
Don't know/No answer	7	0.1
Total Turnover		
1. Less than €25k	704	8.6
2. More than €25k to €50k	562	6.9
3. More than €50k to €100k	671	8.2
4. More than €100k to €250k	920	11.2
5. More than €250k €500k	811	9.9
6. More than €500k to €2m	1,567	19.1
7. More than €2m to €10m	1,209	14.8
8. More than €10m to €50m	504	6.2
9. More than €50m	87	1.1
Don't know/No Answer	1,152	14.1
SME Category		
1. micro (1 to 9 employees)	4,406	53.8
2. small (10 to 49 employees)	2,466	30.1
3. medium (50 to 249 employees)	1,315	16.1
Total	8,187	100

Note: The numbers that appear next to each category correspond to the respective coding in the dataset file.

In this paper, the respondents' demographics are combined with their answers in two specific questions of the questionnaire, asking respondents to answer a. whether they own specific insurance products, and b. whether the ones not owning them, consider them important. The respondents were asked to answer these two questions on a list of 11 products in total[1].

The analytical workflow comprised six stages: variable construction, descriptive profiling, dimensionality reduction, clustering, validation, and inferential comparisons. The objective was to derive coverage patterns, quantify access gaps, and relate resulting profiles to firm demographics.

Binary ownership indicators were constructed for each of eleven named insurance products by coding affirmative responses as 1 and negative responses as 0. Responses such as "Other insurance," "None of these," and "Don't know/No answer" were retained for transparency in descriptive tabulations but excluded from multivariate procedures that require comparable product indicators. A concise perceived-access metric was defined for each product as the ratio of the share indicating a product is 'important but not owned' to the share currently owning it. This gap ratio complements raw percentages by summarizing unmet demand relative to uptake; larger values denote more pronounced perceived access gaps. Observations with "Don't know/No answer" were omitted from inferential tests and from correspondence and clustering analyses; no imputation was applied. Descriptive profiling summarized sample composition by size, age, and turnover; reported ownership rates at the aggregate and across demographic strata; and identified frequent co-ownership pairs and tuples that illuminate how coverage portfolios are assembled. These results provide an interpretable baseline for multivariate analyses.

Multiple correspondence analysis (MCA) was then applied, using the "MCA" function of "FactoMineR" R-package (Husson et al., 2020) to the eleven binary indicators to characterize the multivariate structure of product ownership. In this study, MCA works as a dimensionality-reduction and visualization tool (e.g., Everitt, 2006).

1 The exact wording of the questions, as asked to entrepreneurs, is shown at the Appendix A.

Component contributions and squared cosines ($\cos^2$) were inspected to identify products that define the leading axes, the proportion of variance explained by the principal dimensions was reported, and the positions of firms and products in the latent space were examined. The MCA coordinates served as inputs to a subsequent clustering stage to detect distinct coverage profiles. The number of clusters was selected using the "NbClust" R-package (Charrad et al, 2014) across candidate solutions from two to ten, evaluating multiple distance measures (Euclidean, Manhattan, maximum, Canberra, and Minkowski) and partitioning or linkage methods (k-means, ward.D, ward.D2, single, complete, and average). The solution most frequently recommended across criteria was adopted, and the final partition was estimated with k-means under Euclidean distance. Cluster separation was examined visually on the leading MCA dimensions and validated via discriminant analysis.

Profiles were then related to firm demographics. Differences in proportions were assessed with chi-square tests, while differences in counts – such as the number of policies held – were evaluated using Kruskal–Wallis tests, followed by Bonferroni-adjusted simultaneous confidence intervals for post-hoc contrasts. Interpretation synthesizes three complements: descriptive highlights of high- and low-uptake products and common baskets of covers; gap ratios that flag products with pronounced unmet demand (notably cyber and property cover with business interruption); and the cluster typology that distinguishes minimally, moderately, and broadly insured segments across size, age, and turnover. All computations were conducted in R (R Core Team, 2020).

3. RESULTS AND DISCUSSION

The response frequencies per insurance policy, which SMEs held for business purposes, are shown in Table 2. An interesting and encouraging result is that less than one out of ten SMEs (8.2%) mentioned that they do not own any insurance at all. With regard to policy popularity, the three most popular insurance products are "Commercial motor insurance" (64.3% responded that they own it), "Commercial general liability insurance" (54.4%) and "Worker's compensation" (46.1%), whereas the three least popular are, "Non-damage business interruption insurance" (14.5%), "Cyber and data security insurance" (15.3) and "Commercial property & casualty insurance with business interruption" (20.3%). It is worth mentioning that these responses provide interesting insights into

Table 2. Insurance products that SMEs own, or do not own but consider important

Insurance Products:	Insurance products that SMEs own		Insurance products that SMEs do not own but consider important*		Ratio of Important but do not own / Own
	N	%	N	%	
Commercial property & casualty insurance without business interruption coverage (1)	1,967	24.0	854	10.4	0.43
Commercial property & casualty insurance with business interruption (2)	1,658	20.3	1,415	17.3	0.85
Coverage for property damage from natural disasters (3)	3,692	45.1	386	4.7	0.10
Non-damage business interruption insurance (4)	1,184	14.5	438	5.3	0.37
Commercial general liability insurance (5)	4,452	54.4	513	6.3	0.12
Professional liability insurance / Errors & omissions coverage (6)	3,685	45.0	490	6.0	0.13
Workers' compensation (7)	3,772	46.1	422	5.2	0.11
Product liability insurance (8)	2,359	28.8	454	5.5	0.19
Cyber and data security insurance (9)	1,250	15.3	572	7.0	0.46
Commercial motor insurance (10)	5,265	64.3	146	1.8	0.03
Business legal expense insurance (11)	2,459	30.0	263	3.2	0.11
Other (12)	861	10.5	324	4.0	–
None of these (13)	668	8.2	1,530	18.7	–
Don't know (14)	121	1.5	380	4.6	–

Note: * Only one of the policies must be selected.

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the use of insurance products. For example, an interesting finding is that relatively new risks, such as cyber risks, are not yet popular among SME owners, and that risks linked with climate change, such as natural disaster insurance, are also not listed among the first three.

The second part of Table 2 includes the response frequencies per insurance policy that SMEs do not own but are considered important for their business activities. A notable finding is that all three least popular products in terms of usage, as shown in Table 2, are among the four most popular products that SMEs would like to access. This implies that the low usage scores, as recorded in the first part of Table 2, do not necessarily mean a lack of interest, but rather a lack of access. To further explore this finding, the ratio of the percentages of the "Important but do not own" to the "Own policies" (last column) was calculated, to measure the relative perceived gap in the access of each insurance product. Specifically, the higher the ratio the higher the perceived gap; for example, if only 20.3% of SMEs reported that they own "Commercial property & casualty insurance with business interruption" and 17.3% of them would like to own it, the ratio of 0.85 implies relatively low levels of possession and high levels of desire to get access to this policy, so, high levels of gap. Moreover, the respective, for example, 64.3% that own "Commercial motor insurance" against the only 1.8% that would like to own it (corresponding ratio of 0.03), implies relatively high levels of possession and low levels of desire to gain access to this policy, so, low levels of gap. Looking at the ratios, the three most-desired policies with consequent low access are "Commercial property and casualty insurance with business interruption", "Cyber and data security insurance", and "Commercial property and casualty insurance without business interruption coverage". Table 3 illustrates how the proportion of policies varies across different categories of SMEs, their age, and their total turnover.

For instance, the proportion of SMEs that own "Commercial property and casualty insurance with business interruption coverage" ranges from 15.6% for micro enterprises to 30.5% for medium enterprises. Generally, as the employment category increases, so does the proportion of SMEs that hold this insurance. This is also the case for age, although in many cases, the first and last categories revealed the greatest proportions. The same trend is evident for total turnover, with larger turnovers corresponding to higher proportions of SMEs holding insurance policies. These findings are further confirmed by the last column of Table 3, which shows the mean value of the number of policies held for each category of employ-

Table 3. Proportion (%) of SMEs that own each insurance product, within the SME categories, Age and Total Turnover; number of owned policies (in total) across categories

SMEs Criteria		Insurance product*														Number of owned products (means)
		1	2	3	4	5	6	7	8	9	10	11	Other	None	Don't know	
SME Category	1	21.5	15.6	37.3	12.1	47.0	40.0	38.2	22.4	11.7	56.0	26.3	8.6	13.3	1.4	3.37
	2	27.1	23.1	51.9	17.4	61.4	49.1	54.1	34.0	17.6	73.4	33.9	12.0	2.8	1.5	4.55
	3	26.9	30.5	58.4	17.1	66.1	54.1	57.2	40.7	22.7	75.4	35.4	14.1	1.1	1.8	4.98
Age	1	22.4	15.3	32.9	25.9	48.2	38.8	43.5	22.4	14.1	45.9	29.4	5.9	18.8	3.5	3.45
	2	17.5	15.2	33.0	13.7	47.8	36.9	39.3	22.6	13.1	48.8	27.0	8.4	17.1	1.2	3.23
	3	20.9	15.5	37.7	11.5	49.2	43.1	40.0	26.8	12.7	55.4	26.3	8.9	10.6	1.5	3.48
	4	25.8	22.3	49.0	15.1	56.7	47.0	48.6	30.5	16.2	69.2	31.4	11.3	5.9	1.5	4.23
Total Turnover	1	16.5	10.5	25.3	8.7	33.0	28.8	20.3	15.6	8.0	36.7	16.3	6.0	31.5	1.4	2.26
	2	20.5	9.6	30.6	8.4	37.5	31.5	28.5	17.3	11.0	49.8	19.4	8.2	19.6	0.5	2.72
	3	20.1	14.5	37.1	11.6	45.5	40.1	35.3	21.0	10.1	54.1	22.8	6.1	11.9	1.0	3.18
	4	24.5	15.7	41.5	10.9	51.4	43.3	44.2	22.8	11.6	61.5	25.4	9.2	6.0	0.9	3.62
	5	26.9	16.5	45.8	13.7	54.4	46.4	45.1	25.7	13.9	68.2	30.8	8.8	5.4	0.9	3.96
	6	27.4	24.1	51.1	14.9	59.5	49.2	54.7	30.7	17.4	74.4	34.0	12.4	2.4	0.6	4.50
	7	29.4	28.5	57.5	18.7	67.7	52.7	56.4	40.0	19.4	79.1	37.6	15.1	0.7	1.3	5.02
	8	27.2	36.5	63.7	26.2	78.0	62.1	65.3	57.9	26.2	80.8	47.0	17.1	0.6	1.2	5.88
	9	29.9	40.2	57.5	35.6	79.3	57.5	70.1	49.4	39.1	83.9	54.0	17.2	1.2	2.3	6.14

Note: * Which policy corresponds to 1, 2, ..., 14, can be found in Table 2.

ment, age, and total turnover, separately. For example, micro companies hold an average of 3.37 policies, small companies hold 4.55 policies, and medium companies hold 4.98 policies. A similar pattern is observed for total turnover: as turnover increases, the average number of policies also increases. Additionally, the average number of policies is higher for younger and older enterprises, while middle-aged companies have relatively fewer policies.

Table 4 provides the proportion of SMEs that hold various pairs of policies. Notably, 40% of SMEs hold both "Commercial General Liability Insurance (5)" and "Motor insurance (10)". Other popular pairs of policies include:

a) "Commercial general liability insurance (5)" and "Worker's compensation (7)" (34.8%);

b) "Commercial motor insurance (10)" and "Worker's compensation (7)" (34.0%);

c) "Commercial general liability insurance (5)" and "Professional liability insurance/errors & omissions coverage (6)" (33.8%);

d) "Commercial motor insurance (10)" and "Professional liability insurance/errors & omissions coverage (6)" (32.7%); and

e) "Commercial motor insurance (10)" and "Coverage for property damage from natural disasters (3)" (34.2%).

Furthermore, the last part of Table 4 refers to the frequency of how many SMEs hold (in total) 0, or 1, etc., 12 of the policies (including the option "other"); as can be seen, there are only 16 SMEs which hold 11 of the policies, whereas most of them (approximately, 55.1%) hold 4 or more of the policies. Of the same nature is Table 5, wherein the 40 most selected combinations of three or four policies are mentioned; it is worth noting that the (overall) mean value of the number of policies held by SMEs is 3.98 (median = 4.00, std = 2.60).

An important pattern emerging from the analysis is that certain insurance products tend to be selected together by SMEs, forming distinct "baskets" of coverage. The most frequently co-owned products include coverage for property damage from natural disasters, commercial general liability insurance, professional liability insurance (errors and omissions), workers' compensation, and commercial motor insurance. This clustering reflects the perceived complementarity of these policies: general and professional liability provide basic protection against third-party claims, while workers' compensation and motor insurance are often regulatory or operational necessities, and property damage insurance addresses tangible risk exposure.

The multiple correspondence analysis (MCA) provides further insights into these patterns by illustrating how products are positioned in a multidimensional insurance "space" (Figures 1 and 2). The first two principal dimensions account for

Table 4. Proportion of SMEs (%) with two specific insurance products, along with the number of SMEs with 0, 1, …, 12 policies (in total)

		Prop. for each combination of two products												Owned products		
		Insurance product*												Total	N	%
Insurance policy		5	10	7	6	3	11	8	2	1	9	4	12	0	789	9.6
	5	54.4	40.0	34.8	33.8	31.1	24.8	23.5	15.8	15.9	12.6	12.0	6.1	1	992	12.1
	10	–	64.3	34.0	32.7	34.2	22.3	21.7	15.0	18.1	11.0	10.2	7.4	2	930	11.4
	7	–	–	46.1	28.2	26.3	21.8	19.7	14.4	12.8	11.5	10.5	4.8	3	965	11.8
	6	–	–	–	45.0	25.3	21.0	19.2	13.1	12.3	10.2	9.8	5.1	4	1013	12.4
	3	–	–	–	–	45.1	17.4	17.8	12.8	14.7	9.0	8.9	4.9	5	1030	12.6
	11	–	–	–	–	–	30.0	14.2	11.1	7.9	9.3	8.8	3.3	6	946	11.6
	8	–	–	–	–	–	–	28.8	9.3	8.4	8.2	7.5	3.1	7	696	8.5
	2	–	–	–	–	–	–	–	20.3	0.0	5.8	7.2	2.5	8	460	5.6
	1	–	–	–	–	–	–	–	–	24.0	3.7	2.6	2.3	9	249	3.0
	9	–	–	–	–	–	–	–	–	–	15.3	4.8	1.9	10	101	1.2
	4	–	–	–	–	–	–	–	–	–	–	14.5	1.5	11	16	0.2
	12	–	–	–	–	–	–	–	–	–	–	–	10.5	12	0	0

Note: * Which product corresponds to 1, 2, …, 12, can be found on Table 2.

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Table 5. 40 most owned combinations of three or four insurance products

Three products					Four products					
Insurance product			N	%	Insurance product				N	%
2	7	10	888	10.85	3	5	8	11	651	7.95
6	8	11	890	10.87	1	5	6	10	659	8.05
8	10	11	897	10.96	2	5	7	11	665	8.12
2	5	6	918	11.21	1	5	7	10	666	8.13
7	8	11	929	11.35	2	3	5	10	668	8.16
1	3	10	979	11.96	6	8	10	11	693	8.46
2	5	10	984	12.02	1	3	5	10	707	8.64
3	6	8	988	12.07	2	5	6	10	709	8.66
2	5	7	997	12.18	7	8	10	11	721	8.81
3	7	8	1,009	12.32	6	7	8	11	726	8.87
1	5	10	1,026	12.53	3	6	7	8	735	8.98
3	6	11	1,034	12.63	2	5	6	7	737	9.00
5	8	11	1,038	12.68	2	5	7	10	762	9.31
3	7	11	1,051	12.84	3	6	8	10	801	9.78
3	10	11	1,122	13.70	5	6	8	11	803	9.81
6	7	8	1,159	14.16	3	7	8	10	804	9.82
3	8	10	1,168	14.27	5	8	10	11	808	9.87
6	8	10	1,196	14.61	3	6	7	11	809	9.88
3	5	11	1,205	14.72	3	6	10	11	831	10.15
7	8	10	1,226	14.97	5	7	8	11	843	10.30
3	5	8	1,228	15.00	3	7	10	11	850	10.38
6	10	11	1,293	15.79	3	5	6	8	878	10.72
6	7	11	1,316	16.07	3	5	7	8	892	10.90
5	6	8	1,355	16.55	6	7	8	10	894	10.92
7	10	11	1,362	16.64	3	5	6	11	909	11.10
5	7	8	1,394	17.03	3	5	7	11	930	11.36
3	6	7	1,399	17.09	3	5	10	11	969	11.84
5	8	10	1,459	17.82	3	5	8	10	984	12.02
5	6	11	1,479	18.07	6	7	10	11	1,012	12.36
5	7	11	1,549	18.92	5	6	7	8	1,036	12.65
5	10	11	1,549	18.92	5	6	8	10	1,040	12.70
3	6	10	1,619	19.78	5	7	8	10	1,066	13.02
3	5	6	1,678	20.50	3	6	7	10	1,115	13.62
3	7	10	1,687	20.61	5	6	10	11	1,133	13.84
3	5	7	1,707	20.85	5	6	7	11	1,168	14.27
6	7	10	1,731	21.14	3	5	6	7	1,192	14.56
5	6	7	1,920	23.45	5	7	10	11	1,199	14.65
3	5	10	1,992	24.33	3	5	6	10	1,335	16.31
5	6	10	2,091	25.54	3	5	7	10	1,360	16.61
5	7	10	2,147	26.22	5	6	7	10	1,464	17.88

37.7% of the variability in ownership, with the first dimension broadly separating SMEs that actively hold insurance products from those with limited or no coverage. Policies such as natural disaster insurance, liability insurance, professional liability, and workers' compensation show the strongest correlation with this first dimension, indicating that they collectively define the core insurance profile of covered SMEs. By contrast, the second dimension captures differentiation among property and business interruption policies, particularly distinguishing commercial property insurance with and without business interruption coverage. Products such as "Other insurance" exhibit a weak association with either dimension, suggesting they are idiosyncratic and do not form part of common SME insurance bundles.

Therefore, policies 3-9 and 11 seem to be most correlated with the first dimension (Figure 1 shows that these products are found over the horizontal axis, and away from the origin), whereas policies 1 and 2 with the second (2 is also correlated to the first); note that policy 12, which corresponds to "Other products" seems not to be correlated with any of these dimensions (is very close to origin; this is also verified by Figure 2, and the cos2 values). Moreover, Figure 2 confirms the popularity of choosing two of the products 3 and 5-7 (since those products are close to each other on the graph). The role of the second dimension in representing product 1 can also be verified, as is the case for the distinct profiles between those affirmatively responding to Policies 2, 4, and 9, and Policy 1 (i.e., it appears quite rare for these policies to be chosen together; note that 1 and 2 could not be chosen together in any case).

When comparing these findings to prior research, several observations emerge. First, the prominence of liability, workers' compensation, and motor insurance aligns with the conclusions of Yamori (1999), who noted that regulatory factors are significant drivers for insurance demand, so that smaller firms could be expected to prioritize mandatory critical insurance products. Similarly, the co-ownership of these products reflects the tendency described by Mayers and Smith (1982, 1987) for firms to insure against risks that could trigger significant financial distress or operational disruption.

To explore the latent number of distinct profiles (groups or clusters) of SMEs that exist in the data, according to their insurance product choices, cluster analysis was carried out (using "NbClust" package found in the R-project) on the whole set of dimensions deduced by the conducted multiple correspondence analysis. Considering different distance measures (Euclidean, Manhattan, maximum, Canberra, and Minkowski) and clustering methods (k-means, ward.D, ward.D2, single, complete, and average), and evaluating solutions ranging from 2 to 10 clusters, it came out that the most interpretable solution was a three cluster solution which was suggested by most methods (the Euclidean distance and k-means were the measure and method finally used). Figure 3 shows how well the three clusters are discriminated by the two dimensions of the correspondence analysis (this is also confirmed by a discriminant analysis, where more than 97% of the cases were correctly classified into the derived three clusters).

The cluster analysis of SMEs based on their insurance product ownership reveals a clear segmentation into three behavioral groups. Cluster 3, the largest group with 3,604 firms, is composed primarily of SMEs holding none, one, or two insurance products (Table 6). Even among firms with

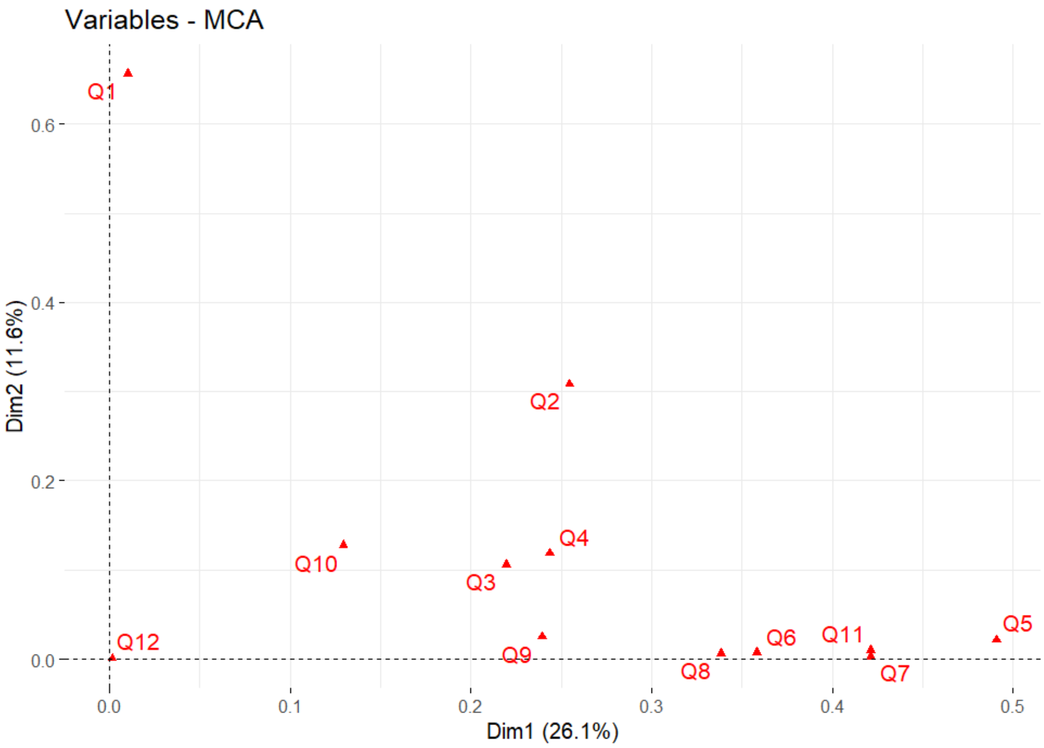

Figure 1. Correlation between policies and principal dimensions in multiple correspondence analysis

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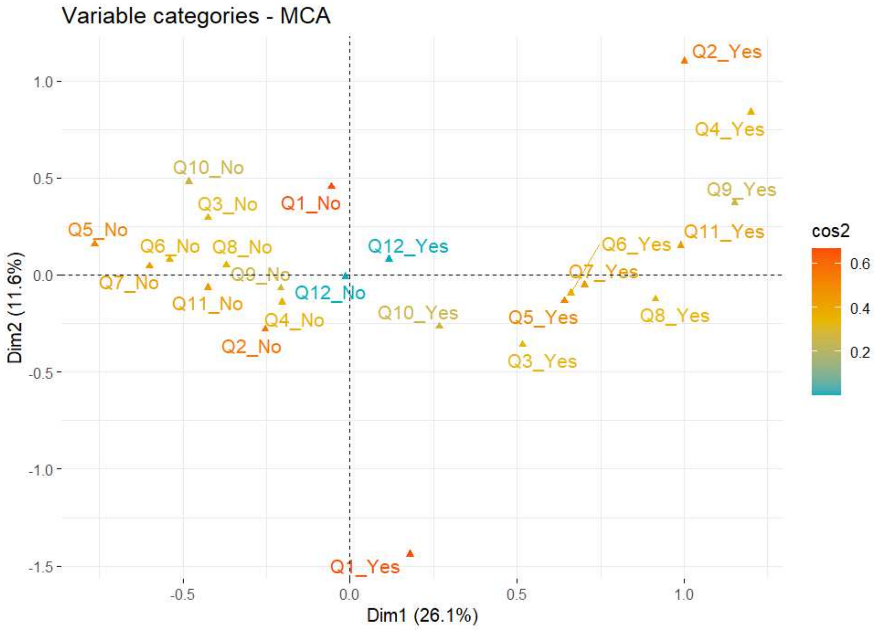

Figure 2. Policy space and quality of representation (cos2) of policy categories (yes or no), in multiple correspondence analysis

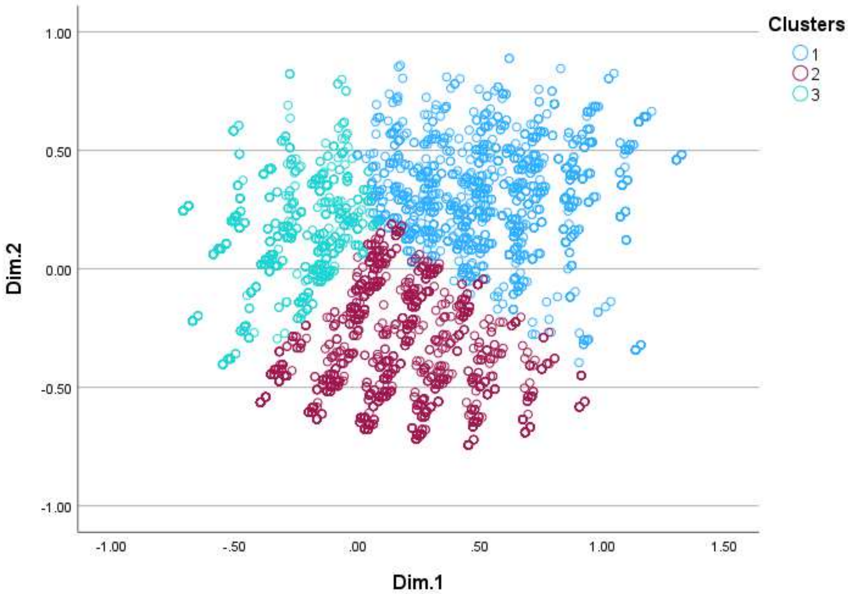

Figure 3. Cluster membership in a two-dimensional space of the correspondence analysis

three products, a significant proportion falls into this cluster. This pattern suggests a substantial segment of European SMEs remains minimally insured, either due to resource constraints, limited risk awareness, or prioritization of only the most essential coverage. Cluster 2, comprising 2,603 SMEs, represents a transitional group that typically owns between four and seven insurance products. This segment reflects SMEs with moderate engagement in insurance markets, balancing regulatory requirements with selective voluntary coverage. Finally, Cluster 1, with 1,980 SMEs, contains firms with the broadest insurance portfolios, averaging 6.73 products per firm. These firms demonstrate a proactive risk management approach, often associated with larger size, higher turnover, and greater operational complexity. The contrast with Cluster 3, which averages just 1.58 policies, illustrates the pronounced heterogeneity in SME insurance behavior.

Examining the distribution of individual products across clusters provides further insights into coverage patterns (Table 7). For example, 84.86% of SMEs holding commercial property insurance with business interruption (Policy 2) are concentrated in Cluster 1. This suggests that complex or higher-cost policies are predominantly adopted by firms already engaged in comprehensive risk management, reinforcing the notion of "layered adoption" where advanced coverage builds upon a foundation of mandatory or basic products.

Table 6. Number of owned products (in total), across clusters

Owned products (in total)	Clusters			Total
	1	2	3	
0	0	0	789	789
1	0	0	992	992
2	0	0	930	930
3	0	225	740	965
4	153	712	148	1013
5	347	678	5	1030
6	446	500	0	946
7	406	290	0	696
8	323	137	0	460
9	194	55	0	249
10	95	6	0	101
11	16	0	0	16
Total	1,980	2,603	3,604	8,187
Means*	6.73	5.22	1.58	–

Note: * All the pairwise differences across clusters are significant at the .05 level, using the Kruskal-Wallis test and Bonferroni adjustment.

Table 7. Clusters and insurance products

Product	Counts (yes)			Prop. (%) within product		
	Clusters			Clusters		
	1	2	3	1	2	3
1	62	1,658	247	3.15	84.29	12.56
2	1,407	0	251	84.86	0	15.14
3	1,253	1,754	685	33.94	47.51	18.55
4	938	142	104	79.22	11.99	8.78
5	1,737	2,014	701	39.02	45.24	15.75
6	1,453	1,613	619	39.43	43.77	16.80
7	1,571	1,634	567	41.65	43.32	15.03
8	1,087	1,065	207	46.08	45.15	8.77
9	838	319	93	67.04	25.52	7.44
10	1,432	2,166	1667	27.20	41.14	31.66
11	1,309	970	180	53.23	39.45	7.32
12	234	259	368	27.18	30.08	42.74

The relationship between SME demographics and insurance behavior (Table 8) reveals clear structural patterns in the clustering results. Cluster 1, which represents the most comprehensively insured firms, is predominantly composed of larger and more established enterprises. Among firms with 1 to 9 employees, only 19.2% fall into this cluster, while this share rises to 34.2% for firms with 50 to 249 employees. In contrast, Cluster 3, which contains the least insured firms, is dominated by micro-enterprises: 52.9% of firms in this size category belong to Cluster 3, while only 29.2% of medium-sized firms fall into this low-coverage group.

The patterns are similar when considering firm age and total turnover. Older firms and those with higher revenues are more likely to occupy Cluster 1, while younger or lower-revenue firms are concentrated in Cluster 3. For instance, SMEs less than one year old in Cluster 3 hold, on average, just 0.78 policies, reflecting minimal engagement with the insurance market. In stark contrast, firms with annual turnover exceeding €50 million in Cluster 1 hold an average of 7.59 policies, indicating a near-complete adoption of available insurance products. Cluster 2 exhibits an intermediate pattern, with demographic distributions more stable but generally following the upward trajectory of Cluster 1 as size and financial capacity increase.

These findings are consistent with the broader literature emphasizing the influence of firm size and resources on insurance uptake. Mayers and Smith (1982, 1987) and Yamori (1999) suggested that smaller firms face higher bankruptcy risk and may theoretically benefit more from insurance; however, in practice, limited resources and risk management capacity constrain coverage. Our results reflect this paradox: micro and young firms are most exposed yet least insured, echoing the access gaps highlighted in the EIOPA (2022) position paper. Similarly, the pattern of increasing coverage with firm age aligns with Asai (2019), who observed that established SMEs are better able to secure and maintain broader insurance portfolios, possibly due to accumulated financial stability and stronger banking relationships.

Interestingly, the U-shaped relationship between firm age and coverage observed in the earlier analysis – where the youngest and oldest firms tend to hold relatively higher coverage – also reflects behavioral dynamics discussed by Ding and Deng

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Table 8. Clusters vs demographics

		Cluster 1			Cluster 2			Cluster 3		
		N	Prop. (%, within row)	Owned products (in total)	N	Prop. (%, within row)	Owned products (in total)	N	Prop. (%, within row)	Owned products (in total)
SMEs Category	1(n = 4,406)	847	19.2^{a}	6.46^{a}	1228	27.9^{a}	5.05^{a}	2331	52.9^{a}	1.35^{a}
	2(n = 2,566)	683	27.7^{b}	6.88^{b}	894	36.3^{b}	5.35^{b}	889	36.1^{b}	1.95^{b}
	3(n = 1,315)	450	34.2^{c}	7.00^{b}	481	36.6^{b}	5.42^{b}	384	29.2^{c}	2.09^{b}
Age	1 (n = 85)	22	25.9^{a,b}	6.27^{a,b}	23	27.1^{a,b}	5.39^{a}	40	47.1^{a,b}	0.78^{a}
	2 (n = 1,038)	198	19.1^{a}	6.48^{a}	261	25.1^{a}	5.03^{a}	579	55.8^{b}	1.31^{b}
	3 (n = 1,242)	253	20.4^{a}	6.47^{a}	359	28.9^{a}	5.00^{a}	630	50.7^{b}	1.42^{b}
	4 (n = 5,815)	1507	25.9^{b}	6.81^{b}	1955	33.6^{b}	5.29^{b}	2353	40.5^{a}	1.70^{c}
Total Turnover	1 (n = 704)	90	12.8^{a}	6.22^{a,b}	121	17.2^{a}	4.84^{a}	493	70.0^{a}	0.90^{a}
	2 (n = 562)	77	13.7^{a,b}	6.00^{a}	131	23.3^{a,b}	4.98^{a,b}	354	63.0^{a,b}	1.18^{a,b}
	3 (n = 671)	114	17.0^{a,b}	6.10^{a}	175	26.1^{b,c}	4.85^{a}	382	56.9^{b}	1.55^{b,c}
	4 (n = 920)	170	18.5^{a,b}	6.23^{a,b}	307	33.4^{c,d}	4.99^{a,b}	443	48.2^{c}	1.67^{b,c,d,e}
	5 (n = 811)	164	20.2^{b}	6.54^{a,b,c}	290	35.8^{d}	5.22^{a,b,c}	357	44.0^{c}	1.75^{c,d,e}
	6 (n = 1,567)	437	27.9^{c}	6.75^{b,c}	552	35.2^{d}	5.34^{a,b,c}	578	36.9^{d}	1.98^{c,d,e}
	7 (n = 1,209)	393	32.5^{c}	7.04^{c,d}	474	39.2^{d}	5.45^{b,c,d}	342	28.3^{e}	2.11^{d,e}
	8 (n = 504)	219	43.5^{d}	7.48^{d}	200	39.7^{d}	5.72^{c,d}	85	16.9^{f}	2.14^{e}
	9 (n = 87)	44	50.6^{d}	7.59^{d}	30	34.5^{b,c,d}	5.97^{d}	13	14.9^{e,f}	1.62^{b,c,d}

Note: Subscripts a, b, c, d, e, f : Each subscript letter denotes a subset of categories whose proportions (across rows) or means do not differ significantly from each other, at .05 level (using the chi-square test, for proportions, and Kruskal-Wallis test, for means, along with a Bonferroni adjustment).

(2024). Young firms may initially be overinsured due to heightened risk perception or external financing requirements, while older firms gradually accumulate comprehensive portfolios as their exposure and experience grow. This demographic differentiation reinforces the need for tailored insurance strategies, as a one-size-fits-all approach is unlikely to bridge the significant coverage gaps present among micro and early-stage enterprises.

Overall, the demographic analysis confirms that SME insurance behavior is systematically influenced by firm size, age, and turnover, resulting in a stratified market where comprehensive insurance adoption is heavily concentrated among resource-rich, established firms. These structural disparities highlight persistent inclusion challenges and align closely with previous observations in both academic and regulatory literature.

CONCLUSION

The primary objective of this study is to explore how micro, small, and medium-sized enterprises (SMEs) in Europe engage with the insurance market, identifying patterns of product ownership, access gaps, and the influence of firm characteristics such as size and age. By applying machine learning techniques – multiple correspondence analysis, cluster analysis, and discriminant analysis on a dataset of 8,187 SMEs in Europe – the study provides comprehensive evidence of the SME insurance landscape.

The analysis revealed three distinct clusters of SMEs based on the number of insurance products they hold, demonstrating that firm size and total turnover are strongly associated with broader insurance coverage, while the youngest and oldest firms often share similar coverage behaviors. Moreover, clear gaps emerged in access to specific insurance products, notably cyber and data security coverage and commercial property insurance with business interruption, which are perceived as important but remain underutilized. The findings also show that SMEs tend to form "baskets" of commonly co-owned policies, highlighting patterns of complementary coverage. Interestingly, the analysis also reveals that property-related policies, especially those involving business interruption coverage, occupy a distinct and less integrated space in the MCA plot. Overall, the results indicate that SME insurance portfolios are not random but structured around core operational and regulatory needs, while voluntary and emerging-risk policies remain peripheral. This structured heterogeneity highlights the segmentation challenge noted in previous literature: SMEs form distinct insurance behavior groups that cannot be captured by single-policy analyses alone. By identifying these product clusters and visualizing their relationships, this study extends prior single-product or single-country studies to a European context, providing a broader empirical foundation for understanding SME insurance behavior.

The findings have practical value for market participants and policymakers. Insurers can tailor bundled offerings aligned to observed baskets, calibrate pricing and underwriting to segment-specific risk appetites, and prioritize outreach for complex or emerging covers (notably cyber and business interruption). Regulators and SME support bodies can target inclusion gaps through disclosure standards, incentive schemes, and advisory programs focused on products with high perceived importance but low uptake. Such actions address the concentration of comprehensive coverage among resource-rich firms and support risk protection for micro and younger enterprises.

Further research should move beyond cross-sectional description to identify mechanisms, quantify effects, and test solutions. First, causal drivers of adoption merit designs that leverage plausibly exogenous variation (e.g., staggered regulatory changes, eligibility thresholds, or market entries/exits), enabling difference-in-differences, event-study, or regression-discontinuity estimates. Second, dynamic portfolio formation should be examined with longitudinal or linked administrative data to track acquisition, retention, and lapse, including responses to shocks such as cyber incidents or local natural hazards. Third, supply-side constraints require direct evidence: audits or market scraping could document quote availability, price dispersion, declination rates, and documentation burdens faced by micro enterprises. Fourth, integrating prices, claims histories, and loss experience with survey responses would separate demand frictions from risk-based underwriting and allow valuation of coverage breadth versus depth. Fifth, sectoral and geographic heterogeneity should be modeled explicitly, with attention to lifecycle stage and ownership characteristics, to identify segments where complex covers (cyber, business interruption) face the greatest frictions. Sixth, policy and market interventions – standardized disclosures, targeted incentives, or bundled offerings – should be evaluated in piloted or quasi-experimental settings with pre-registered outcomes on take-up, portfolio breadth, and realized loss mitigation. Together, these avenues would clarify barriers to complex cover uptake and provide credible evidence on the effectiveness and cost-benefit of inclusion measures.

AUTHOR CONTRIBUTIONS

Conceptualization: Nikolaos Daskalakis.
Data curation: Fotios S. Milienos.
Methodology: Fotios S. Milienos.
Project administration: Nikolaos Daskalakis.
Writing – original draft: Nikolaos Daskalakis, Fotios S. Milienos.
Writing – review & editing: Nikolaos Daskalakis, Fotios S. Milienos.

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DISCLOSURE OF INTEREST

There are no relevant financial or non-financial competing interests to report.

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REFERENCES

1. Asai, Y. (2019). Why do small and medium enterprises (SMEs) demand property liability insurance? *Journal of Banking and Finance, 106,* 298-304. https://doi.org/10.1016/j.jbankfin.2019.07.012
2. Beck, Th., & Demirguc-Kunt, A. (2006). Small and medium-size enterprises: Access to finance as a growth constraint. *Journal of Banking and Finance, 30*(11), 2931-2943. https://doi.org/10.1016/j.jbankfin.2006.05.009
3. Charrad, M., Ghazzali, N., Boiteau, V., & Niknafs, A. (2014). NbClust: An R package for determining the relevant number of clusters in a data set. *Journal of Statistical Software, 61,* 1-36. https://doi.org/10.18637/jss.v061.i06
4. Danielsson, M., & Scott, J. (2006). The capital budgeting decisions of small businesses. *Journal of Applied Finance, 16*(2), 45-56. Retrieved from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3202231
5. Davidson III, Wallace N., Cross, M., & Thornton, J. (1992). Corporate demand for insurance: Some empirical and theoretical results. *Journal of Financial Services Research, 6*(1), 61-72. https://doi.org/10.1007/BF01046118
6. Di Bella, L., Katsinis, A., Lagüera-González, J., Odenthal, L., Hell, M., & Lozar, B. (2023). *Annual Report on European SMEs 2022/2023.* Luxembourg: Publications Office of the European Union. Retrieved from https://publications.jrc.ec.europa.eu/repository/handle/JRC134336
7. Ding, Y., & Deng, P. (2024). Learning from natural disasters: Evidence from enterprise property insurance take-up in China. *Journal of Risk and Uncertainty, 68*(3), 299-334. https://doi.org/10.1007/s11166-024-09428-4
8. Ekanem, I., & Smallbone, D. (2007). Learning in small manufacturing firms: The case of investment decision-making behaviour. *International Small Business Journal, 25*(2), 107-129. https://doi.org/10.1177/0266242607074515
9. Everitt, B. S. (2006). *An R and S-PLUS® Companion to Multivariate Analysis*. London: Springer.
10. Fama, E. F. (1980). Agency problems and the theory of the firm. *The Journal of Political Economy, 88*(2), 288-307. https://doi.org/10.1086/260866
11. Hall, G., Hutchinson, P., & Michaelas, N. (2004). Determinants of the capital structure of European SMEs. *Journal of Business Finance and Accounting, 31*(5), 711-728. https://doi.org/10.1111/j.0306-686X.2004.00554.x
12. Hoyt, R. E., & Khang, H. (2000). On the demand for corporate property insurance. *Journal of Risk and Insurance, 67*(1), 91-107. https://doi.org/10.2307/253678
13. Husson, F., Josse, J., Le, S., Mazet, J., & Husson, M. F. (2020). *Package 'FactoMineR'. Multivariate Exploratory Data Analysis and Data Mining*. Retrieved from https://cran.r-project.org/web/packages/FactoMineR/FactoMineR.pdf
14. Insurance and Reinsurance Stakeholder Group – European Insurance and Occupational Pensions Authority (IRSG-EIOPA). (2022). *SMEs Access to Insurance – The Information Gap and a Way Forward.* Retrieved from https://www.eiopa.europa.eu/system/files/2022-07/smes-access-to-insurance-irsg-position-paper.pdf
15. Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: managerial behavior, agency costs and ownership structure. *Journal of Financial Economics, 3*(4), 305-360. https://doi.org/10.1016/0304-405X(76)90026-X
16. Kumar, S., Sureka, R., & Colombage, S. (2020). Capital structure of SMEs: A systematic literature review and bibliometric analysis. *Management Review Quarterly, 70*(4), 535-565. https://doi.org/10.1007/s11301-019-00175-4
17. Lazaridis, I. T. (2004). Capital budgeting practices: A survey in the firms in Cyprus. *Journal of Small Business Management, 42*(4), 427-433. https://doi.org/10.1111/j.1540-627X.2004.00121.x
18. Mayers, D., & Smith, C. W. (1982). On the corporate demand for insurance. *Journal of Business, 55*(2), 281-296. https://doi.org/10.1086/296165
19. Mayers, D., & Smith, C. W. (1987). Corporate insurance and the underinvestment problem. *Journal of Risk and Insurance, 54*(1), 45-54. https://doi.org/10.2307/252881
20. Mayers, D., & Smith, C. W. (1990). On the corporate demand for insurance: evidence from reinsurance market. *Journal of Business, 63*(1), 19-40. https://doi.org/10.1086/296481
21. O'Sullivan, N. (1997). Insuring the agents: The role of directors' and officers' insurance in corporate governance. *The Journal of Risk and Insurance, 64*(3), 545-556. https://doi.org/10.2307/253764
22. Psillaki, M., & Daskalakis, N. (2009). Are the determinants of capital structure country or firm specific? *Small Business Economics, 33*(3), 319-333. https://doi.org/10.1007/s11187-008-9103-4
23. Regan, L., & Hur, Y. (2007). On the corporate demand for insurance: The case of Korean nonfinancial firms. *Journal of Risk and Insurance, 74*(4), 829-850. https://doi.org/10.1111/j.1539-6975.2007.00236.x
24. Ricci, O., & Santilli, G. (2024), Exploring the link between financial literacy and business interruption insurance: evidence from Italian micro-enterprises. *Geneva Pap Risk Insur Issues Pract 49,* 663-681. https://doi.org/10.1057/s41288-024-00312-5
25. Sarwary, Z. (2019). Capital budgeting techniques in SMEs: A literature review. *Journal of Accounting and Finance, 19*(3), 97-114. Retrieved from http://www.na-businesspress.com/JAF/JAF19-3/SarwaryZ_19_3.pdf

26. Smith, C. W., & Warner, J. B. (1979). On financial contracting: an analysis of bond covenants. *Journal of Financial Economics, 7*(2), 117-161. https://doi.org/10.1016/0304-405X(79)90011-4

27. Torres, O., & Julien, P. A. (2005). Specificity and denaturing of small business. *International Small Business Journal: Researching Entrepreneurship, 23*(4), 355-377. https://doi.org/10.1177/0266242605054049

28. United Nations. (2023, June 27). *Micro-, Small and Medium-sized Enterprises Day.* Retrieved from https://www.un.org/en/observances/micro-small-medium-businesses-day

29. Wakeman, L. M. (1980). Optimal tax depreciation. *Journal of Accounting and Economics, 2*(3), 213-237. https://doi.org/10.1016/0165-4101(80)90003-8

30. World Bank. (2021, July 31). *Small and Medium Enterprises (SMEs) Finance*. IBRD-IDA. Retrieved from https://www.worldbank.org/en/topic/smefinance

31. Yamori, N. (1999). An empirical investigation of the Japanese corporate demand for insurance. *Journal of Risk and Insurance, 66*(2), 239-252. https://doi.org/10.2307/253611

32. Zou, H., & Adams, M.B. (2006). The corporate purchase of property insurance: Chinese evidence. *Journal of Financial Intermediation, 15*(2), 165-196. https://doi.org/10.1016/j.jfi.2004.06.007

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APPENDIX A

Table A1. Two specific questions of the questionnaire used in this study

ASK ALL	
Which of the following insurance policies do you own for business purposes? List all that apply	
(READ OUT - MULTIPLE ANSWERS)	
[SHOW 1, 2, 3, 4, THEN RANDOMISE 5-11] [CODE 998 AND CODE 13 ARE EXCLUSIVE]	
Commercial property & casualty insurance without business interruption coverage	1
Commercial property & casualty insurance with business interruption	2
Coverage for property damage from natural disasters	3
Non-damage business interruption insurance	4
Commercial general liability insurance	5
Professional liability insurance / Errors & omissions coverage	6
Worker's compensation	7
Product liability insurance	8
Cyber and data security insurance	9
Commercial motor insurance	10
Business legal expense insurance	11
Other (DO NOT READ OUT)	12
I do not own any insurance products (DO NOT READ OUT)	13
Don't know (DO NOT READ OUT)	998
ASK ALL (UNLESS ALL ITEMS FROM 1 TO 11 HAVE BEEN SELECTED IN Q1)	
Which, if any, of the following insurance products do you consider the most important for your business activities?	
(READ OUT - ONE ANSWER ONLY)	
[ONLY OPTIONS NOT SELECTED IN Q1 SHOWN, ITEMS SHOWN IN SAME ORDER AS IN Q1]	
Commercial property & casualty insurance without business interruption coverage	1
Commercial property & casualty insurance with business interruption	2
Coverage for property damage from natural disasters	3
Non-damage business interruption insurance	4
Commercial general liability insurance	5
Professional liability insurance / Errors & omissions coverage	6
Worker's compensation	7
Product liability insurance	8
Cyber and data security insurance	9
Commercial motor insurance	10
Business legal expense insurance	11
Other (DO NOT READ OUT)	12
None of these (DO NOT READ OUT)	13
Don't know (DO NOT READ OUT)	998