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A matter of life or non-life: the role of economic uncertainty on insurance consumption

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Abstract

This paper examines the effect of economic uncertainty proxied by the World Uncertainty Index on life and non-life insurance consumption using a panel dataset from 114 countries between 1996 and 2017. We find evidence that while higher economic uncertainty lowers life insurance penetration, non-life insurance penetration remains unaffected by economic uncertainty.

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1. Introduction

The determinants of life and non-life insurance consumption have been extensively studied in the literature. In addition to traditional determinants such as income (Alhassan and Biekpe 2016), trade openness (Elango and Jones 2011), financial development (Li *et al.* 2007), education (Kjosevski 2012), and dependency (Beck and Webb 2003), the effect of nontraditional variables such as religion (Feyen *et al.* 2011), culture (Chui and Kwok 2008), and Economic Policy Uncertainty (EPU) (Canh *et al*. 2021) have been the subject of studies in the related literature.

In this study, we examine the effect of economic uncertainty on life and non-life insurance penetration. As a proxy for economic uncertainty, we use the World Uncertainty Index (WUI) of Ahir *et al.* (2018). According to Ahir *et al*. (2018, p. 3), WUI's association is not limited to "greater economic policy uncertainty, stock market volatility, risk, and lower GDP growth" but it also rises with international conflicts and political elections.

The implications of the role of economic uncertainty utilized by WUI have been widely explored in several studies, ranging from energy consumption (Adams *et al.* 2020) to tourism (Nguyen *et al.* 2022) and financial markets. Especially in the literature concerning banking and finance, economic uncertainty is associated with lower credits and distortion of the financial system. For instance, the findings of Gozgor *et al*. (2019) demonstrate the negative association between economic uncertainty and domestic credits in the banking sector using a global sample of 139 countries from 1996 to 2017. In another study, Nguyen and Lee (2021) utilize the WUI to show the relationship between economic uncertainty and foreign direct investment (FDI) inflows. The study finds evidence of the detrimental effect of economic uncertainty on FDI inflows for a sample of 116 countries from 1996 to 2017. The findings of Bilgin *et al.* (2021) also suggest the harmful effects of economic uncertainty on the banking sector, documenting the significantly negative impact of economic uncertainty on the default risks of conventional banks in 12 countries from 2009 to 2018. Additionally, in a more comprehensive study with a sample of 89 countries between 1996 and 2015, Baum *et al.* (2020) provide evidence of the adverse effect of economic uncertainty on several dimensions of the financial system, including financial depth, bank efficiency, and bank stability. Overall, studies using WUI suggest the disruptive impact of economic uncertainty on the financial system's stability.

Against the background of these past studies, we analyze the role of economic uncertainty on insurance consumption. To our knowledge, this is the first study that utilizes the WUI to explore the role of economic uncertainty on life and non-life insurance consumption. Although the impact of the EPU Index on insurance consumption in a cross-country setting has been examined by Canh *et al.* (2021), this article differs in terms of using the WUI, which is more suitable for panel data analysis since it is obtained from one source and comparable across countries. More importantly, the data is available for a much larger set of countries. Extending the country setting from 16 countries to a global sample of 114 countries[1], we aim to draw a general picture of the association between economic uncertainty and insurance consumption by analyzing the international sample with the inclusion of developing and underdeveloped countries in addition to developed countries. In this study, we reach the empirical evidence that economic uncertainty has an adverse impact on life insurance, but we document no statistically significant relationship between economic uncertainty and non-life insurance. Our findings have several implications. We attribute the negative association between economic uncertainty and life insurance to higher risks stemming from economic uncertainty, which results in higher costs for insurers. Higher cost lead to higher insurance premiums, and insurance becomes costlier for insurance buyers, leading to decreased life insurance consumption. Although a

[1] See Appendices for the countries in the dataset.

similar insurance pricing mechanism exists in the case of non-life insurance, compulsory regulations of countries might cause non-life insurance to remain unaffected by economic uncertainty. Furthermore, non-life insurance mainly covers property, vehicles, and other items, which may serve as a hedge against uncertainty since they have an investment component (Aye *et al.* 2019). Therefore, we hypothesize that different purchase behaviors for these items across countries might present an unclear pattern in non-life insurance consumption during economic uncertainty.

The remainder of the article is organized as follows. The "Data and Methodology" section introduces the control variables and models. The "Findings" section reports the findings, and the "Conclusion" section concludes the paper by discussing the results of our paper.

2. Data and Methodology

As one of the common indicators of the insurance sector consumption (Abel and Marire 2021), we use insurance penetration, calculated as the total insurance premium to the gross domestic product (GDP). This study includes two measures for insurance consumption: life insurance penetration and non-life insurance penetration obtained from the Global Financial Development Database (GFD) of the World Bank.

As the proxy for economic uncertainty, we use the WUI data (Ahir *et al.* 2018), a quarterly constructed index based on the frequency of the word “uncertainty” and its variants in the quarterly Economist Intelligent Unit country reports. This paper utilizes the index by transforming the quarterly data into annual by taking the average of four quarters in each year (Bilgin *et al.* 2021). The adopted models for the analysis are as in Equations (1) and (2).

$$\mathrm{LIFE}_{\mathrm{it}} = \mathrm{a} + \beta_1 \mathrm{UNCERTAINTY}_{\mathrm{it}} + \beta_2 \mathrm{X}_{\mathrm{it}} + \varepsilon_{\mathrm{it}} \quad (1)$$

$$\mathrm{NON\text{-}LIFE}_{\mathrm{it}} = \mathrm{a} + \beta_1 \mathrm{UNCERTAINTY}_{\mathrm{it}} + \beta_2 \mathrm{X}_{\mathrm{it}} + \varepsilon_{\mathrm{it}} \quad (2)$$

where LIFE_{it} and $\mathrm{NON\text{-}LIFE}_{\mathrm{it}}$ represent the life insurance penetration and non-life insurance penetration for country i at year t, respectively. X_{it} represents the set of control variables used in the estimations in line with the previous literature (Canh *et al.* 2021; Li *et al.* 2007). These include GDP per capita (Current US$) as the proxy for income, the ratio of deposit money banks' assets to GDP (GFD, World Bank) as the indicator for financial development, the human capital index that is based on years of schooling and returns to education (Feenstra *et al.* 2015), annual inflation in consumer prices (WDI, World Bank), the ratio of trade volume to GDP as the proxy for trade openness (WDI, World Bank), the total population of a country to measure the market size (WDI, World Bank), the dependency ratio of the working-age population, the type of a legal system in a country (The World Factbook, CIA)[2], and the estimate of political stability and absence of violence/terrorism from the World Governance Indicators (WGI) of the World Bank.

Tables 1 and 2 report the descriptive statistics and correlation matrix, respectively. As GDP per capita is highly correlated with the proxies of human capital and financial development, we include a second model in our analysis, which replaces income with human capital and financial development.

In this study, we first perform the random-effects model to assess the impact of uncertainty on life and non-life insurance penetration since there is a time-invariant variable. Second, as a robustness check, we use a two-step generalized method of moments (GMM) to

[2] There are four types of legal systems in this analysis: civil law, common law, mixed law, and Sharia law.

control for possible endogeneity. Third, we replicate the estimations with all independent variables with a one-year time lag to predict future insurance consumption. In the analysis, we control for year effects in all models. As the WUI is available from 1996 onwards, a total of 114 countries are included in the study for the period 1996-2017 due to the data available at the time of this writing.

Table 1. Descriptive statistics

Variable	Description	Source
Life Insurance	Life insurance premium volume to GDP (%)	GFD
Non-Life Insurance	Non-life insurance premium volume to GDP (%)	GFD
Uncertainty	Yearly mean of World Uncertainty Index (WUI)	WUI
Income	(Log) GDP per capita (Current US$)	WDI
Financial Development	Deposit money banks' assets to GDP (%)	GFD
Human Capital	Human capital index based on years of schooling and returns to education	PWT 10.0
Inflation	Inflation, consumer prices (annual %)	WDI
Trade	Trade (% of GDP)	WDI
Population	(Log) Total population of a country	WDI
Dependency	(Log) Age dependency ratio (% of working-age population)	WDI
Political Stability	Estimate of political stability and absence of violence/terrorism	WGI
Legal	Type of the legal system in a country	CIA The World Factbook

Variable	Obs.	Mean	Std. Dev.	Min	Max
Life Insurance	2331	1.491	2.251	0	18.0737
Non-Life Insurance	2404	1.1945	0.8906	0.0023	14.7226
Uncertainty	2508	0.0563	0.0471	0	0.4180
Income	2502	8.2685	1.6417	4.5057	11.5416
Financial Development	2444	54.5288	43.3727	0.3836	241.549
Human Capital	2508	2.4640	0.7098	1.0533	3.9742
Inflation	2428	10.1680	89.6243	-8.4842	4145.106
Trade	2431	77.0469	45.0215	0.1674	437.3267
Population	2508	16.6191	1.3677	13.1664	21.0500
Dependency	2508	4.0877	0.3097	2.7564	4.7380
Political Stability	2166	-0.1402	0.9607	-2.9419	1.7601

Notes: The table presents the variables' definitions, descriptive statistics, and sources. Life and non-life insurance are the dependent variables, whereas the uncertainty is the main variable of interest. Sources GFD, PWT 10.0 WUI, WDI, and WGI denote Global Financial Development Database, Penn World Table version 10.0, World Uncertainty Index, World Development Indicators, and Worldwide Governance Indicators, respectively.

Table 2. Matrix of correlations

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(1) Life Insurance	1.0000										
(2) Non-life Insurance	0.6136	1.0000									
(3) Uncertainty	0.0749	0.0570	1.0000								
(4) Income	0.5443	0.6286	0.0011	1.0000							
(5) Financial Development	0.6467	0.5576	0.0084	0.7191	1.0000						
(6) Human Capital	0.4553	0.6146	0.0524	0.8014	0.5893	1.0000					
(7) Inflation	-0.1423	-0.0832	-0.0122	-0.2044	-0.2121	-0.1589	1.0000				
(8) Trade	0.1675	0.1491	-0.0687	0.3060	0.2575	0.3069	-0.0696	1.0000			
(9) Population	0.1181	-0.0997	0.0834	-0.1519	0.0608	-0.1242	0.0639	-0.4365	1.0000		
(10) Dependency	-0.2772	-0.3778	0.0375	-0.6764	-0.5049	-0.6702	0.1280	-0.3723	0.0249	1.0000	
(11) Political Stability	0.4208	0.5288	-0.1082	0.6717	0.5103	0.5946	-0.2144	0.3775	-0.4349	-0.4399	1.0000

Notes: Life and non-life insurance is the dependent variable, whereas (economic) uncertainty is the main variable of interest. The rest of the variables are control variables. As GDP per capita is highly correlated with the proxies of human capital and financial development, we include a second model in our analysis, which replaces income with human capital and financial development.

3. Findings

We present our findings in Table 3. According to the results, economic uncertainty has a negative impact on life insurance both in the baseline estimation and the random-effects models. Yet, non-life insurance penetration remains unaffected by economic uncertainty. Our GMM estimation confirms this finding. Furthermore, the replication of estimations using variables with a one-year lag report similar results, as shown in Table A1 in Appendices[3]. The results are in line with the findings of Canh *et al.* (2021), which suggest that economic policy uncertainty negatively impacts life insurance but not non-life insurance across 16 OECD countries.

Table 3. Estimations of the effect of economic uncertainty on insurance penetration

	LIFE (RE) [1]	LIFE (RE) [2]	LIFE (RE) [3]	LIFE (GMM) [4]	NON-LIFE (RE) [5]	NON-LIFE (RE) [6]	NON-LIFE (RE) [7]	NON-LIFE (GMM) [8]
Uncertainty	-1.1446**	-0.9322***	-1.0642***	-2.5046***	0.5325	0.2596	0.2001	0.0618
	(0.5744)	(0.3221)	(0.3179)	(0.1164)	(0.5151)	(0.1873)	(0.1864)	(0.0470)
Income		0.3583***		0.0751***		0.2009***		0.0070***
		(0.0587)		(0.0111)		(0.0272)		(0.0022)
Inflation		0.0008	0.0004	0.0008**		0.0025***	0.0024***	0.0005***
		(0.0009)	(0.0009)	(0.0003)		(0.0005)	(0.0005)	(0.0001)
Trade		0.0014	0.0005	-0.0013***		0.0010*	0.0002	-0.0007***
		(0.0010)	(0.0010)	(0.0003)		(0.0005)	(0.0005)	(0.0001)
Population		0.1375	0.1499	0.0126		0.0093	-0.0055	-0.0003
		(0.0958)	(0.0911)	(0.0155)		(0.0331)	(0.0331)	(0.0035)
Dependency		0.0494	0.1184	0.1494***		-0.3612***	-0.3660***	-0.0380***
		(0.1972)	(0.2011)	(0.0370)		(0.1001)	(0.1041)	(0.0083)
Political Stability		-0.0444	0.0184	0.0170		0.0165	0.0443*	0.0285***
		(0.0441)	(0.0421)	(0.0191)		(0.0250)	(0.0239)	(0.0048)
Legal (Civil)		1.5211	0.9938	0.1338***		0.6375*	0.3555	0.0220**
		(1.0774)	(1.0170)	(0.0284)		(0.3339)	(0.3315)	(0.0091)
Legal (Common)		3.0301***	2.2927**	0.1076***		0.9907***	0.6386*	0.0260**
		(1.1373)	(1.0757)	(0.0303)		(0.3525)	(0.3511)	(0.0119)
Legal (Mixed)		1.8059	1.3635	0.1688***		0.5819*	0.3349	0.0216**
		(1.1025)	(1.0384)	(0.0279)		(0.3416)	(0.3378)	(0.0101)
Financial Development			0.0086***				0.0039***	
			(0.0009)				(0.0005)	
Human Capital			0.7535***				0.3639***	
			(0.1498)				(0.0668)	
$Life_{(t-1)}$				0.9666***				
				(0.0027)				
$Non\text{-}Life_{(t-1)}$								0.9399***
								(0.0037)
Constant	1.0429***	-6.0787**	-5.231**	-1.3133***	1.3478***	.2944	1.4659*	0.1924***
	(0.1904)	(2.4336)	(2.2485)	(0.4533)	(0.1680)	(0.9311)	(0.8730)	(0.0667)
AR(1)	-	-	-	0.002	-	-	-	0.021
AR(2)	-	-	-	0.447	-	-	-	0.486
Observations	2331	1923	1897	1813	2404	1979	1949	1876
R-squared	0.0002	0.3249	0.4053	-	0.0103	0.4334	0.4477	-
Countries	114	111	110	111	114	111	110	110

Notes: The first four columns present the estimations of the effect of economic uncertainty on life insurance penetration, whereas the rest of the columns document the findings of the impact of economic uncertainty on non-life insurance penetration. Standard errors are in parentheses. ***, **, and * indicate the significance levels at 1, 5, and 10 percent, respectively. Sharia legal system is the reference category to analyze the impact of type of legal system. We control for year effects in estimations.

[3] We use two other uncertainty measures for the robustness check: weighted average and fourth-quarter data obtained from WUI. The estimations report similar results.

The findings on the role of economic uncertainty on insurance types might be grounded on the nature of these insurances. Considering that life insurance is a long-term investment (Emamgholipour *et al.* 2017), insurers, reinsurers, and insurance demand might be affected negatively by economic uncertainty due to a shift from long-term needs toward short-term ones (Canh *et al.* 2021). Also, economic uncertainty may cause an increase in insurance premiums, leading to low life insurance consumption. On the other hand, non-life insurance might not be impacted by the changes in economic uncertainty as non-life insurance covers mostly property, vehicles, and other items, which are deemed commonly compulsory due to the regulation of states (Canh *et al.* 2021). Another reason for non-life insurance consumption to remain unaffected by economic uncertainty might be due to the components of non-life insurance. Property, vehicles, and other items covered in non-life insurance can be used as a hedge against economic uncertainty, leading to the purchase of these items as an investment (Aye *et al.* 2019). The behavior to purchase might vary across countries or according to the cause of the economic uncertainty.

As for the control variables, our findings are mostly in line with Canh *et al.* (2021), Li *et al.* (2007), and Feyen *et al.* (2011) and show evidence that income, inflation, financial development, human capital, and civil, common, and mixed legal systems have a statistically significant positive impact on both dependent variables. Trade openness decreases life insurance penetration, although its results in explaining the non-life insurance penetration are mixed. On the other hand, dependency increases life insurance penetration even though it lowers non-life insurance penetration. Finally, political stability positively affects non-life insurance penetration.

4. Conclusion

We are the first to utilize the World Uncertainty Index to investigate the impact of economic uncertainty on the insurance sector. The results based on 114 countries from 1996 to 2017 show the adverse effect of economic uncertainty on life insurance penetration, whereas non-life insurance penetration remains unaffected by economic uncertainty. Our GMM estimations and models using variables with a one-year lag document similar findings.

Considering the negative role of economic uncertainty on life insurance, policymakers should take a careful approach to minimize or avoid uncertainty when possible. Further, regulatory bodies should take the necessary steps to keep insurers and reinsurers in the course of a long-term oriented vision in their investments to prevent a decrease in the life insurance sector during uncertain times. For further studies, the scope of the analysis can be extended by investigating the impact of economic uncertainty on the components and types of life and non-life insurance. This research direction can give a clearer picture of economic uncertainty and insurance consumption.

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6. Appendices

List of countries in the dataset

Albania, Algeria, Angola, Argentina, Australia, Austria, Bangladesh, Belgium, Benin, Bolivia, Botswana, Brazil, Bulgaria, Burkina Faso, Burundi, Cambodia, Cameroon, Canada, Chile, China, Colombia, Costa Rica, Cote d'Ivoire, Croatia, Czech Republic, Democratic Republic of the Congo, Denmark, Dominican Republic, Ecuador, Egypt, El Salvador, Ethiopia, Finland, France, Gabon, Germany, Ghana, Greece, Guatemala, Haiti, Honduras, Hungary, India, Indonesia, Iran, Ireland, Israel, Italy, Jamaica, Japan, Jordan, Kazakhstan, Kenya, Kuwait, Kyrgyz Republic, Latvia, Lithuania, Madagascar, Malawi, Malaysia, Mauritania, Mexico, Moldova, Mongolia, Morocco, Mozambique, Myanmar, Namibia, Nepal, Netherlands, New Zealand, Nicaragua, Niger, Nigeria, Norway, Pakistan, Panama, Paraguay, Peru, Philippines, Poland, Portugal, Qatar, Republic of Congo, Romania, Russia, Rwanda, Saudi Arabia, Senegal, Singapore, Slovak Republic, Slovenia, South Africa, South Korea, Spain, Sri Lanka, Sudan, Sweden, Switzerland, Tajikistan, Tanzania, Thailand, Togo, Tunisia, Turkey, Uganda, Ukraine, UAE, UK, United States, Uruguay, Venezuela, Yemen, Zambia.

Table A1. Impact of the lagged effect of economic uncertainty on insurance penetration

	LIFE (RE) [1]	LIFE (RE) [2]	LIFE (RE) [3]	LIFE (GMM) [4]	NON-LIFE (RE) [5]	NON-LIFE (RE) [6]	NON-LIFE (RE) [7]	NON-LIFE (GMM) [8]
$Uncertainty_{(t-1)}$	-1.2127**	-0.9214***	-1.0391***	-1.2313***	0.3985	0.1299	0.0749	0.0739
	(0.5130)	(0.3268)	(0.3251)	(0.1572)	(0.4362)	(0.1450)	(0.1455)	(0.0578)
$Income_{(t-1)}$		0.4039***		0.2086***		0.1914***		0.0170***
		(0.0583)		(0.0147)		(0.0230)		(0.0046)
$Inflation_{(t-1)}$		0.0002	-0.0001	0.0005**		0.0000	-0.0001	0.0004***
		(0.0009)	(0.0009)	(0.0002)		(0.0004)	(0.0004)	(0.0001)
$Trade_{(t-1)}$		0.0008	-0.0006	-0.0007**		0.0018***	0.0011**	-0.0009***
		(0.0010)	(0.0010)	(0.0003)		(0.0004)	(0.0004)	(0.0001)
$Population_{(t-1)}$		0.1391	0.1448	0.0599***		0.0054	-0.0047	-0.0044
		(0.0972)	(0.0931)	(0.0174)		(0.0318)	(0.0316)	(0.0049)
$Dependency_{(t-1)}$		-0.0003	0.0029	0.4351***		-0.3868***	-0.4300***	-0.0257**
		(0.2013)	(0.2094)	(0.0548)		(0.0815)	(0.0867)	(0.0116)
$Political\ Stability_{(t-1)}$		-0.0793*	-0.0048	0.0210		0.0093	0.0407**	0.0425***
		(0.0437)	(0.0422)	(0.0149)		(0.0191)	(0.0186)	(0.0112)
Legal (Civil)		1.6039	1.0163	0.2456***		0.5989*	0.3349	0.0131
		(1.0952)	(1.0389)	(0.0795)		(0.3364)	(0.3322)	(0.0163)
Legal (Common)		3.1073***	2.3438**	0.2958***		0.9433***	0.6310*	0.0414**
		(1.1561)	(1.0989)	(0.0795)		(0.3550)	(0.3516)	(0.0173)
Legal (Mixed)		1.8776*	1.3959	0.3360***		0.5389	0.3178	0.0347**
		(1.1208)	(1.0607)	(0.0775)		(0.3442)	(0.3388)	(0.0160)
$Financial\ Development_{(t-1)}$			0.0076***				0.0024***	
			(0.0010)				(0.0004)	
$Human\ Capital_{(t-1)}$			0.8505***				0.3702***	
			(0.1587)				(0.0608)	
$Life_{(t-1)}$				0.8907***				
				(0.0047)				
$Non\text{-}Life_{(t-1)}$								0.9249***
								(0.0050)
Constant	1.1668***	-6.1223**	-4.6289**	-4.5117***	1.1942***	0.4380	1.6397**	0.1750
	(0.2125)	(2.4662)	(2.3088)	(0.5807)	(0.1056)	(0.8560)	(0.8119)	(0.1116)
AR(1)	-	-	-	0.002				0.032
AR(2)	-	-	-	0.408				0.832
Observations	2239	1824	1799	1801	2306	1879	1850	1863
R-squared	0.0000	0.3412	0.3906	-	0.0068	0.4416	0.4418	-
Countries	114	111	110	111	114	111	110	111

Notes: The first four columns present the estimations of the effect of economic uncertainty with a one-year lag on life insurance penetration. The rest of the columns document the findings of the impact of economic uncertainty with a one-year lag on non-life insurance penetration. Standard errors are in parentheses. ***, **, and * indicate the significance levels at 1, 5, and 10 percent, respectively. Sharia legal system is the reference category to analyze the impact of the type of legal system. We control for year effects in estimations.