Drivers of Insurance Market Development in Central, Eastern, & Southeastern Europe

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Abstract

In this paper, we evaluate the development of property-casualty and life-health insurance markets in post-transition economies. Using data from 21 countries in Central, Eastern, and Southeastern Europe (CESEE), we identify factors associated with variations in insurance density, defined by the volume of insurance premiums divided by population. Following the development literature and previous research, we explore four main categories of drivers: (1) affordability of coverage, (2) comprehension of insurance products, (3) trust of the insurance industry, and (4) need. Our analysis also investigates the role of several novel factors, including consumer access to technology. Using a variety of methodologies, we identify robust drivers in all four categories. The findings have important implications for understanding effective avenues for closing the protection gap in developing countries.

Introduction

Since the 1990s, countries of Central, Eastern, and Southeastern Europe (CESEE) have largely transitioned to market economies with democratic forms of government and now participate in global markets for goods and services. While many of these countries have experienced significant economic growth including a growing financial services sector, they continue to face a large insurance protection gap. Alexandru Ciuncan, Chief Insurance Enthusiast & General Manager at UNSAR,[1] suggests several reasons for lagging insurance market development, including low purchasing power due to low wages, lack of financial education, and distrust of the financial services industry.[2] CESEE insurance markets face an uphill battle in providing personal insurance coverage to a population that has long been entitled to social welfare payments from their governments and is largely unfamiliar with insurance products.

In this paper, we explore the variation in insurance market performance across CESEE countries to identify factors that are significantly associated with the development of insurance markets. Specifically, we assess the relative influence of economic development, education, and other social and demographic factors on insurance density (premiums to population), our proxy for insurance "protection" in the country. Using insurer-level data from 21 CESEE countries, comprised of countries from CEE (Central Eastern Europe), the CIS (Commonwealth of Independent States), and SEE (South Eastern Europe), we conduct an international comparison of the important drivers of insurance density, for property and liability (P/L) and life and health (L/H) business.[3] While insurers

[1] UNSAR is the National Insurance and Reinsurance Companies in Romania.

[2] https://www.linkedin.com/pulse/bridging-protection-gap-eastern-europe-alexandru-ciuncan/

[3] Our categorization of countries in the CESEE region follows the definition used by the World Bank (2016). The CESEE includes countries in the Baltics (Estonia, Latvia, and Lithuania), Central and Eastern Europe (Czech Republic, Hungary, Poland, Slovak Republic, and Slovenia), Commonwealth of Independent States (Belarus, Moldova, Russian Federation, and Ukraine), Southeastern European EU Member States (Bulgaria, Croatia, and Romania), Southeastern European non-EU member states (Albania, Bosnia and Herzegovina, Kosovo, North Macedonia, Montenegro, and Serbia), and Turkey. Figure 1 provides a mapping of these country groups. Due to data limitations, we are not able to include every CESEE

in each country face a unique regulatory environment and/or social insurance scheme, policymakers share a common concern regarding the availability and affordability of insurance. They also share a need to educate a workforce that is prepared to develop and distribute suitable insurance products.

This research is motivated by evidence of significant differences across countries in the growth of gross written premiums for P/L and L/H business. While the CESEE countries have all transitioned to market economies, country-specific factors that have affected the speed of transition (e.g., the forms of business regulation) may persist today. These factors may have varying degrees of influence on the development of the financial services sector and, specifically, the size of the insurance market. We focus on four main types of factors in this paper, with an emphasis on the demand side of the insurance transaction. These factors include (1) affordability of premiums, (2) comprehension of insurance products, (3) trust of insurance companies, and (4) need for coverage, or availability of substitutes.

This article extends the existing literature on CESEE with consideration of the extent, speed, and nature of the growth of the private insurance market in the CESEE region. First, we have assembled one of the largest samples of CESEE countries yet analyzed: 21 countries over an eight-year period. Our research findings will enhance our understanding of how to increase awareness of personal insurance products, to promote financial preparedness and reduce the protection gap. Even in the U.S., where insurance markets are highly developed, insurance protection is inadequate, especially in retirement planning. This area of research is ripe for comparisons across markets with varying degrees of development and different socio-economic characteristics, which may help to inform both public and private decisions for addressing catastrophic property damage coverage, social security and retirement planning. Regulators in the CESEE countries are increasingly concerned with

country in our analysis, e.g., we do not have usable data for the four countries in the Commonwealth of Independent States. We additionally include in our analysis two non-CESEE countries: Kazakhstan and Cyprus.

closing the protection gap and are looking for strategies to assist populations in managing personal risks. Thus, we consider implications of this change for stakeholders around the world, including other insurers, reinsurers, and education.

Background and Hypothesis Development

In this section, we review existing studies of insurance market performance in developing economies. We begin with a brief overview of economic development in the CESEE region, generally, and motivate our hypotheses using traditional theories of insurance demand and prior research on the determinants of insurance demand across countries.

Economic Development in CESEE Countries

The 1990s transition period led to privatization of many industries in the CESEE region. In a study of the growth of supermarkets in the region, Dries et. al. (2004) suggest three stages of development for the countries in this region: (1) a pre-transition or communist period, (2) an early transition period in which privatization is introduced, and (3) a globalization period characterized by the introduction of multinational firms. This third stage started for some countries in the late 1990s. The authors note significant variation across the CEE countries in the speed at which they moved through all three stages due to the timing of reforms in each country. Some countries, including Hungary and Poland, started into the third stage in 1996 while the Balkan countries, such as Bulgaria and Croatia, did not reach this stage until 2002.

Privatization of the financial services sector, when compared to the transition in the retail sector, generally, faced additional hurdles. In their study of the development of financial sectors in the economies of CEE countries, Anderson and Kegels (1998) suggest “In finance above all, the principles of central planning were radically opposed to those of capitalism.” (p. 1).

Studies of the factors associated with general economic growth in the CESEE region include a focus on a wide range of drivers. Some of these include total factor productivity (Benkovskis et al., 2012), and the capacity of decentralized governments to innovate in the provision of public services (Rodriguez-Pose and Kroijer, 2009). When compared to the large body of international comparisons of insurance markets across developed countries, existing research on the development of CESEE insurance markets is relatively sparse, largely due to a lack of usable data. We review here several studies that evaluate variations in insurance penetration or insurance density across sets of CESEE countries, which offer insights for our hypotheses.[4]

Early studies of the insurance markets in the CESEE countries indicate mostly a monopolistic and uncompetitive market. While many of these studies document insurance market conditions in the period immediately following transition,[5] some also focus on the transition process itself. For example, Dorfman and Ennsfellner (2001) provide a case study of the transition in Poland, Czech Republic, and Hungary. The authors develop a framework to evaluate the transition in these countries for the period 1991-1999. Their framework considers the development of supervision authority and regulation of the industry, which was required because the starting point for these countries was a state-owned monopolist organization. The authors find that a strong legal and professional infrastructure are essential for supporting an insurance industry.

Pye (2005) evaluates the insurance markets in eight CEE countries through the period 1990-2001, to identify factors associated with insurance density and penetration rates during and immediately following transition. The author notes variations in "insurance culture" that may affect insurance market development. For example, prices for coverage under the state provider may have

[4] For brevity, single-country studies of insurance penetration conducted on CESEE member countries are not included here.

[5] See, for example Frinquelli et al (1991), and several Swiss Re Sigma reports by Baur and Enz (1994), Meyer et al. (1998), and Rustmann (2001). Many of these earlier studies suggested that insurance penetration rates in CEE countries would converge with other EU levels within 5-10 years of transition (Pye, 2005).

had little to do with actual risk, and many types of insurance were viewed as non-essential because the state provided necessary services, such as health care.

Kozarevic et al (2011) evaluate the development of insurance markets in seven Western Balkan countries for the period 1996-2009, with emphasis on the relationship between insurance density and integration into the European Union. The authors note a variety of barriers to insurance market development including lack of experience in private insurance and risk management, loss of confidence of insurers due to frequent insolvencies, and a high unemployment rate (pp 290-291). The authors also note the importance of an adequate legal framework for regulation of insurance. Kozarevic et al. (2013) conduct a similar analysis of ten SEE countries for the period 2001-2010, and again show a strong correlation between transition of insurance markets and the level of EU integration. They cite continuing problems with inefficient supervision of the insurance sector but note that consumer protection is generally increasing through licensing of insurers and intermediaries.

Brokešová and Vachálková (2016) explore the relationship between the macroeconomic environment and insurance market development in the Visegrad Four countries: the Czech Republic, Hungary, Poland, and the Slovak Republic. They find that while the non-life insurance industry is more sensitive than the life insurance industry to four indicators – GDP growth, inflation, balance of payments as a percentage of GDP,[6] and the unemployment rate – all indicators are statistically significant determinants of insurance market development when measured by insurance penetration or insurance density.

Njegomir and Stojić (2011) evaluate non-life insurance operations in eleven CESEE countries using a traditional structure-conduct-performance approach. They find that that greater liberalization is associated with reduced market concentration, which has an indirect effect of reducing profitability

[6] Zhang and Zhu (2005) suggest that the balance of payments level captures a degree of openness of an economy for trade; a high balance of payments suggests growth of disposable income within the country.

of insurers. While they suggest this is welfare enhancing, they do not report evidence of how these market characteristics relate to insurance density.

Poposki et al. (2015) use a panel vector error correction model to identify the most important determinants of non-life insurance penetration in eight countries from southeastern Europe. They find that the most important determinants of non-life insurance penetration are the number of passenger cars per 1,000 people, GDP per capita and rule of law.[7]

Beckmann et al. (2013) evaluate factors associated with various savings instruments, including life insurance, in ten CESEE countries in 2010-2011. They find that age and self-employed status are associated with a higher probability of having life insurance. Education and income are also positively related to holdings of life insurance, but the effects are less significant.

Following the existing literature, we categorize potential drivers of insurance market development into four main areas: (1) affordability and availability, (2) comprehension of insurance products, (3) trust of insurers, and (4) need for coverage. Each is described further below.

Affordability and Availability

One of the factors associated with economic development, generally, is the income of the population. Unemployment is high in many of the CESEE countries, and while many countries have experienced an increase in GDP per capita over the past two decades, only three countries – Czech Republic, Lithuania, and Slovakia – have achieved purchasing power parity on par with Spain and Italy when compared to Germany.[8] Income level is an important determinant of demand for insurance, as it proxies the ability to pay as well as the potential financial consequence of personal loss events, e.g., a disability.[9]

[7] The authors' rule of law measure is an index measure provided by Worldwide Governance Indicators, and is a proxy for the protection of property rights.
[8] Bakker (2018).
[9] Numerous country-level studies show a strong positive correlation between population income and demand for insurance. For studies pertaining to the demand for life insurance, see, e.g., Browne and Kim (1993). For studies pertaining

Affordability can also depend on the number of options available to the population and the competitiveness of the insurers in the market. While we cannot account for the variety of products available, we note that the number of insurers per country during our sample period ranges from 10 to 65, with an average of 25.[10] We include a measure of the size of the market as well as a measure of concentration, measured by the Herfindahl-Hirschman Index (HHI). This measure of concentration ranges from 531 to 2621, with an average of 1152. Tipurić et al. (2008) evaluated concentration in the insurance industry for six CEE countries for the period 1998-2006 and report a significant decline in HHIs over their sample period. Country-level HHIs in 1998 exceeded 3500 for Croatia, Czech Republic, Slovakia and Slovenia. By 2005, the HHIs for the same four countries ranged from 1883 to (Croatia) to 2678 (Czech Republic), suggesting at least some reduction in market concentration.

Comprehension of Insurance Products

Individuals are more likely to obtain insurance if they understand its purpose. While numerous studies suggest rational reasons for individual non-purchase of coverage, we expect aggregate purchases of coverage would increase with comprehension of risk and risk management approaches, i.e., insurance products. Greater comprehension may arise for a number of reasons, beginning with education. Beck and Webb (2003) evaluate life insurance consumption across 68 economies over the period 1961-2000 and suggest that a higher level of education implies a better understanding of the benefits of risk management. However, they find that education and the size of the social security system are not significantly associated with life insurance consumption. Kjosevski (2012) shows that the education level of the population is linked to life insurance penetration.

to the demand for property insurance, see, e.g., Beenstock et al. (1988). Many studies use gross national product (GNP) and gross domestic product (GDP) to capture income differences across countries. Browne and Kim (1993) use national income because it captures the "income earned by the factors of production" (p. 622).

[10] Our data are described further in the next section.

Beyond the basic level of education, comprehension of insurance products may arise from awareness of a growing financial sector, including increased access to savings accounts and other financial products. The more insurers operating in a country, the more likely the population will be exposed to advertising and word-of-mouth references to insurance products.[11] Transaction costs may be reduced market size also increases geographical proximity of insurers.[12] The extent of the awareness of insurance products is likely to grow further with advances in consumer technology, including access to the internet and cell phones. Schindler and Bickart (2012) report that one of the main reasons for accessing internet reviews of new products is to facilitate a decision process.

Trust in Insurance Companies

The nature of insurance complicates the ability to evaluate insurance coverage. The insurance product cannot be immediately evaluated because significant time may elapse between the payment of premiums and the services received (claims paid). Good faith – in the form of reputation and trust – is an important driver of the decision to purchase coverage from an insurer.[13] We note that most insurers in the CESEE markets are relatively new and have had only a short time to build a reputation, so willingness to purchase insurance will rely on regulations that enhance consumer protections, such as legal enforcement of contracts. CESEE countries vary substantially with respect to their legal enforcement of contracts, the size of government, business regulations, and enforcement of property rights. Browne et al. (2000) suggest that the legal system is especially important for the development of insurance because it specifies the liability for damages. Of note, Bergl and Pajuste (2005) evaluate

[11] Celerier and Matray (2017) show a positive relationship between density of bank offices in poor counties and the share of low-income households with a bank account.

[12] Fiebig et al. (1999) suggests that increased bank density encourages higher volumes of institutional savings as bank agencies get closer to their customers.

[13] In a study of Islamic banking products offered in Australia, Rammal and Zurbruegg (2006) find that perceived awareness of certain halal banking products was not a strong determinant of purchase, but individuals were more receptive if the bank had a positive reputation.

corporate governance mechanisms among 370 companies in CESEE countries with a focus on transparency regulation and note wide variations in the enforcement of disclosure laws.

Need for Coverage

A final consideration for explaining variations in insurance density across the CESEE countries is the extent to which the population remains covered, post-transition, by state-sponsored programs, or has access to credit for post-loss financing. For example, some, but not all countries have moved away from centrally planned health systems (Waters et al., 2008). Nemec et al. (2019) note that while universality of access to health care is still a constitutional principle for most CEE countries, "in reality, universality of access to health care disappeared in the region in 1989" (p. 5). Fenger (2007) explores differences across Eastern European countries in public welfare types, suggesting that certain institutional legacies may persist for years following transition from a communist state. Further, many CESEE countries have adopted significant reforms to their state pension programs (Müller, 1999).

Binswanger (1986) addresses the use of credit and purchase of insurance among farmers and suggests "when insurance markets are poorly developed, an open credit line substitutes for insurance by allowing borrowing after disastrous events" (p. 74). Backe et al. (2005) report high private sector lending growth leading up to 2006. Vandenbussche et al. (2015) report that a significant number of CESEE countries "went through large and synchronized credit and housing boom–bust cycles" (p. 344) since 2002.

Structural Transformation State

One distinguishing characteristic of a country is the nature of its economic activity. Several authors have tied economic development to "structural transformation" within the country over

time.[14] This "three sector theory," categorizes economies based on the sector experiencing the bulk of economic activity; the primary sector is industry (e.g., farming), the secondary sector is manufacturing, and the tertiary sector includes other industries (e.g., services). Developing countries experience shifts in activity from the primary sector to the secondary and tertiary sectors, where these shifts are driven by a number of factors including education and technology. Numerous studies have used the categorization of countries in this way to explain other economic phenomena.[15] We include the sector measures in our analysis to capture potential variation in the need for, and availability of insurance coverage.

Hypotheses

Following both the theories and findings from previous studies, we propose the following hypotheses regarding the influence of our four main drivers of insurance market development.

H1. Insurance density is positively related to the affordability and availability of insurance coverage.

Affordability is captured by population income, wages, and market concentration (HHI); availability is proxied by the number of insurers.

H2. Insurance density is positively related to comprehension of insurance products.

Variables included to capture comprehension include educational attainment, urbanization, internet access, cell phone use.

[14] See, for example, Clark (1940), Fisher (1939), and Fourastié (1954).

[15] For example, Bujakowski and Schmit (2019) incorporate these sectors in their study of litigation rates across provinces in China. Weissenberger-Eibl and Koch (2007) provide a theoretical link between the shift from the secondary to the tertiary sector and the growth of consumer services. Specifically, "the growth of the industrial sector leads to a growing demand for business related services. This leads to investments for human capital and physical capital within the service sector which subsequently leads to further productivity developments. These are in turn offering revenues that lead to new investments. The resulting buying capacity of households leads to a significantly growing demand for consumer services" (p. 94).

H3. Insurance density is positively related to trust of insurance companies.

We include several index variables to proxy population trust of insurance, including enforcement of property rights, size of government, business regulations, and contract enforcement.

H4: Insurance density will be lower in countries with more substitutes for insurance.

We include in our analysis measures of access to credit and the extent of government support provided.[16]

Data and Methodology

For our analysis, we employ eight years (2010-2017) of quarterly premiums data across 21 CESEE countries.[17] These data were obtained from XPRIMM and include total premiums written and claims paid for life insurance and non-life insurance business, by insurer. These data are aggregated to the country level, and then combined with other quarterly and yearly country-level statistics from a variety of sources. A full description of our variables and corresponding sources is provided in Table 1. All monetary values are expressed in $US and adjusted for inflation. To account for skewness, all variables except those that are percentages or indices are expressed in log form.

Table 2 provides summary statistics. Most variables have a small standard deviation relative to their mean, indicating that these variables are rather symmetric. Additionally, for most variables, variation between countries exceeds variation within countries over time. This result likely stems from low growth rates of many CESEE following the global recession in 2008. We also note that data are missing for three explanatory variables: college, HHI, and insurers. As such, their use presents a

[16] The exact measure for this is to be determined. We are exploring several sources for this information. In the meantime, basic variations in the types of government support are captured in the country-level fixed effects.
[17] While XPRIMM collects information on the insurance markets in 32 CEE, SEE, and CIS countries, we include in our analysis only the countries for which the premium and claims data is provided consistently through our sample period.

tradeoff between model completeness and sample size. To remedy the situation, we report regression results with and without the inclusion of these measures.

Figure 2 provides a closer inspection of L/H and P/C insurance density over time. Slovenia has the highest average L/H and P/C insurance density over timespan, whereas Moldova has the lowest average L/H insurance density and Armenia has the lowest average P/C insurance density of those countries included in our study. P/C markets are generally larger than L/H markets, but expectations can be seen within several countries. Interestingly, some countries exhibit increasing insurance density over the timespan, while other exhibit decreasing insurance density, and still other appear nearly flat, albeit seasonal fluctuations. We consider L/H and P/C insurance density separately in our analysis.

Given that we are working with a longitudinal dataset, we can exploit both cross sectional and time series variation to test relationships between insurance density and the other variables in our analysis. In purely cross sectional studies, variation in insurance density may arise from sources beyond the particular variables studied, such as differences in norms and attitudes toward insurance across countries. A longitudinal design addresses this limitation by examining dynamics across time, holding constant country-specific attributes.

Like many longitudinal studies, we begin by specifying a traditional fixed effects model that accounts for country-level, quarter-level, and year-level heterogeneity.[18] This model is shown in Equation 1:

$$\text{Insurance Density}_{itq} = \alpha_i + \lambda_t + \delta_q + \mathbf{x}'_{\boldsymbol{itq}}\boldsymbol{\beta} + \varepsilon_{itq} \quad (1)$$

[18] The Hausman specification test indicates that province fixed effects are preferred to random effects.

where insurance density in county i in year t in quarter q is a function of a fixed country-specific intercept (α_i), a fixed year-specific intercept (λ_t), a fixed quarter-specific intercept (δ_q), a vector of explanatory variables ($\mathbf{x}'_{it}$), and an error term (ε_{it}). The inclusion of country fixed effects controls for unobserved country characteristics that are time-invariant. Similarly, the inclusion of quarter and year fixed effects control for seasonal effects and for shocks to insurance density in particular years from sources beyond those included in our study. Given that these characteristics may partially explain differences in insurance density across countries and time, it is important that we hold them fixed in our analysis.

A potential shortcoming of the traditional fixed effects framework is that errors are assumed to be serially uncorrelated. Figure 2 suggests a high degree of persistence in insurance density from one period to the next. Indeed, tests for serial correlation reject the assumption of independence of errors over time. We account for serial correlation in two ways. First, we allow for an autoregressive structure of order one (AR(1)) in the error term as shown in Equation 2.[19] Second, we utilize the generalized method of moment (GMM) estimations of Holtz-Eakin et al. (1988), Arellano and Bond (1991), Arellano and Bover (1995) and Blundell and Bond (1998), which use a single lag of the dependent variable as a predictor of current values. This model is shown in Equation 3.

$$\text{Insurance Density}_{itq} = \alpha_i + \lambda_t + \delta_q + \mathbf{x}'_{itq}\boldsymbol{\beta} + \mu_{itq} \quad \text{where } \mu_{itq} = \rho\mu_{i,tq-1} + \varepsilon_{itq} \qquad (2)$$

$$\text{Insurance Density}_{itq} = \gamma\ \text{Insurance Density}_{i,tq-1} + \alpha_i + \lambda_t + \delta_q + \mathbf{x}'_{itq}\boldsymbol{\beta} + \varepsilon_{itq} \qquad (3)$$

[19] We investigate more complex correlation structures, but find that AR(1) provides sufficient flexibility.

In addition to accounting for persistence in insurance density over time, the GMM specification relaxes the assumption of strict exogeneity – that regressors are uncorrelated with past, present, and future values of the error term. The GMM specification instead assumes weak exogeneity – that regressors are uncorrelated with future values of the error term but may be correlated with past and present values. Relaxing the strict exogeneity assumption is particularly useful in an insurance context given the potential for reverse causality with respect to several explanatory variables. For example, we control for several measures of economic development given its potential to spur insurance consumption; yet, insurance coverage may, in turn, serve to promote economic development by mitigating risk. The potential for reverse causality violates the strict exogeneity assumption, but not the weak exogeneity assumption.[20]

The mechanism by which the GMM specification relaxes the strict exogeneity assumption is through the instrumentation of both the lagged dependent variable and the regressors. The original GMM estimator proposed by Arellano and Bond (1991) estimates Equation 3 by taking differences of both sides of the equation and then using lags of all regressors as instruments for their current values. Blundell and Bond (1998) show that when instruments are weak, estimates may be biased and imprecise. As a potential remedy, they propose using lagged first differences of the variables as instruments. This method of instrumentation is known as the GMM system estimator and is shown by Blundell and Bond (1998) to provide substantial improvements in bias and precision over the original GMM estimator. Following these developments, we report both the original and system GMM estimates when estimating Equation 3.

The consistency of the GMM estimators depends on two assumptions: (1) that errors are serially independent after controlling for a lagged dependent variable and (2) that instruments are

[20] The weak exogeneity assumption is maintained given that future levels of economic development do not affect current explanatory variable values.

valid. For all models, a test of first order serial correlation suggests that the first assumption is met and the Sargan test of over-identifying restrictions suggests that the second assumption is met. Results of both tests are shown in the appendix.

Results

Tables 3 and 4 report the results of estimating our equations under the methodologies described above, for property/casualty insurance density and life/health insurance density, respectively. For some countries, in some years, we are missing data on educational attainment, or we lack insurer-level information to include the number of insurers or calculate an HHI. Thus, we show two models for each approach, one that includes all countries for which we have this data and one in which we leave these three variables out of the model, thus increasing the sample size.

The first two columns in each table (Models 1 and 2) provide the results of estimating the traditional fixed effects model shown in equation (1) for our two samples. Similarly, the next two columns (Models 3 and 4) provide the results from estimating equation (2) allowing for an autoregressive structure of order one (AR(1)) in the error term. The last four columns show the results of estimating equation (3) following the GMM specification. The columns labeled Model 5 and Model 6 show the original GMM estimates for our two samples and the columns labeled Model 7 and Model 8 show the system GMM estimates of Blundell and Bond (1998).

The results shown in Tables 3 and 4 reveal several significant factors related to insurance density that provide support for our four hypotheses. Further, these factors are consistently strong in both the P&C and L&H markets, and our significant factors are generally robust across the four

methodologies employed. The following is a summary of the most significant findings across all specifications as well as the two markets, as they relate to our hypotheses.[21]

H1. Insurance density is positively related to affordability and availability of insurance coverage. We find wages to be a positive and significant determinant of insurance density in both markets, and this result is robust across almost all specifications. The unemployment rate is negatively related to insurance density, but this effect is statistically significant and consistent only in the P&C market. The number of insurers and market concentration are generally not important determinants of insurance density.

H2. Insurance density is positively related to comprehension of insurance products. We find that urbanization is positively related to insurance density in almost all specifications for the P&C market, suggesting exposure to an urban environment might lead to more exposure to insurance company advertising. Internet access is a significant factor in only some of our specifications, and only for the L&H market. Educational attainment, which we measured by the proportion with a college degree, is only a significant positive factor in two of our models, and only for the L&H market

H3. Insurance density is positively related to trust of insurance companies. We find strong support in the P&C market for the role of government regulation of business. Namely, a stronger regulatory environment is associated with higher insurance density. This finding supports our hypothesis that

[21] We will provide a more detailed discussion of the results, and address the economic significance of these findings in our next draft.

citizens are more likely to purchase insurance because they can trust the operation of regulated insurers.

H4: Insurance density will be lower in countries with high levels of state-supported programs. We find that our proxy for access to credit, domestic credit expressed as a percentage of GDP, is a strong positive determinant of insurance density, contrary to our expectation that credit would be considered a substitute for insurance. Regarding state supported programs, do not have findings yet to report here.

Overall, we have significant statistical evidence to support our first three hypotheses, although the evidence regarding the relationship between insurance density and comprehension is weak.

Conclusion and Next Steps

Using data from 21 CESEE countries, we identify the socioeconomic factors that are significantly associated with insurance density in the period 2010-2017. Although all countries in our sample had already transitioned to market economies before our time frame, we find that significant differences in insurance market development persist across countries in both the P&C and L&H markets. We identify factors associated with insurance density that confirm three of our hypotheses; namely, affordability/availability of products, comprehension of insurance, and trust of insurers, are all associated with insurance density in some way.

We recognize drawbacks to the analysis of insurance density as a proxy for understanding the protection gap. For one, aggregate premium volume is not an accurate measure of insurance coverage; with the right data, we could allocate premiums across the population that are actually insured, and control for the population that is uninsured. Even this approach, however, would miss whether the

premium volume accurately reflects the exposures covered. More detailed data would facilitate a better understanding of where gaps in protection lie, e.g., in particular lines of insurance or for particular populations within a country.

We have identified several avenues for further research which we intend to explore prior to the conference. Most importantly, we are compiling measures of government support (social security, health insurance), to better control for the need for coverage.

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Figure 1. CESEE Mapping of Country Groups

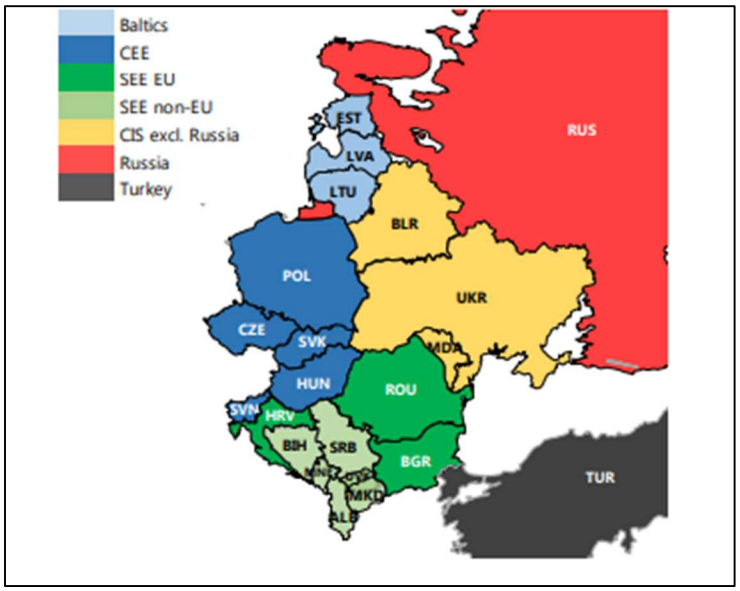


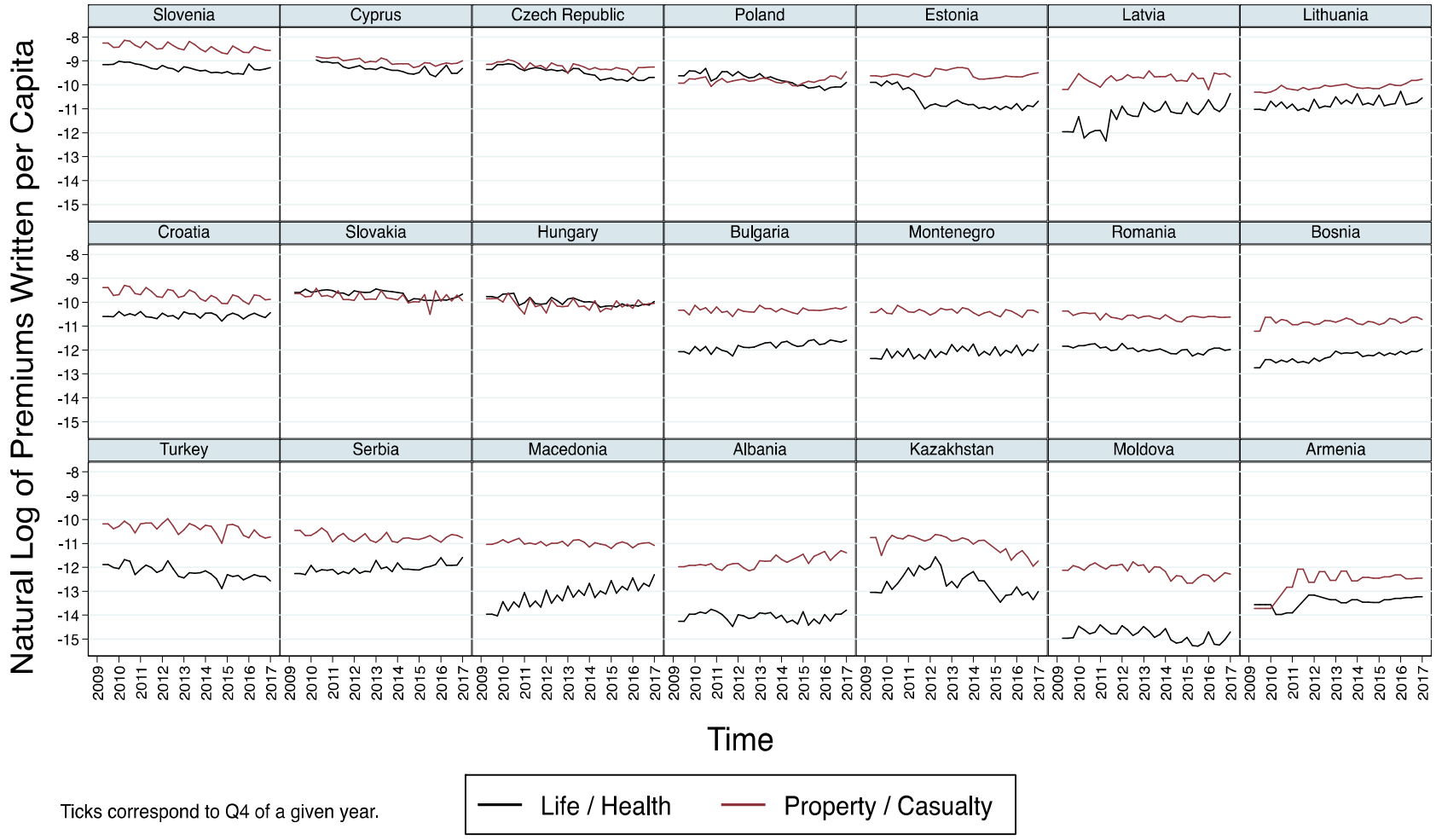
Table 1. Variable Sources and Definitions

Source	Variable	Definition
XPRIMM	L/H Density	Natural log of real life/health insurance premiums written per capita (2014 base year)
	P/C Density	Natural log of real property/casualty insurance premiums written per capita (2014 base year)
	GDP	Natural log of real gross domestic product per capita (2014 base year)
World Bank (via Statista)	Agriculture	Percentage of GDP associated with agriculture, forestry, mining, and fishing
	Industry	Percentage of GDP associated with industry and manufacturing
UNESCO Institute for Statistics, Sept. 2019 release.	Wages	Natural log of real average monthly earnings (2014 base year)
	CPI	Consumer price index (2014 base year)
	Unemp.	Percentage of the labor force that is jobless
	FDI	Foreign direct investment expressed as a percentage of GDP
	Credit	Domestic credit expressed as a percentage of GDP
	Savings	GDP less consumption expenditure expressed as a percentage of GDP
	Debt	Household debt expressed as a percentage of GDP
	Population	Natural log of population
	Tourism	Natural log of the annual number of tourists
	Male	Percentage of the population that is male
	Young	Percentage of the population age 0 to 14
	Old	Percentage of the population age 65 and older
	Urban	Percentage of the population living in urban areas
	Internet	Percentage of the population having access to the Internet within the last three months
	Mobile	Number of mobile cellular subscribers expressed as a percentage of the population
	College	Percentage of relevant age students enrolled in universities, colleges, and trade schools
	HHI	Herfindahl-Hirshman Index (specific to life/health and property/casualty insurance lines)
	Insurers	Natural log of the number of insurers (0-10,000)
Economic Freedom of the World Report Index, 2018 Report	Govt. Size	Development index for the size of government (0-10)
	Prop. Rights	Development index for property rights (0-10)
	Contract Enf.	Development index for enforcement of contracts (0-10)
	Legal System	Development index for legal system (0-10)
	Regulations	Development index for business regulations (0-10)

Table 2. Summary Statistics

Variable	Obs.	Mean	Standard Deviation			Min.	Max.
			Overall	Between	Within		
L/H Density	653	-11.50	1.60	1.61	0.28	-15.30	-8.96
P/C Density	639	-10.35	1.00	1.01	0.21	-13.72	-8.13
GDP	653	-5.98	0.65	0.66	0.11	-7.87	-4.98
Wages	653	6.74	0.51	0.51	0.12	5.30	7.95
CPI	653	111.25	12.66	8.69	9.43	96.23	181.80
FDI	653	5.40	30.29	7.72	29.43	-60.47	705.45
Population	653	15.41	1.15	1.18	0.02	13.34	18.21
Tourism	653	14.68	1.52	1.54	0.22	11.07	17.37
Male	653	48.43	1.22	1.25	0.05	45.79	50.50
Young	653	16.89	3.36	3.41	0.57	13.26	27.93
Old	653	14.69	3.68	3.71	0.72	6.75	20.80
Urban	653	60.99	8.62	8.78	0.71	42.49	74.67
Internet	653	63.49	13.00	10.02	8.51	25.00	88.41
Mobile	653	122.27	21.98	21.06	7.96	71.60	188.88
Unemp.	653	13.51	8.88	8.72	2.43	2.39	44.62
Agriculture	653	6.16	4.73	4.80	0.58	1.73	20.33
Industry	653	25.28	5.70	5.78	1.35	9.37	40.60
Credit	653	2.62	1.71	1.76	0.50	0.64	11.75
Savings	653	16.83	13.50	12.52	5.75	-29.67	51.70
Debt	653	31.79	25.04	26.49	4.25	5.77	147.56
Govt. Size	653	6.54	0.77	0.76	0.22	4.90	8.64
Prop. Rights	653	5.03	0.94	0.88	0.37	2.96	7.57
Contract Enf.	653	4.88	0.95	0.89	0.39	3.14	6.96
Legal System	653	5.63	0.73	0.69	0.25	4.13	7.51
Regulations	653	6.62	0.68	0.66	0.20	5.14	8.45
College	570	60.20	13.80	12.87	5.87	36.88	103.75
HHI L/H	598	2238.94	1869.94	1816.45	217.98	534.58	9421.78
HHI P/C	598	1413.08	586.32	607.29	173.64	534.58	2974.36
Insurers	618	3.17	0.59	0.58	0.09	1.79	4.20

Figure 2. Insurance Density Over Time



Ticks correspond to Q4 of a given year.

Table 3: Regression Results – Life / Health Premiums Written

	Model 1 FE	Model 2 FE	Model 3 FE AR1	Model 4 FE AR1	Model 5 Dif. GMM	Model 6 Dif. GMM	Model 7 Sys. GMM	Model 8 Sys. GMM
GDP	0.086	-0.066	0.067	0.069	-0.138	-0.155	0.086	0.173
Wages	0.385**	0.287**	0.344*	0.221	0.658***	0.420**	0.629***	0.597***
CPI	-0.013***	-0.017***	-0.007*	-0.008**	0.001	-0.004	0.002	-0.001
FDI	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Population	-0.191	-0.973	-0.774	-1.439**	-5.703***	-3.863***	0.285**	0.059
Tourism	0.700***	0.558***	0.377**	0.277**	0.232*	0.161	-0.072	0.148*
Male	-1.676***	-1.512***	-0.270*	0.096	0.895*	0.660	0.036	0.003
Young	0.117***	0.058**	0.044	-0.023	0.036	-0.053	-0.058**	-0.064**
Old	-0.134**	-0.352***	-0.123	-0.217***	-0.145*	-0.308***	0.028	0.034
Urban	0.175***	0.115***	0.109***	0.040	0.075*	0.035	-0.003	-0.010
Internet	0.017***	0.009***	-0.005	0.001	0.000	0.003	0.006	0.011***
Mobile	-0.002	0.002	-0.002	0.000	-0.003	-0.002	-0.001	-0.003*
Unemp.	0.001	0.003	-0.006	-0.002	-0.018**	-0.016**	-0.014**	-0.006
Agriculture	-0.060***	-0.070***	-0.071**	-0.040	-0.042	-0.049**	-0.015	-0.056***
Industry	0.012	0.027***	-0.005	0.023*	0.011	0.022*	0.006	0.016
Credit	0.194***	0.145***	0.179***	0.157***	0.127***	0.086**	0.139***	0.080**
Savings	0.000	0.002	0.000	0.000	0.002	0.002	0.000	-0.002
Debt	0.002	-0.014***	0.011*	-0.008*	0.003	-0.012***	0.005	-0.004
Govt. Size	0.147**	0.142***	0.089	0.043	0.001	0.038	0.024	0.060
Contract Enf.	-0.055	-0.064**	-0.046	0.031	0.040	0.052	-0.026	-0.037
Legal System	0.221***	-0.050	0.069	-0.008	0.080	-0.149**	0.191***	-0.012
Prop. Rights	-0.085***	0.017	-0.014	0.011	-0.048	-0.008	-0.037	-0.034
Regulations	0.088	0.203***	-0.040	-0.005	0.072	0.149**	-0.010	-0.001
College	0.004*		0.005		0.009***		0.001	
HHI L/H	0.000		0.000		0.000		0.000***	
Insurers	-0.143		-0.251		-0.167		-0.283**	
Year 2011	-0.044	0.027	-0.009	-0.022	-0.078	-0.010	-0.062	-0.106**
Year 2012	-0.109	0.062	0.014	0.032	-0.093	0.065	-0.092*	-0.090*
Year 2013	-0.081	0.169**	0.091	0.138	-0.055	0.139	-0.081	-0.154**
Year 2014	-0.108	0.322***	0.121	0.229*	-0.024	0.262*	-0.093	-0.163**
Year 2015	-0.161	0.334***	0.118	0.257	-0.031	0.268	-0.083	-0.205**
Year 2016	-0.262	0.372**	0.101	0.298	-0.060	0.334	-0.151	-0.299***
Year 2017	-0.300	0.489***	-0.002	0.361	-0.087	0.432*	-0.126	-0.354***
Quarter 2	0.043*	0.058**	0.018	0.039**	0.012	0.040*	0.065***	0.129***
Quarter 3	-0.011	0.001	-0.049*	-0.020	-0.055**	-0.026	-0.008	0.044
Quarter 4	0.175***	0.204***	0.132***	0.167***	0.136***	0.175***	0.192***	0.251***
AR1 (ρ)	—	—	0.580***	0.572***	—	—	—	—
Lag L/H Den.	—	—	—	—	0.137***	0.152***	0.358***	0.446***
Observations	509	653	488	632	464	605	490	630
Countries	21	21	21	21	21	21	21	21
R^2	0.527	0.476	0.862	0.725	—	—	—	—

Table 4: Regression Results – Property / Casualty Premiums Written

	Model 1 FE	Model 2 FE	Model 3 FE AR1	Model 4 FE AR1	Model 5 Dif. GMM	Model 6 Dif. GMM	Model 7 Sys. GMM	Model 8 Sys. GMM
GDP	0.302**	0.301***	0.368***	0.344***	0.413***	0.286**	0.534***	0.462***
Wages	0.385***	0.318***	0.258**	0.340***	0.341**	0.345**	0.359**	0.414***
CPI	-0.003	-0.005***	-0.006***	-0.005***	-0.003	-0.004	-0.002	-0.003
FDI	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Population	-0.526	-0.270	-0.788	-0.450	2.265	-1.291	0.096	0.016
Tourism	0.047	-0.019	0.071	0.006	0.354***	0.152*	-0.051	-0.040
Male	0.688***	0.294	-0.054	-0.115	0.460	0.637*	0.096*	0.144**
Young	-0.037*	-0.044**	-0.035	-0.031	-0.026	-0.048	-0.056***	-0.031
Old	-0.009	-0.020	-0.067	-0.018	0.147*	-0.016	0.034	0.053*
Urban	0.074***	0.041**	0.081***	0.053***	0.083**	0.064**	0.004	0.015*
Internet	-0.003	0.001	-0.004	0.001	0.002	-0.002	-0.011***	-0.004
Mobile	0.002	0.002*	0.003*	0.003**	-0.004**	-0.003*	0.001	0.000
Unemp.	-0.019***	-0.017***	-0.016***	-0.012**	-0.004	-0.009	-0.011**	-0.009*
Agriculture	0.005	0.021	0.016	0.020	0.025	0.041**	-0.053***	-0.041***
Industry	-0.009	0.000	-0.010	-0.001	-0.011	0.001	-0.010	-0.002
Credit	0.109***	0.074***	0.112***	0.071**	0.144***	0.072**	0.109***	0.059**
Savings	0.002	0.000	0.001	0.000	0.002	0.001	0.001	-0.001
Debt	0.003	-0.003	-0.001	-0.005**	0.003	-0.005	-0.007**	-0.005*
Govt. Size	-0.034	0.006	-0.065	-0.025	-0.190***	-0.114**	-0.131**	-0.093**
Contract Enf.	0.047	0.050**	0.048	0.030	0.040	0.019	-0.007	-0.011
Legal System	-0.049	-0.041	-0.022	-0.023	-0.006	-0.075	-0.236***	-0.199***
Prop. Rights	0.039	0.046*	0.043	0.035	0.046	0.034	0.173***	0.117***
Regulations	0.120**	0.110**	0.126**	0.119**	0.062	0.131**	0.189***	0.148***
College	-0.001		0.001		0.004		0.003	
HHI P/C	0.000		0.000		0.000		0.000	
Insurers	-0.041		-0.013		-0.286		-0.280*	
Year 2011	-0.019	-0.024	-0.010	-0.054	-0.042	-0.026	0.023	-0.010
Year 2012	-0.053	-0.039	-0.021	-0.077	-0.124	-0.028	-0.006	-0.036
Year 2013	-0.069	-0.036	-0.006	-0.078	-0.233	-0.073	-0.040	-0.084
Year 2014	-0.045	-0.021	0.040	-0.063	-0.308	-0.080	-0.012	-0.095
Year 2015	-0.119	-0.103	-0.009	-0.135	-0.465	-0.179	-0.078	-0.181
Year 2016	-0.129	-0.091	0.016	-0.126	-0.538	-0.162	-0.099	-0.199
Year 2017	-0.170	-0.066	0.007	-0.099	-0.725	-0.152	-0.176	-0.202
Quarter 2	-0.049	-0.046	-0.049	-0.057	-0.035	-0.052	-0.065	-0.071
Quarter 3	-0.148	-0.121	-0.148	-0.132	-0.133	-0.130	-0.170	-0.152
Quarter 4	-0.152	-0.132	-0.150	-0.147	-0.141	-0.143	-0.162	-0.158
AR1 (ρ)	—	—	0.096***	0.136***	—	—	—	—
Lag L/H Den.	—	—	—	—	-0.037	0.000	0.130***	0.124***
Observations	500	639	479	618	458	593	482	617
Countries	21	21	21	21	21	21	21	21
R^2	0.557	0.476	0.587	0.533	—	—	—	—