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**Review of Public and Private Disaster Risk Financing
Mechanisms in Central Europe**

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Executive Summary

Central Europe's Risk Exposure to Natural Hazards

This study comprises a review of government post-disaster safety nets as well as those provided by the private insurance market in four countries of Central Europe, namely the Czech Republic, Hungary, Poland and Slovakia.

As frequency and severity of major natural hazards and economic and insured losses caused by them have considerably increased world-wide, the countries of Central Europe have been no exception. Central Europe is vulnerable to a number of natural hazards, such as flood, landslide/mudslide/debris-flow, avalanche, wind-storm, weight of snow, and fluctuations of extreme temperature.

Between 1980 and 2006, Europe has witnessed a major growth in the scale and frequency of extreme weather events, which represented 89 per cent (238 billion of euro) out of the 366 billion of euro overall losses from disasters caused by the impact of natural hazards in this region. The European Environmental Agency's current projections suggest that South Eastern, Mediterranean and Central Europe regions are among the most vulnerable to climate change. Considerable adverse impacts are expected to occur to natural and human systems that are already under pressure from changes in land use and settlement.

The 1997, 2005 and 2006 floods in Central Europe demonstrated that large disasters caused by the impact of natural hazards can be very costly and can have major negative impacts on national budgets.

For instance, the 1997 floods caused over EUR 5.6 bn in economic damages mainly to Poland (2.9 bn), the Czech Republic (1.8 bn) and Slovakia (0.06 bn).

The 1997 floods were followed by another devastating flood across the Central European region in 2002. On that year, total economic losses from floods in Central Europe exceeded EUR 3 bn. During this event, the Vltava river exceeded the water level of the major 1890 floods in Prague. Some 200 000 Czech residents were evacuated during the flooding, which caused the total economic loss of EUR 2.3 bn in the Czech Republic alone.

The 2006 floods affected Hungary, Bulgaria and Romania with economic damages estimated in excess of EUR 0.5 bn.

Despite considerable economic loss potential from flood in the region, Central Europe appears to fare much better than most disaster prone areas in the world in terms of its financial preparedness for natural disasters. On average, over 50 percent of homeowners across the region are insured against natural disasters and governments, cognizant of devastating floods at the turn of the last century, have been allocating significant

budgetary resources annually for emergency preparedness and post-disaster reconstruction and aid.

Fiscal Disaster Risk Financing Mechanisms at the Country Level

In all surveyed CE countries, national annual budgetary allocations for emergencies are significant. All national emergency funds are annual non-accruing funds, meaning that they maintain the same statutory size in budget percentage terms and cannot be accumulated or carried forward from one year to another.

In all surveyed CE countries, the emergency assistance aid can be made available to households, businesses, and local governments. None of the surveyed countries have a means testing requirement as a precondition for emergency assistance, although in Poland local officials have a considerable discretion in determining the eligibility for post-disaster aid. Overall, there is no clear delineation of government and private sector liabilities when it comes to funding economic damages in the aftermath of a disaster.

In all four countries the government stands ready to provide post-disaster financial assistance to the victims of natural disasters both for emergency relief and reconstruction purposes. While the former comes in the form of grants, the latter form of assistance is provided in the form of low interest reconstruction loans and reconstruction grants.

The administrative process involved in mobilizing additional resources in cases of major disasters caused by the impact of natural hazards appears to rely by and large on the administrative capabilities of local governments, which are deeply involved in the whole process of post-disaster loss assessment and eventual distribution of the funds to beneficiaries. The emergency relief assistance appears to be delivered to victims of disasters within days.

The Role of Private Catastrophe Insurance in Disaster Risk Financing in CE countries

Due to the very large floods at the turn of century the insurance industry in CE is well prepared to handle large catastrophic events. The big floods have also helped to increase the public awareness of risk which translated into a rather high level of property insurance penetration among households and SMEs. The unique feature of the CE markets is that traditionally catastrophe insurance perils have been included in the overall scope of coverage under the homeowners' policy rather than being an optional policy endorsement, which is the case in most other markets. As a result, almost all households with a fire policy are also automatically covered against flood, windstorm, landslides, hails and avalanches. Table 1 below summarizes our estimates of catastrophe insurance penetration in the CE region by country.

Table 1. Catastrophe Insurance Penetration in Central European Countries

Country	Homeowners with catastrophe insurance (%)
Czech Republic	49
Poland	56
Slovakia	51
Hungary	73

The cost of catastrophe insurance coverage varies considerably across the region, not only because of different levels of disaster risk exposure in different countries but also because of varying levels of market discipline over risk pricing. For instance, if in the Czech Republic, most insurers charge adequate risk premium for the catastrophe portion of the risk, in Poland the situation is markedly different as the risk premium is driven more by the market competition than by the technical fundamentals.

On the supply side, as the market is dominated predominantly by large international insurance groups, except for Poland where the state-owned insurer PZU still holds the lion's share of the market. Reinsurance for individual country subsidiaries is typically placed in a centralized fashion through reinsurance departments of mother companies, which in turn place the cover for the whole group. This approach allows realizing considerable savings which translates into lower premiums for homeowners. In the case of PZU, the sheer size of the company allows it to pull the risk country-wide which results in a well-diversified risk exposure and highly affordable pricing.

Insurance regulators in CE countries seem to be well aware of the importance of adequate catastrophe risk management in insurance companies. In the Czech Republic, for instance, the Insurance Regulator requires companies to supply estimates of their overall Probable Maximum Loss from a 200-year event as well as the details of their reinsurance programs. In Poland, catastrophe risk scenarios have been incorporated into a planned stress testing for the whole market.

Conclusions and policy recommendations

Despite considerable risk exposure to natural disasters the existing risk financing mechanisms in the countries of Central Europe are relatively well developed to address the consequences of large catastrophic events. The financial preparedness of CE countries to natural disasters manifests itself in rather high levels of catastrophe insurance coverage (well over 50%) as well as in considerable commitment of government resources in national budgets for emergency situations.

Several recommendations emerge from this study. They are intended to guide government policymakers in developing and applying national and regional disaster risk financing strategies, suggest ways in which Bank staff and managers can better address catastrophe risk financing in their dialogue with clients, and provide information and

ideas that may be of value to other stakeholders, such as international donor organizations, NGOs, academics, and the general public.

Lessening the impact of natural disasters on government budgets. Despite a relatively high level of insurance penetration in CE countries, governments still carry a considerable budgetary exposure to catastrophic floods. The current regulatory frameworks in the Czech Republic and Poland, for instance, make it a government obligation to assist homeowners in post-disaster recovery and reconstruction efforts. Moreover, in the case of 1997 flood, the Czech government paid an equal compensation to both insured and uninsured homeowners for equity reasons. The post-disaster compensation was funded by additional government borrowing.

This approach to disaster compensation does not seem to optimal. In the case of disaster compensation, governments should clearly find a way to separate between public and private liabilities. While the provision of disaster relief, reconstruction of national life-lines (e.g., utilities, roads, schools and hospitals) is clearly the government responsibility, recovery of private assets should be funded by individual savings and insurance. This is particularly the case when such insurance is widely available and quite affordable. To this end, the governments of CE countries may consider changing the existing post-disaster compensation policies for housing reconstruction by introducing a strong element of private responsibility for losses inflicted by natural disasters. Such a policy change is likely not only to considerably increase insurance penetration among homeowners but also will help significantly reducing government fiscal exposures to natural disasters.

Reducing the financial vulnerability of homeowners and SMEs to natural hazards. While the study documented rather high levels of catastrophe insurance penetration among homeowners and SMEs in Central Europe, almost 50 percent of population still remains uninsured. In this context, the governments of should consider investing in increasing public risk awareness as well as changing the existing post-disaster compensation policy (see above). In addition, those countries of the region, which have a lower level of property insurance coverage among homeowners, should consider introducing a stand-alone catastrophe insurance coverage for homeowners and small business owners, which can be backed by a dedicated reinsurance capacity at the regional level. As has been demonstrated by the international experience, such programs can provide highly affordable coverage by realizing the benefits of region-wide risk diversification, economies of scale and the ability to obtain better pricing terms from the global reinsurance market. The work on a regional catastrophe insurance facility for the countries of South Eastern Europe has reached a fairly advanced stage. Once created, the SECE CRIF will enable insurers selling a stand-alone catastrophe insurance cover to receive access to a dedicated reinsurance capacity on highly attractive terms.

Enhancing the ability of local regulators to assess the solvency implications of insurers' catastrophe risk exposures. Although the study documented a considerable level of technical sophistication on the part of CE insurance supervisors in monitoring and regulating insurers' risk exposures to natural disasters, the capacity of CE insurance

regulatory bodies in catastrophe risk management would benefit from further investments in regulatory (risk assessment and monitoring) tools and specialized staff training.

INTRODUCTION

The Impact of Natural Catastrophes on Central Europe

This study comprises a review of government post-disaster safety nets as well as those provided by the private insurance market in four countries of Central Europe, namely the Czech Republic, Hungary, Poland, and Slovakia.

As frequency and severity of major natural hazards and economic and insured losses caused by them have considerably increased world-wide, the countries of Central Europe have been no exception. Central Europe is vulnerable to a number of disasters both natural hazards, such as flood, landslide/mudslide/debris-flow, avalanche, wind-storm, and fluctuations of extreme temperature. However, most of disaster related losses in the regional can be attributed to the risk of flood.

Objectives, scope and methodology of the study

The study attempts to establish the extent of financial vulnerability of governments and households to natural hazards in four countries of Central Europe by examining:

- The fiscal policy of four Central European countries in the areas of post-disaster relief and reconstruction.
- The extent of catastrophe insurance coverage provided by the private insurance industry in the region as well as the technical capacity of national insurance markets to manage catastrophe insurance risk.

Besides documenting the current state of government and market-based safety nets for homeowners and SMEs affected by natural disasters, the study also suggests a range of practical solutions and policy recommendations with the view of reducing the financial vulnerability of the region to natural disasters.

The study is intended for four principal audiences: government officials in Central European countries; World Bank staff involved in disaster risk financing and reconstruction projects; the international development community as well as the private insurance and reinsurance industry.

This Report was prepared based on a series of written surveys followed by interviews with key government officials, government experts and insurers in four countries of the study. The field work has been supplemented by a review of the pertinent literature.

The structure of the report is as follows. Chapter I reviews the level of catastrophe insurance penetration in the four countries of Central Europe. It also provides an overview of fiscal policies and mechanisms currently in place for dealing with national emergencies. Chapter II presents the main findings and policy recommendations of the study.

Chapter I

A Survey of Catastrophe Insurance Markets in Central Europe

Central Europe's Risk Exposure to Natural Hazards

Central Europe is highly vulnerable to natural disasters such as flood, landslide, mudslide, debris-flow, wind-storm, weight of snow, and extreme temperature fluctuations, with the risk of flood being the most significant. As shown in Table 1, economic and insured losses in four countries of the region from the 1997 flood alone – which is considered to be the most catastrophic event in the region over the last 200 years – were in excess of USD 5 billion.

Table 1. Economic and Insured Losses from 1997 Flood in Central Europe

Country	Poland	Czech Republic	Slovakia
Economic loss (USD million)	2900	1800	60
Insured loss (USD million)	450	305	10

Sources: Swiss Re and Munich Re (1997)

Catastrophe Risk Policy Coverage.

Over the last 10 years, the non-life insurance industry in Central European countries has been transformed by the rapid consolidation, privatization and entrance in the market of large multinational insurance groups (such as Generali, Allianz, ERGO (Munich Re Group), and VIG), which currently control the lion's share of the market in all countries of the region, except Poland where the state-owned PZU still remains the biggest player. As a result, the insurance terms and conditions offered by most companies to homeowners and SMEs in the market under the FLEXA¹ cover are pretty standard, with only slight variations across different companies.

Natural Hazards Covered.

In all Central European countries, insurers offer all-risks homeowners coverage which insures property damage to private dwellings from FLEXA and all major natural perils such as flood, land-slide, windstorm, avalanche, hail, earthquake. Most FLEXA policies offered by the market in Central Europe do not allow the insured to decline natural hazards cover, which is an integral part of individual property insurance policy. Small businesses, industrial and commercial customers however can choose perils to be covered by their insurance policy, which to a large extent explains why a considerably larger percent of homeowners is covered against natural disasters. Specifically, while in the case of homeowners, almost 100 percent of those insured against the risk of fire are also

¹ FLEXA is an abbreviation for the following 5 insured perils, which are typically covered under one insurance policy: fire, lightning, explosion and aviation.

insured against natural perils, only 40-50 percent of SMEs with a FLEXA cover have coverage against natural perils.

Catastrophe Insurance Penetration

In general, Central European countries have a rather high level of insurance coverage for natural perils – well over 50 percent, which is considerably higher than in most OECD countries without a mandatory catastrophe insurance scheme. For comparison, catastrophe insurance penetration in Germany during 2001 floods stood at a meager 7 percent.

The main drivers of such a high level of catastrophe insurance coverage have been a heightened level of risk awareness by the public after the 1997 and 2001 major floods, the expansion of the mortgage lending industry (as lenders typically require a proof of property insurance), considerably improved distribution and marketing capabilities of local insurance companies and, finally, rapid economic growth, which translated into stronger demand for insurance.

Insured Limits

Insured policy limits for natural perils are typically the same as the sum insured under the underlying FLEXA policy. The limits of coverage however vary significantly from one country to another. It is worth mentioning that in some countries Central European countries the insured limits remain artificially low due to the fact that they are linked to the historic book property values, which have not updated since the early 1990s.

Deductibles

As deductibles are not very popular with individuals and corporations in Central European countries, they rarely exceed two percent of sum insured or a few hundred euros. Many companies do not have any deductibles at all under their all-risk property policies.

Premium rates

The pricing of all-risk property covers varies significantly throughout the region based on the local market conditions and the pricing sophistication of insurers. The premiums for all-inclusive property coverage range from 1 to 4 per mille, e.g. (0.01% to 0.04%). The variation in the rates can be mainly attributed to the level of competition in each market rather than to risk characteristics of insured dwellings. In some countries however insurers refuse coverage to dwellings located in the most flood prone areas, e.g. in Zone IV.

Terms of coverage

The terms of coverage for catastrophic perils offered by the local market appear rather generous as insurance policies cover all risks (e.g. FLEXA and natural hazards) with low

deductibles. In most cases, FLEXA policies include provide coverage for damage to the building structure alone, with contents of the building insured under a separate policy.

Indemnification basis

In covering catastrophic perils, insurers are often faced with the problem of underinsurance arising of policyholders buying less coverage than the replacement cost of their property. To deal with this problem, insurers include underinsurance penalties into the terms and conditions of the policy which have the effect of reducing the amount of indemnity paid in the aftermath of a disaster proportionately to the rate of underinsurance.² However, as many insurance policies are sold in conjunction with mortgage loans, the insured limits are typically set to cover the replacement cost of mortgaged property to protect mortgage lenders against the loss or damage to their collateral that may be caused by fires or natural perils.

Claims settlement

In Central Europe, loss adjustment is typically carried out by loss adjustors from insurance companies, although for complex and large commercial/industrial losses external professional loss adjusters may be engaged as well. Reinsurers may also be involved if losses exceed a pre-agreed value.

In most countries of the region, claim settlement is typically done either on the new replacement cost or residual value basis. The residual value approach enables insured to reduce the insured limit (initially set at a historic book value) by the amount of accrued depreciation and hence pay less for coverage which consequently, in the case of a loss, results in a corresponding reduction of indemnity payment. T Under the new replacement cost approach the insured limit is set based on the estimated current replacement cost of the dwelling, which is updated annually, which naturally results in higher insurance premiums and indemnity payments.

Risk Management

In all Central European markets, large insurance companies have the necessary risk management skills and expertise to adequately manage their catastrophic risk. As catastrophe risk accumulations of local insurers can be quite significant relative to their capital base, large companies actively monitor their risk accumulations and buy considerable amounts of catastrophe excess of loss reinsurance to reduce their overall risk exposures to major floods. In the case of large insurance groups reinsurance is typically placed at a group level for all country subsidiaries, which results in a considerably improved quality and amount of available reinsurance protection. Typically, reinsurance treaties are concluded with large reputable international reinsurance companies. The amount of reinsurance bought by large groups is sufficient to cover catastrophic events with a 250-year return period. Most of surveyed large insurers had quantitative estimates of their probable maximum loss potentials (for different return periods) as probabilistic

² In the insurance industry, this approach is known as a rule of averaging.

commercial flood risk models have been made available by several European risk modeling companies (a Prague-based Inter-map is one example) as well as large reinsurers (Swiss Re and Munich Re) and commercial reinsurance brokers. As a result, several companies reported that they use at least 2-3 risk models before committing to a given estimate of PML for a chosen return period (typically 200-250 return periods are used).

The above described level of sophistication in risk management is rarely the case for smaller companies, which do not have the necessary capital and human resources to afford sophisticated risk management systems. Those however account for 10-15 percent of market share and hence are unlikely to pose a systemic threat to the market in case of a major flood event.

Insurance Laws and Regulations

None of the countries of the region, except for Czech Republic have any specific requirements for pricing, reserving, reinsuring or reporting catastrophe risk underwritten by local insurers. The Czech Insurance Regulator requires companies to regularly report their estimates of 250 year PMLs (based on their own risk models) as well as the details of their reinsurance treaties. In Poland, the monitoring of companies' catastrophe risk exposures is viewed by the local regulator as an integral part of preparatory work for Solvency II. Hence, plans have been made to incorporate catastrophe risk scenarios into the stress testing of insurers scheduled for the next year.

Poland is in the process of developing a mandatory catastrophe insurance law which would make catastrophe insurance mandatory for all homeowners. The law however is at the very early stages of development.

Product Distribution Channels

In Central Europe, to distribute their products, insurers use mainly their own sales force, and often tied agents. Bank-assurance is also becoming more and more common.

The Czech Republic

Catastrophe insurance market overview

Country disaster risk profile

Flood is by far the main natural hazard in the Czech Republic, causing insured losses of CZK 9.8bn (USD 305.8mn) in 1997 and CZK 36.79bn (USD 1.13bn) in 2002. Floods result from the limited drainage capacity and the lack of regulation of some of the country's major rivers. Flooding normally occurs in the summer months when annual rainfall is at its highest but can also be caused by snow melt. The most hazardous areas are the river valleys of Moravia and East Bohemia, some of which form narrow, steep-sided channels deeply cut through the surrounding plateau lands. As the July 1997 floods demonstrated, however, almost every part of the country is potentially exposed. Flooding is an annual occurrence in the Czech Republic, but was regarded as little more than a nuisance until the catastrophic floods of July 1997, which inundated 35% of the country. This led to a huge increase in the penetration of industrial and residential flood insurance, with the result that further floods in August 2002 caused insured losses of CZK 36.79bn (USD 1.13bn), up from CZK 9.78bn (USD 305.8mn) in 1997. Events of this magnitude are reckoned to have a return period of 500 years on the Vltava and Labe rivers and 250 years on the Berounka, though the fact that two catastrophes occurred only five years apart must throw all such calculations into doubt. A list of major recent flood events in the Czech Republic is presented in Table 1 below.

The country is also exposed to a greater or lesser extent to windstorm, hail, weight of snow, snow melt, and earthquake, although the latter is very insignificant. The risks of windstorm and weight of snow, however, appear to be quite real. For instance, there have been two unexpected windstorm catastrophes in the last two years caused by "Kyrill" and "Emma" causing over €100 million in damages. An atmospheric hazard which caused unexpectedly high losses in 2006 was weight of snow, followed by flooding caused by snow-melt. Contrary to initial indications, most of the damage was caused by flooding rather than weight of snow, which mainly affected disused buildings in the residential and small business sectors. There is no published estimate for the total market loss, though Ceska Pojistovna alone paid weather-related claims of CZK 1.5bn (USD 66.37mn) in the first half of 2006, which would be an equivalent of about USD180 million for the whole market.

Date	Area	Losses
December 1993	South and west Bohemia	Insured losses CZK 750mn to CZK 1bn (USD 26mn to USD 34mn)
June 1995	Central Bohemia	Estimated loss CZK 200mn (USD 7.5mn)
May 1996	Central and south Bohemia, north and south Moravia	Estimated loss CZK 500mn (USD 18mn)
September 1996	North Moravia	Estimated loss CZK 220mn (USD 8mn)
July 1997	East Bohemia, north and south Moravia	Worst floods since 1903 caused by rainfall of up to 300 litres per square metre of ground. One-third of the country under water. 60 fatalities. Total material damage estimated at CZK 63bn (USD 1.99bn), of which insured losses were CZK 9.78bn (USD 305.8mn)
July 1998	East Bohemia	Total economic losses CZK 1.8bn (USD 55.8mn). 10 dead. Estimated insured losses CZK 569.5mn (USD 17.6mn) including two commercial claims at CZK 100mn each (USD 3.1mn)
March 2000	North and east Bohemia	Estimated losses CZK 2bn (USD 49.0mn), including CZK 200mn (USD 4.9mn) in respect of VW Skoda car plant
April 2000	Flash flooding hit the Juta textile mill	Insured loss CZK 400mn (USD 10.4mn)
August 2002	Catastrophic flooding affecting 15% of the land area, including the capital, Prague	Estimated economic losses CZK 73bn (USD 2.23bn). Estimated insured losses CZK 36.79bn (USD 1.13bn)
April 2006		Flooding caused by snow melt and rain. Estimated insured losses in excess of CZK 2.0bn (USD 88.5mn)

Source: AXCO Country Report, 2008.

Natural hazards insurance

Currently, the local insurance market offers an all-risk inclusive property insurance policy, which besides traditional FLEXA perils also provides coverage against almost all known types of natural disasters. While in theory, homeowners can exclude natural perils from their coverage, in practice very few are doing so as the design of homeowners policies by most companies does not provide consumers with an option to opt out of natural perils coverage. There are no stand-alone catastrophe insurance policies in the market today.

The scope of coverage under the homeowners policies includes damage to structures and internal fixtures. House contents must be insured under a separate policy. A standard contents coverage includes a small insurance sub-limit on the value of insured contents in

house basements, which are the most vulnerable to floods. The sub-limit can be increased for an additional premium.

Due to the floods of 1997 and 2002 and the rapid growth the market has experienced ever since, the number of individual property policies at the end of 2007 stood at 1,875,523³. This corresponds to about 49 percent of all residential dwellings in the Czech Republic, which is a rather high level of catastrophe insurance penetration by OECD standards. This high number however conceals the problem with obtaining coverage for people living in flood prone areas as most insurers do not provide the coverage. In contrast to Hungary, however, non-availability of flood cover has not become a political issue and there is no pressure for the establishment of a national flood insurance pool. The problem with insurability of houses located in close proximity to rivers is also being gradually addressed by the government investments in flood protection barriers as well as the government decision to prohibit housing reconstruction in the most flood prone areas.

The main drivers behind such a high level of catastrophe insurance coverage among homeowners have been the tremendously increased risk awareness among the population after the two major consecutive floods, exponential growth in mortgage lending (as banks require proof of property insurance) and the overall economic expansion experienced by the Czech Republic over the last 10 years.

The level of catastrophe insurance penetration among SMEs is considerably lower as enterprises can opt out of natural perils coverage and those located in relatively low flood exposure zones do so.

Most property insurance policies are typically with a small deductible of about 2 percent. The sum insured for natural hazards is the same as for FLEXA perils and is typically established at the time of policy issuance. However, the insured limits are typically small for most of the existing policies (around USD 18,405-USD 30,675)⁴ due to several factors. First, non-life policies in the Czech Republic are commonly issued for an indefinite term or for an annual period with an automatic renewal. This means that the terms and conditions of coverage remain the same till the policy is cancelled, or a policyholder requests a new insured limit, or agrees to switch from the currently prevalent book-value claims settlement to a replacement cost approach which will considerably increase the insured limit. The main reason behind homeowners' reluctance to switch to a replacement cost approach is a considerable increase in annual insurance premiums entailed by such a change. Also, as a result of the August 2002 floods, some insurers limit flood coverage to 20-50 percent of the total sum insured, which limits the market average for overall individual coverage limits. While floods are unlikely to cause complete property loss for most homeowners, such low limits of coverage are likely to trigger considerable underinsurance penalties in case of a major claim.

In the case of loss, claims are settled by insurance companies' own loss adjustors.

³ See Annual Report of the Czech Insurance Association, 2007, p. 62.

⁴ See AXCO Country Report for the Czech Republic, 2008.

As 75 percent of the residential property insurance market is controlled by only two companies – Generali and Kooperativa (VIG), competition on residential property rates for the existing business is rather weak, which enables insurers to charge actuarially sound rates for the coverage and remain profitable. The situation with the rates was however dramatically different before the major floods of 1997 and 2002, which served as a major catalyst for re-pricing the flood risk by the market. After the 2002 floods the premium rates have been increased by 400 percent and currently remain at around 250 percent level of the pre-2002 flood rates. A summary of flood premium rates charged by the market is presented in Table 2 below.

Table 2. Flood premium rates in different flood risk zones

Flood zones (Return Periods in years)	HHs and SMEs premium rates (per mille)	Commercial and industrial premium rates* (per mille)
Zone I (risk of flood is highly remote)	0.4	0.7
Zone II (50 or above)	0.8	1.4
Zone III (20-50)	2.0	3.0
Zone IV (<20)	NA	NA

Notes: *Commercial and industrial are defined as policies with insured limit in excess of Kcz 100 million

Despite the fact that at least 20-25 percent of risk premium is paid back to insurance agents in the form of sales commissions, these rates still compare rather well with other flood prone countries in Europe, such as Poland, where the premium rates are driven predominantly by competition rather than by actuarial risk models.

Virtually, all homeowners policies are sold through companies' own sale force, agents, or bank-assurance channels.

Since the 2002 floods the risk management capabilities of the local market have been transformed and are now on par with the best international practice. Most companies adopted highly sophisticated risk accumulation control systems that enable them to link each insured property to a geo-code and hence trace their risk accumulations in real time. In addition, due to the efforts of large international reinsurance brokers (AON/Benfield) and reinsurers (Swiss Re and Munich Re), the local insurance market now has rather accurate flood risk modeling tools which are used to determine companies' probable maximum loss (PML) potentials by risk accumulation and at the portfolio level. Model generated estimates of risk are then used by companies to determine the amount of reinsurance they need to protect themselves against severe catastrophic events. Currently, most companies buy reinsurance protection with the view of surviving a 1-in-200 or 250 loss scenario. This roughly comes to about a €1.5 billion insured loss for the whole Czech market. For comparison, the 1997 and 2002 floods caused insured losses of USD 305 and USD 1.13 bn, respectively. To reduce the uncertainty of risk modeling estimates large companies use at least 2 external models, as well as their own. One company recently

hired the Prague University to review major risk models currently in use by the market to validate the assumptions and methodology employed by the external modelers.

However, the above description of risk management capabilities of the Czech market applies only to large international insurance groups as the remaining few small domestically owned companies still do business the old-fashioned way. The problem of inadequate risk management capabilities in small insurance companies is further exacerbated by the fact that they must aggressively compete on price with large players, which leaves them with insufficient premium for placing adequate reinsurance protection (e.g., with reputable reinsurers and of sufficient quantity).

The insurance market is regulated by the Czech National Bank (CNB). Despite the fact that the insurance supervision of catastrophe risk management in the market began only in 2006 it is currently rather advanced by international standards. In brief, companies are required to submit their reinsurance programs along with estimates of net catastrophe risk exposure derived from internal risk models. The regulator requires at least a 200-300 year PML estimate for the whole risk portfolio along with the calculation of aggregate company's risk retentions under all reinsurance treaties. A ratio of net retentions arising from a 200-250 year flood event to solvency capital should not exceed 2-5 percent. From this year onwards, besides the aggregate retentions the CNB will also be requesting all sums insured by flood risk zones that were covered by reinsurance treaties.

The CNB appears to be cognizant of the possibility of larger size catastrophe events that may threaten insurers' solvency but deems it impractical to require the level of claims paying capacity in excess of those required by 1-in-250 year events. The government appears to be clearly committed to provide necessary financial assistance to the insurance industry in the case of such an unlikely catastrophic scenario. During the 1997 floods, for instance, the government paid claims for an insolvent locally owned insurer, whose claims paying capacity was clearly insufficient to survive such a catastrophic event.

The CNB also plans in the very near future to have the technical capacity to validate internal companies' catastrophe risk models. To this effect, the CNB is in the process of establishing a special risk-based solvency group with advanced quantitative capabilities.

Government post-disaster safety nets

According to the Czech Ministry of Finance, the existing regulatory framework provides for two types of budgetary emergency allocations in the aftermath of natural disasters. These are as follows:

1. Budgetary allocations for emergency and immediate measures aimed at rescue and health protection of affected population. To this effect, according to Regulatory Acts No. 239/2000 Sb. and No.240/2000 Sb, the government makes an annual CZK100 million allocation in the state budget under the chapter of Public Treasury Administration. Mentioned financial aid can reach ultimate beneficiaries within hours if necessary, as was demonstrated during the 2002

flood. A similar structure of emergency financial aid exists at the level of local administrations.

2. Budgetary allocations for property reconstruction and revitalization. There are several short to medium time programs managed by the Ministry of Industry and Trade and the Ministry for Regional Development which allocate government post-disaster financial aid for the purposes of reconstruction of destroyed property in the form of interest-free loans to municipalities, firms and households. This type of assistance is based on Acts No. 12/200 Sb and No.186/2002 Sb. – titled “State Aid for Territorial Restoration.” This assistance is funded by a 0.3 percent annual state budget allocation. In 2009, this amount was CZK 3.5 billion. The speed with which assistance is delivered to ultimate beneficiaries depends on individual case by case evaluations of the needs of aid applicants⁵.

Disaster reconstruction can also be funded from the following additional sources:

- Insurance indemnities (Act No.: 218/2000 *on Budget Rules* explicitly provides for the possibility of insuring state property);
- Local and regional budgets;
- State budget chapters (i.e. government departments) by the savings or inhibition of some governmental expenditure of the current year;
- State budget by the global or selective reduction of the expenditures of state budget chapters of the current year based on the government decision and Parliament approval in certain cases (so called government packages);
- Proceeds from the privatization of state property (for example, in 2005, the privatization of ČEZ and OSINEK generated CZK 5 billion for the state treasury);
- Issuance of state bonds as stipulated by Act No.: 163/1997. For instance, in the aftermath of the 1997 flood, in 1997-1998, the Ministry of Finance issued CZK 5 billion of bonds to finance reconstruction and rehabilitation efforts;
- Issuance of bonds and other debt obligations by the regions and local authorities;
- Commercial loans.

⁵ For more detailed information there is a link on MRD web pages <http://www.mmr.cz/Regionalni-politika/Programy-Dotace/Poskytovani-statni-pomoci-po-zivelni-nebo-jine-poh>

POLAND

Catastrophe insurance market overview

Country disaster risk profile

Although the country is exposed to a variety of natural perils, flood is by far the most common and significant. Of all historical events, the 1997 Odra river flood was the most devastating to the country and the insurance industry. The overall economic losses caused by the event were USD 3.7 billion, with most of them uninsured. Although large floods in the Odra river and its tributaries are rather frequent - in the 19th century, four major floods were recorded in 1813, 1829, 1854 and 1880, while in the 20th century 12 large floods were recorded – the 1997 event was the biggest on record. The July 1997 flood was caused by extremely heavy rain, with some meteorological stations recording as much as 400 mm over a four-day period, which was four times of the long-term average. A brief summary of the most recent floods is presented in Table 3 below.

Table 3. Most significant floods in Poland (1997-2008)

Year	Date	Description of event	Economic impact
1997	July/August	Devastating floods in July and August 1997 affected large areas of central Europe. In Poland, a total area of 31,000 square kilometres, about 10% of the country, was affected, with the loss of 2,000 km of railway line, 3,000 km of roads, 900 bridges and 100,000 houses. More than 50 people died. The flooded areas extended along the rivers Odra, Nysa and Wisla together with their catchment areas.	The economic loss was estimated at USD 3.7bn in Poland, and the insurance industry bore losses of over USD 225mn.
2001	July/August	Beginning 9 July, torrential rainfall and consequent flooding affected southern Poland. The hardest hit areas were the cities and towns along the Vistula river, where 300 hectares of land were flooded. Bridges, sewage systems, water and gas supplies, houses and livelihoods were destroyed. Some 25 people died.	The economic loss was estimated at USD 700mn.
2005	March	Flooding caused by melting snow and heavy rainfall. Tributaries of the Odra river burst their banks near the south-western city of Wroclaw, and sections of the main road from Warsaw to Gdansk were cut.	No significant damage was reported.
2006	March	The central European floods of March 2006 mainly affected agricultural land.	No information.
2006	August	Rain caused severe flooding in the south-west.	Insurance market losses were estimated to be below PLN 40mn (USD 12.8mn).

Source: AXCO Country Report, 2008.

The existing hazard risk models offered by major reinsurance brokers imply an insured market loss of about USD 2 billion from a 1-in-200-year event – an event of severity of the 1997 flood.

Poland is also exposed to wind storms, although the risk is relatively low compared to that of floods. For comparison, a 1-in-200 wind storm is likely to cause only 1/10 of economic damage expected from a similar frequency flood.

Hazard Insurance

All natural perils, including flood, are automatically covered by a homeowners' policy offered by most local insurers. The most common design of the insurance policy simply does not provide for an option to opt out of natural hazards coverage. For agricultural buildings, property insurance cover (including that for flood cover and other acts of god) is obligatory⁶, but the legislation is not well enforced and many risks remain uninsured. As a result of increased flood risk awareness and a growing number of mortgage-financed properties among newly constructed dwellings, 56 percent of homes in Poland are insured today against natural perils. This can be considered quite an achievement for a country where insurance coverage was quite low even 15 years ago. The potential for expansion is noteworthy due to the growing segment of mortgage-financed construction, which is 100 percent insured due to the banks' requirements. In 2007 alone, Poland's central bank (NBP) reported that mortgage lending increased by 50.4 percent to PLN 116.84bn (USD 41.1bn), which mirrors the significant growth experienced in prior years. As can be seen from Figure 1 below, today 7.7 million Polish households (or 56 percent of homeowners) have property flood coverage. This compares to less than 2.5 million policies in 1996.

Typically, companies do not limit sums insured for flood coverage under the offered policies. As a result, most of homeowners' policies do not have flood sub-limits, except for the areas that are highly exposed to floods.

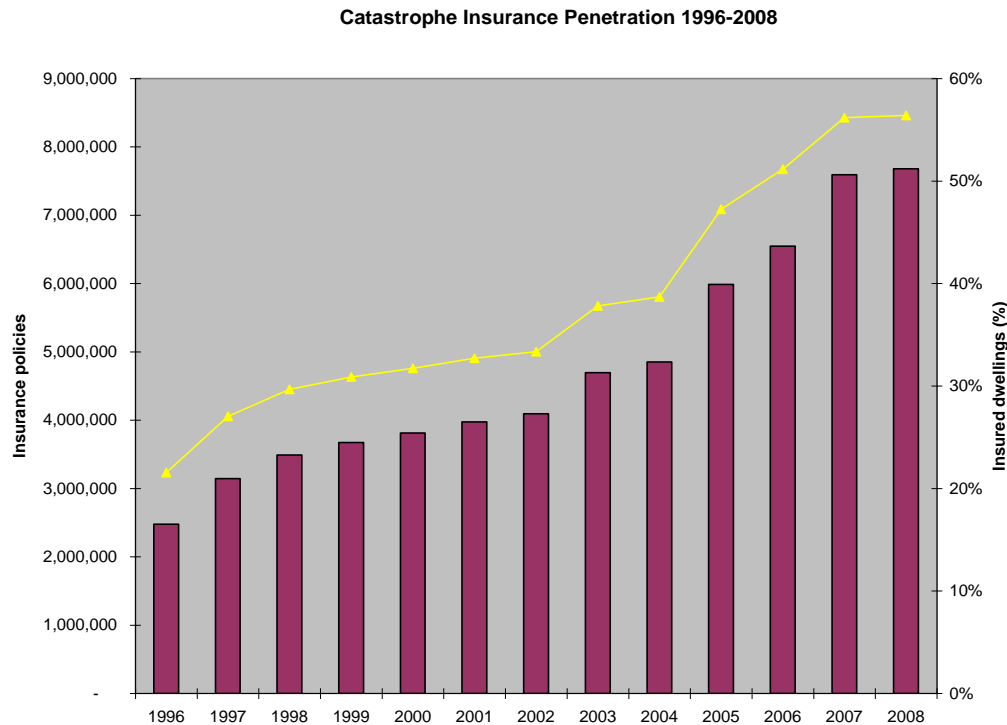
Due to the increasing competition for the residential property business, which still remains highly profitable despite a considerable increase in the number of market players, premium rates are rather low by international or even the Central European standards. The basic additional premium rate for flood cover historically has been 20 percent of the basic fire rate, but in the current extreme competitive climate coverage is often included in a global rate. Nevertheless, with an average loss ratio of 40 percent the residential property business remains highly profitable.

For instance, PZU, the biggest player in the market has been offering all-perils property covers (e.g., FLEXA and NATCAT) for less than 0.1 percent of insured value, as compared to 0.25 percent in the neighboring Czech Republic. The average premium generated per risk is around PLN 99 (USD 44) each for buildings and contents. Despite the low pricing, the company remains highly profitable and appears to have sufficient

⁶ Act of 22 May 2003 on Compulsory Insurance, the Insurance Guarantee Fund and the Motor Insurers' Bureau

claims paying capacity (comprising reinsurance, own reserves and surplus) to survive a 1-in-200 year flood. PZU's ability to maintain such low pricing without losing its profitability can be mainly explained by its country-wide diversification of the risk and a very large share of the market it commands.

Figure 1. Catastrophe Insurance Coverage Penetration among Homeowners



Source: Authors based on the data provided by the Polish Insurance Regulator, 2009

Also, for reasons of competition, most policies in Poland have very low deductibles. In the case of PZU, for instance, deductibles on a residential property insurance policy are €100, but even then, they are applied only if the loss is below that amount. Deductibles for flood and other natural perils are usually the same as for the main FLEXA policy.

Perhaps, one of the key limitations of the current insurance practice is the low insured limits which rarely approximate the true value of insured dwellings and contents. The average amount of cover for contents is PLN 15,000 (USD 6,700) and for buildings PLN 130,000 (USD 57,800). Insured limits under most existing policies are set based on the depreciated book value. However, newly issued policies use the current market value rather than the historic replacement cost as a basis for claims settlement. These terms of coverage cannot be changed unless a policy-holder requests it, which most policy-holders are reluctant to do because of a potential increase in premium. Hence, in case of complete loss of dwelling, most homeowners will face severe underinsurance penalties – as the rule of “averaging” is quite common.

As opposed to the residential property segment, most Polish owned SMEs do not buy any insurance, though awareness is increasing. Companies with foreign capital are generally

better insured and protected. Government property risks in many cases are insured on written-down book values and not on current or replacement values.

Although the Polish insurance market does not have a commonly shared flood risk model or high resolution flood risk maps, most companies use their own proprietary accumulation control systems which enables them to underwrite, price and monitor residential risk accumulations in flood-prone areas by postal code. For corporations address based monitoring is used. The PZU, for instance, uses a customized version of MapInfo program for monitoring its own risk aggregates. For instance, according to S&P's 2006 credit report, the PZU estimates its probable maximum loss to be between PLN 860mn (USD 382mn) and PLN 920mn (USD 408mn) based on a one-in-200-year event.

There are several commercial flood risk models in the market which are offered by large reinsurance brokers (AON/Benfield, Guy Carpenter), reinsurers (Swiss Re), and risk modeling companies (RMS). All these models allow monitoring flood risk aggregates at least by postcode and making estimates of probable maximum loss from events with different return periods. It is not uncommon for large companies to use several models at the same time to reduce the level of uncertainty in their estimates of the required claims paying capacity and, ultimately, the amount of reinsurance protection needed.

Local companies' risk management efforts are further stimulated by the local regulatory requirements to report 10 biggest risks as well as by the accumulation control requirements from the international rating agencies, which are concerned about companies' excessive risk exposure to catastrophic risks.

Due to the growing risk retention capabilities of the local market – mainly due to the market consolidation and buy-outs of locally owned companies by large foreign insurers – the amount of reinsurance placed with foreign reinsurers has been declining in relative terms (e.g., as a percent of gross premium written). Nevertheless, for smaller size insurers reinsurance provides most of claims paying capacity in catastrophic events as their retentions remain rather insignificant – 5-10 percent, vs. 98.5 percent in the case of the PZU. The growing risk retentions by larger local companies are partially driven by the regulatory allowance for claims equalization reserves. The reserves must be set up by all companies in operation for five years and over. Retentions on any one risk must not exceed 25% of total technical reserves and own capital, although the regulator can approve a higher figure in justifiable cases.

While there are no specific catastrophe risk related regulatory requirements, as part of Solvency II calibration tests (QIS IV), the Insurance Regulator asked companies to include in their solvency calculations catastrophe risk scenarios for flood and hurricanes with a 200-year return periods. Further market stress tests are planned by the Regulator this year, which inter-alia will include major catastrophe risk scenarios and validation of the modeling methodology used by insurers.

Since 1997 floods, the government has been trying to limit land development in flood prone areas and has been investing heavily into flood protection infrastructure. For instance, in March 2007, country borrowed USD 189 million from the World Bank for the Odra River Basin Flood Protection Project. The main development objective of the project is to protect the population in the Odra basin against loss of life and damage to property caused by severe flooding. This will be achieved by reducing the extreme flood peaks through storage in a dry polder on the Odra river, just upstream of Raciborz town, enabling a reduction of the flood peak downstream of the reservoir, and by increasing the flood carrying capacity of the Odra river channels through and around Wroclaw. The project would protect more than 2.5 million people in towns such as Raciborz, Kedzierzyn, Kozle, Krapkowice, Opole, Brzeg, Olawa and Wroclaw, and settlements in the three vovoidships of Slaskie, Opolskie and Dolnoslaskie.

Government post-disaster safety nets

Since 1997, the government allocates PZN 753 million (€171 million) in its annual budget for emergencies. The funds can be used for (a) disaster risk prevention activities, such as flood protection works; (b) liquidation of property damages caused by natural disasters through financial assistance to local governments for housing or infrastructure reconstruction; and (c) post-disaster assistance to individuals. The latter can be eligible for small grants (up to €1500) to pay for living expenses incurred due to natural disasters or housing reconstruction grants. Although there is no official limit on the size of individual reconstruction grants, the ultimate decision on the individual eligibility and the amount of reconstruction assistance rests with local government officials. There appears to be a considerable room for government discretion in making such decisions as the eligibility for government assistance is linked to the demonstrable deterioration of living conditions as a consequence of a natural disaster. On average it takes up to 1 month for the funds to reach the beneficiaries, which is relatively quick by international standards.

Currently, the Ministry of Interior, which is in charge of allocating post-disaster aid in Poland, is working on the first draft of a compulsory catastrophe insurance law, which will make flood insurance compulsory for all homeowners in the country. At the moment, only rural dwellings are subject to this requirement. Under the proposed plan, the two state-owned companies – PZU and Warta- will offer a stand-alone flood insurance policy to homeowners, which will be made compulsory by the proposed catastrophe insurance law. The risk will be then partially retained by the companies and partially reinsured in the international reinsurance market. No special risk pooling mechanism is envisaged under the plan.

SLOVAKIA

Catastrophe insurance market overview

Country disaster risk profile

The Slovak Republic has minimal exposure to earthquake risk, and is not considered to be an area of particular hazard. The four seismic stations in Slovakia associated with the Geophysics Institute occasionally record weak tremors below Richter 4. The latest recorded earthquake occurrence was registered in eastern Slovakia on 21 May 2003. The tremor measured 4.2 Richter and damaged more than 120 of the 135 houses in one village. The insured damage is not known, but Allianz Slovenska stated that some policies only pay when the tremor exceeds 5 or 6 Richter.

Traditionally the Slovak Republic was considered a greater flood risk than the Czech Republic. Floods occurred when rivers overflowed due to water from melting snow or exceptional rainfall and endangered areas along the river valleys in the lowlands. However, after the disastrous floods in 1964 a system of dams and dykes was built on the Danube in Slovakia and Hungary in order to prevent the recurrence of a similar event. The small losses in Slovakia in summer 2002 seem to indicate that the flood control system is now quite effective and that the country's hazard risk profile has been reduced considerably.

Floods following heavy rain have occurred in recent years, but damage has been significantly lower than in Austria or the Czech Republic. In July 1998, flooding rivers devastated villages and Romany camps in both the Czech and the Slovak Republics. In Slovakia, this resulted in the loss of at least 44 lives. Around 2,500 insurance claims were filed and approximately SKK 54mn (USD 2.81mn) claims were paid.

In 1999 and 2000, there were more occurrences of floods and severe rain damage. These events were less severe than the 1998 floods. Areas in eastern Slovakia with low concentration of domestic or commercial risks were the most affected.

The disastrous floods of summer 2002 caused greater devastation in the Czech Republic and other countries than in Slovakia. Bratislava was in a state of emergency for eight days in August, however. Preventive measures including sandbags and evacuation were effective, and there was only one fatality. It was the highest water level in Bratislava for 65 years. The Slovak government estimate of total economic damage from this event and earlier floods in March and July was SKK 1.8bn (USD 93.654mn). Insured damage was relatively light as many affected dwellings were not insured: the insurance association estimated a market loss of SKK 140mn (USD 7.28mn). In 2004, the National Contact Centre for Civilian Security registered nine flood events, the biggest ones in July in the Kosice and Presov areas. The insured loss was insignificant.

AON-Benfield (a reinsurance broker) has the only fully probabilistic model in the country, which has been available since 2003. The also can help clients to calculate their

probable maximum losses for insured portfolios for the purpose of placing reinsurance coverage. Despite the increasing competition, so far the average market loss ratio for property has been rather low as Slovakia typically remains unaffected by windstorms such as Emma which frequently cause considerable property damages in Austria and the Czech Republic. A full probabilistic flood model has existed.

Hazard Insurance

In contrast to Poland and the Czech Republic, where property owners cannot opt out of natural perils coverage, in Slovakia coverage for all major natural perils, including flood, earthquake, hail, wind, burden of snow and landslide is optional and can be obtained for an additional premium in addition to the standard insurance package of FLEXA perils. As a result of this consumer discretion over the scope of coverage, over 30 percent of insured homeowners opt out of the catastrophe insurance coverage. A similar percentage of SMEs – 30 percent - with general property insurance coverage do not have optional flood and earthquake endorsements. Yet, the estimated level of catastrophe insurance penetration in Slovakia is still relatively high – about 51 percent of all homes (e.g., 0.952 million dwellings) are covered against catastrophic perils. This can be considered quite an achievement for a country where insurance coverage was quite low even 20 years ago. There is potential for further expansion due to the growing segment of mortgage-financed construction, which is 100 percent insured due to lenders' requirements.

Deductibles for natural perils are virtually non-existent or very small. Instead, since the floods of August 2002, insurers typically use sub-limits of about of 20-30 percent of sums insured under the FLEXA policy. Some insurers check the loss history for new risks and exclude flood altogether if a risk had a flood loss within the last 10 years.

Replacement is the basis for indemnity of property damage most of the time; very occasionally, cover is placed on a "book value" basis.

No indications of premium rates are available, since they can vary widely depending on the area where flood coverage is requested.

Insurers track the flood risk mainly for insured properties in low-lying areas close to rivers and for the earthquake risk by CRESTA zone. Following the 2002 floods, many companies are now looking into acquiring more sophisticated flood risk accumulation control tools. In response to the growing interest from the market in flood modeling tools, Benfield has produced a flood reinsurance model mainly to calculate aggregate risk exposures and probable maximum losses from events with different return periods. Swiss Re has been working with the Slovak Insurance Association and a software company to develop a rating model for floods in Slovakia, which can also allow monitoring aggregate risk exposures and estimating probable maximum portfolio losses. The model is very similar to that developed by the company for the Czech Republic.

Large companies appear to track their aggregate accumulations and use modeling tools to determine their PMLs. A return period of 250-years is used for internal risk management purposes in calculating insurers' own risk exposures.

The existing *Aquarius* model now allows calculating probable maximum portfolio losses in each of four flood zones for different return periods. It has been almost 50 years since there was a major flooding incident when the Danube burst its banks. Since then a dam has been built to contain any future loss exposure. In response to the flood management regulations, a national program has been set up to reinforce flood prone areas and build dykes and dams where necessary.

Government Risk Financing

The Ministry of Environment of the Slovak Republic is the main government body responsible for flood control. The budgetary appropriations for flood management and post-flood recovery are made under the budgetary chapter Všeobecná pokladničná správa (General Treasury Administration) which is administered by the Ministry of Finance.

The Law of the National Council of the Slovak Republic Nr. 42/1994 Z.z. (and in the wording of subsequent directives) regarding the civil protection of the population defines an extraordinary event as natural disaster, accident, catastrophe or terrorist attack. Since the time the law has been adopted, flood is always classified as a natural disaster.

The Ministry of Environment is responsible for preparing an annual flood damage report. The report serves as a basis for budgetary allocations for rescue and relief work as well as for post-disaster reconstruction and prevention. The government disaster risk financing mechanism typically involves a budgetary transfer from the Ministry of Finance to the Ministry of Environment (or other government agencies involved in disaster relief or rehabilitation work), which in turn make the funds available to the final beneficiaries-municipalities, regional environment administration offices, and state-owned hydropower stations. The regional offices of the Ministry of Environment further allocate the funds to villages and private citizens.

The existing national legislative framework for disaster risk management and financing is described in the following legislation:

1. Law Nr. 666/2004 on flood prevention;
2. Decree Nr. 386/2005 issued by the Ministry of Environment on monitoring flood related damages and undertaken response measures;
3. Decree Nr. 387/2005 by the Ministry of Environment evaluation of damages and compensation of flood-related damages.

Typically, it takes at least half a year to get the aid to the flood victims. Ministry of Environment does not provide any additional resources besides those envisaged under the above described budgetary allocation from the Ministry of Finance.

Provision of post-disaster subsidies is not contingent upon availability of private insurance.

There is no maximum pre-set in advance amount of financial assistance to victims of disasters and no means testing requirements.

HUNGARY

Catastrophe insurance market overview

Country disaster risk profile

Hungary's risk exposure to natural perils is by-and-large limited to earthquake and flood. But even then the country's overall economic exposure to these perils is rather moderate.

Hungary's exposure to earthquake results from the compressive motions of the Eurasian and African plates, which elevated the Carpathian Mountains to the north and east of the great Hungarian Plain (see Figure 1 below).

A relic of past crustal movements can also be seen in the long-extinct volcanoes on the northern shores of Lake Balaton. Earthquake is regarded as a minor hazard by most of the local companies, though the risk appears to be under-estimated and therefore under-rated. The local market works on the assumption of a moderate earthquake every 30 to 35 years and a severe earthquake every 90 years.

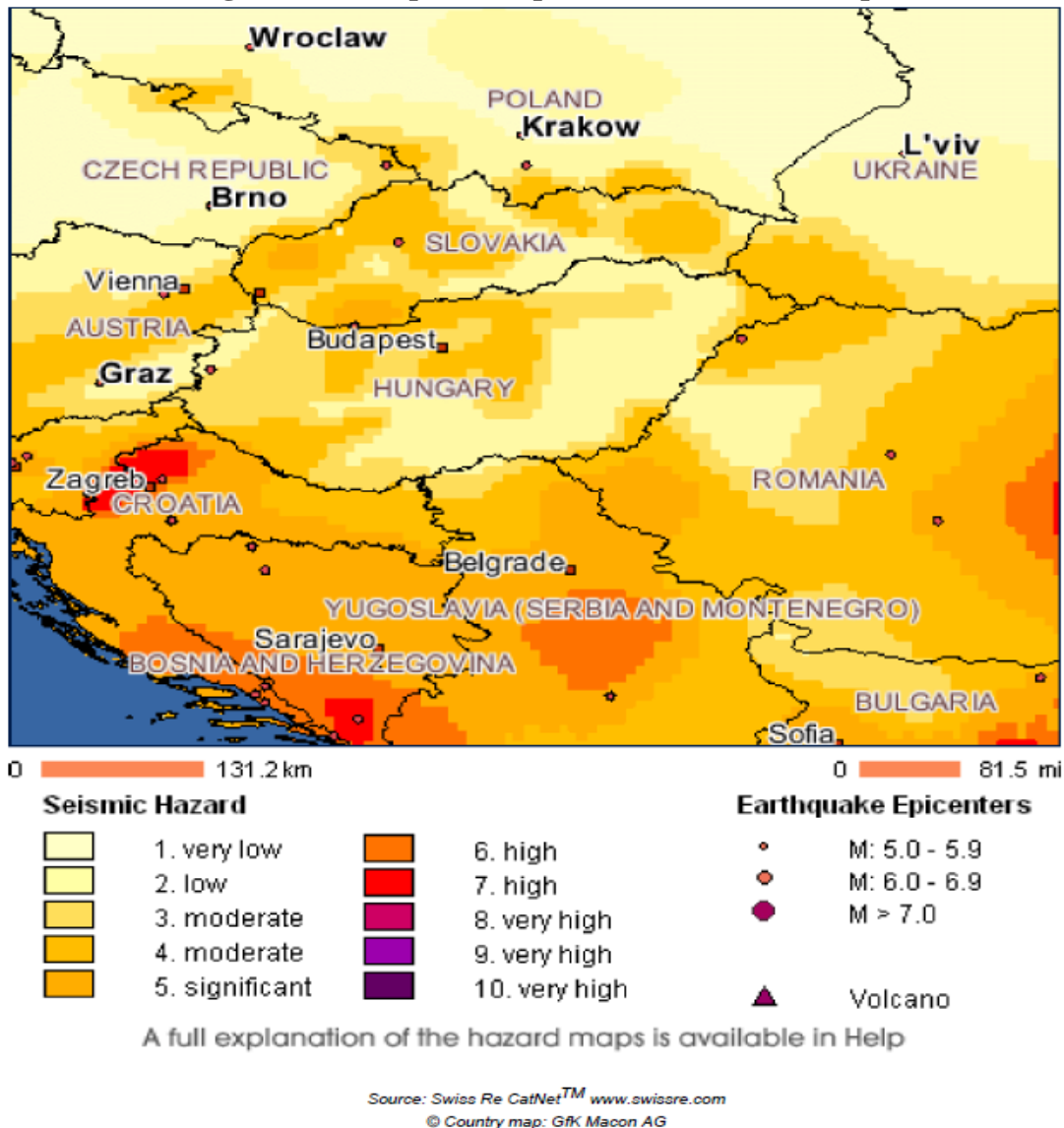
There is an earthquake construction code which applies to concrete slab and steel frame and concrete buildings. Most buildings in Hungary either pre-date the code, however, or are not covered by it. There is said to be a Richter 5 event every year, but damage is usually negligible. Recorded events in excess of intensity 5 from 1917 onwards are listed below:

Table 1. History of sizeable earthquakes in Hungary

Date	Area	Magnitude	Intensity
1978	Bekes	n/a	6.5
1956	Dunaharaszti	5.1	8.0
1956	Pakscz	4.2	6.0
1953	Ukkurje	4.0	6.5
1951	Tereske	4.4	7.0
1942	Bekonybel	3.6	6.0
1942	Tapiosuly	4.1	6.0
1939	Almoso	4.5	5.5
1939	Eger	3.0	6.0
1937	Tarcal	4.2	6.0
1934	Bucuszentlászlg	4.5	6.5
1931	Bregdaroc	4.0	6.0
1930	Cserharsurame	3.9	6.0
1927	Varpalcta	3.4	7.0
1927	Varpalcta	3.7	7.0
1925	Eser	5.2	8.5
1925	Naskanizza	4.3	6.5
1922	Pecs	3.8	5.5
1917	Gasztany	4.0	6.0

Source: AXCO, 2009

Figure 1. Earthquake map of South Eastern Europe



The last significant event was in 1985 in the area north of Lake Balaton. The estimated loss was HUF 200mn (approximately USD 2.4mn) falling mainly on the household account.

Hungary's risk exposure to floods arises from the presence of two main rivers on its territory – Tisza flowing through Szeged and the Danube that flows through Budapest. The country's flood plain areas are estimated at 5450 sq. km., out of which 900 sq. km. were flooded in 2006.

In more distant past Hungary suffered a number of catastrophic floods, two of the most notable being the Danube flood of 1838 which destroyed Pest and the Tisza flood of 1879 which destroyed Szeged. Such major events have been largely eradicated, however, by river improvement schemes and the building of dikes to create flood basins along the

courses of the major rivers. The success of these measures was dramatically proven in April 2006 when the Danube rose to its highest level for nearly 150 years but caused almost no insured flood losses. The river Tisza in the east of the country produced severe floods in March 1999, 2000 and 2001 but insured losses were low.

Table 2. Hungary's flood exposure

	Hungary [km ²]
Size of morphological floodplain ⁽¹⁾	5,450
Size of recent floodplain	900
(loss in %)	(85%)
Flooded in 2006	882
Artificial polder opening	0
Potential restoration area	700 ⁽²⁾
	80 ⁽³⁾
Flooded potential restoration area	60
(% of total potential restoration area flooded)	(8%)

¹ Floodplain only, without groundwater influenced areas

² Vasarhelyi Plan

³ Bodrog mouth

⁴ Novi Becej, and Bodrog mouth identified in GEF study

Source: AXCO Country Report, 2009.

Hungary's floods are normally caused by rainfall and snow-melt in the Carpathian and Tatra mountains, outside Hungary itself. The most exposed areas are the northern reaches of the Tisza where it enters Hungary from the Ukraine, the Koros where it enters Hungary from Romania, and the southern reaches of the Tisza after its confluence with the Koros. There is also a risk of flooding from the Danube south of Budapest. Altogether, an estimated two million hectares of land are exposed to 1:100 year flooding. Between 1999 and 2001 there was a marked increase in severe flood incidents in the east of the country.

Flooding on the upper reaches of the Tisza in 1999 was regarded as a 1:100 year event, and yet the flood level in March 2000 was nearly 20cm higher. In a further incident in March 2001 the level of the Tisza rose by 8m in a day as a result of melt-water from the Carpathians coinciding with unusually heavy rains. This increase in flood incidents is said to be the result of deforestation in the Tatra Mountains increasing the amount of rainwater run-off. Flood waters draining from central Europe in August 2002 and April 2006 raised the Danube to dangerously high levels, but the embankments in Budapest held and insured flood losses further down-river were negligible. As a result of recent incidents the government has initiated a 10-year flood improvement plan for the Tisza. Overflow channels are being dug and dikes heightened to 1m above the level of the highest recorded flood.

The local insurance market however does not see the flood PML as being significant, even in the event of the Danube and Tisza rivers flooding simultaneously. One reason for a low PML is the fact that the most flood-prone rivers, the Tisza and the Koros, flow through agricultural areas where insurance penetration is low and there is relatively little industrial development. Insurers have also taken comfort from the fact that recent floods have been relatively localized and have affected different stretches of the Tisza valley each year. In 2001, for example, only four villages were inundated. Insurers are also protected by restrictive policy wordings, which exclude non-flood-protected properties, and by specific underwriting measures, such as the exclusion of properties of mud brick construction. The overall insured loss statistics for the last decade is summarized in Table 3 below.

Table 3. Insured flood losses

Flood date	Total losses	Insured losses
March 1999	HUF 82bn/USD 345.8mn	Not known
March 2000	Not known	HUF 500mn/USD 1.8mn
March 2001	HUF 23bn/USD 80.3mn	HUF 3.2bn/USD 11.2mn

Source: AXCO Report, 2009.

Most damage was caused to roads, bridges and village houses. A surprising feature of the floods was the number of total loss buildings claims. These arose because many rural homes are built of mud brick which can become saturated and unstable after prolonged exposure to standing water.

Hazard insurance

At the time this report was being prepared there were 30 insurance companies supervised in Hungary, of which 10 were non-life, 10 life and 10 composite. A total of 11 branches have been established by EU insurers on a freedom of establishment basis, though most of these are inactive. Non-life insurance is also written by 34 insurance associations which are mainly active in agriculture and motor. Every insurance company except the state export credit insurer is foreign-owned. The market is dominated by Allianz Hungaria, which retains a market share of around 35 percent.

An unusual feature of the Hungarian property insurance market is the high level of penetration of household business. According to our estimates, in 2009 the local insurers held around 2.9 million residential property policies in their portfolios, which represents a penetration rate of over 70 percent of households. OTP Garancia, Generali-Providencia, Aegon and Allianz Hungaria have all in excess of 500,000 household policies on their books, which accounts for a high proportion of their catastrophe accumulations. As catastrophe insurance coverage is typically offered by the local market as part of the all-risk property policy at a very competitive rate, very few homeowners (around 5 percent) opt out of it. In fact, it appears that such opting out of the natural hazards coverage is only possible in the case of smaller insurance companies which use this feature to remain competitive. Such a high level of property insurance coverage among

households can at least be partially explained by the mandatory insurance coverage requirement introduced by local banks for all new mortgage borrowers. In response to the government interest rate subsidies for new mortgage borrowers, the mortgage lending market grew rapidly between 2002 and 2006, hence driving up the level of property insurance penetration among the Hungarian homeowners. The recent phasing out of mortgage subsidies has reduced the amount of household new business, and insurers are now trying to increase their premiums per policy by selling assistance, legal protection, life and personal accident riders.

A typical comprehensive policy includes the perils of fire, lightning, explosion, aircraft, storm, hail, weight of snow, landslide, collapse of underground cavities, impact by vehicles, cloudburst, flood, earthquake, burst pipes, burglary and glass breakage. Flood wordings generally exclude damage to houses built of mud brick and houses situated between river banks and flood protection dikes. Policies are normally issued on a reinstatement basis and sums insured are index-linked. Many policies specify the level of security protections required for varying sums insured. "Condominium" policies are available to provide collective insurance on the buildings of apartment blocks.

The earthquake peril includes earthquake fire, landslip and collapse following subsidence. Most companies define earthquake as "shaking reaching the fifth degree on the MSK-64 scale", and thus avoid liability for damage to buildings with inadequate earthquake resistance.

Although there are virtually no deductibles, earthquake is insured either on a replacement or cash value basis and with a sub-limit above the sum insured specified in the contract – typically up to USD25,000, e.g. if aggregate losses from flood or earthquake exceed that amount, individual property damage claims are scaled down proportionately, based on sum insured. While earthquake insurance is almost universal for foreign-invested enterprises and householders, penetration is lower for Hungarian enterprises, but it is still estimated that 80 percent of industrial risks are covered against earthquake. Our survey of the market indicates that there are about 300,000 all-risk property insurance covers for SMEs in Hungary.

Household earthquake rates are the same across Hungary, whereas industrial rates can vary by region. Because of intense competition, most insurers charge inclusive fire and perils rates with only a minimal allocation of premium for earthquake.

In addition to earthquake, all-risk residential property policies cover two types of flood, namely cloudburst and flood. Cloudburst is defined as damage caused by standing water resulting from excessive rainfall, excluding the effects of rising ground water. Flood is defined as the "overflow of any permanent or seasonal, natural or artificial waterways, lakes, ponds or reservoirs which inundates flood-protected areas". The limitation to flood-protected areas effectively excludes properties located in the flood basins between riverbanks and dikes, as well as properties which are not protected by dikes or embankments. Insurers generally survey flood-exposed properties within 15km of a river and exclude those for which the risk is unacceptably high. Some companies automatically

decline risks in areas around the upper reaches of the Tisza which were affected by flooding in 1999 to 2001. Others take the view that since the floods occurred in different places in different years, the average incidence of risk along the Tisza remains acceptable. Some insurers decline mud-brick houses in flood-prone areas because prolonged exposure to standing water can lead to structural failure. Similarly to earthquake, flood is insured on a replacement value basis, with losses subject to a sub-limit above the maximum loss threshold specified in the insurance policy. It is estimated that approximately 95 percent of household policies and 80 percent of commercial policies are extended to include flood.

Flood is included in the overall special perils rate, which is the same across the country.

A Law on Social Flood Insurance (popularly known as the *Miklos Wesselenyi Law* after a 19th century Hungarian river regulator) was passed in August 2003. The law authorized the establishment of a state-backed flood insurance fund for the benefit of homeowners who are unable to obtain commercial flood insurance because their properties are situated in unprotected flood plains. The fund provides maximum cover of HUF 15mn (USD 87,057) per property and compensation is available to any eligible homeowner who elects to pay premiums. The fund is administered by the state and there is no involvement by the commercial insurance sector.

The main purpose of the Miklos Wesselenyi Flood Protection Fund is to save the government from having to make *ex gratia* payments to uninsured flood victims. Because many of those who live on unprotected flood plains are poor farmers with low insurance consciousness and below-average incomes, the number of people buying protection from the fund is virtually zero. It therefore seems that the main beneficiaries of the scheme will be the insurance companies, which will no longer be under political pressure to underwrite flood risks in exposed areas.

Rating levels are low, largely because of the need to remain competitive. A typical buildings rate for an all-perils-policy, which would be applied throughout Hungary, is 1.06‰. Some companies however make an effort to charge Contents rates are 1.5‰ in the country but up to 3.6‰ in Budapest because of the higher burglary risk. Policies are normally issued with nil deductibles.

The average household premium in 2006 was HUF 25,000 (USD125) and of earthquake cover is HUF 2000 (about USD10). Average limits reach US100,000 for residential and USD 400,000 for commercial properties.

Risk accumulations are monitored on a postcode basis. All companies are said to base their catastrophe PMLs on a severe earthquake affecting Budapest, though there is no generally accepted earthquake model for Hungary and therefore no consensus about the appropriate level of catastrophe protection. Some models produce PMLs which seem unrealistically high, whilst others produce PMLs which are unaccountably lower. Companies which have either produced or are working on Budapest earthquake models include Munich Re, Equecat, Benfield Group and Aon Re.

The companies are also required to report their risk aggregates for earthquake and flood to the local insurance regulator.

Since most of the local companies are foreign owned, most of reinsurance is placed with the parent companies.

Government Risk Financing

According to the Ministry of Local Governments and National Directorate General for Disaster Management the government annually allocates HUF 3-4 billion to the national Force Majeure Fund. The fund proceeds are used for the purposes of reconstructing government owned assets destroyed by natural disasters. The size of the fund can be increased by a government decree. In addition to the central FMF, all local and regional governments must be allocated at least 2-3 percent of their annual budgets for emergency situations. There are 19 counties and 3200 Local Government offices.

Government financial assistance to homeowners that have been adversely affected by natural disasters is not predicated upon a proof of insurance.

Typically, it takes 2-3 weeks from the declaration of a national disaster by the government for the aid from the Calamity fund to reach disaster victims. Local government offices perform the role of a payment agent.

The County Disaster management Office and insurance companies are involved in evaluating the extent of loss. There is no statutory maximum amount of financial aid to be paid per household and amount of assistance may vary significantly from one catastrophe event to another based on the government assessment of overall economic damages from a disaster. Unused funds in the National Calamity Fund can be carried forward in addition to the new budget.

CHAPTER II

CONCLUSIONS

Despite considerable risk exposure to natural disasters the existing risk financing mechanisms in the countries of Central Europe are relatively well advanced to mitigate the consequences of large catastrophic events. Several recommendations emerge from this study. They are intended to guide government policymakers in developing and applying national and regional disaster risk financing strategies, suggest ways in which Bank staff and managers can better address catastrophe risk financing in their dialogue with clients, and provide information and ideas that may be of value to other stakeholders, such as international donor organizations, NGOs, academics, and the general public.

Lessening the impact of natural disasters on government budgets. Despite a relatively high level of insurance penetration in CE countries, governments still carry a considerable budgetary exposure to catastrophic floods. The current regulatory frameworks in the Czech Republic and Poland, for instance, make it a government obligation to assist homeowners in post-disaster recovery and reconstruction efforts. Moreover, in the case of 1997 flood, the Czech government paid an equal compensation to both insured and uninsured homeowners for equity reasons. The post-disaster compensation was funded by additional government borrowing.

This approach to disaster compensation does not seem to optimal. In the case of disaster compensation, governments should clearly find a way to separate between public and private liabilities. While the reconstruction of the former is clearly the government responsibility, the latter should be covered by private insurance. This is particularly the case when such insurance is widely available and quite affordable. To this end, the governments of CE countries may consider changing the existing post-disaster compensation policies for housing reconstruction by introducing a strong element of private responsibility for losses inflicted by natural disasters. Such a policy change is likely not only to considerably increase insurance penetration among homeowners but also will help significantly reducing government fiscal exposures to natural disasters.

Reducing the financial vulnerability of homeowners and SMEs to natural hazards. While the study documented rather high levels of catastrophe insurance penetration among homeowners and SMEs in CE countries, almost 50 percent of population still remains uninsured. In this context, the governments of CE should consider investing in increasing public risk awareness as well as changing the post-disaster compensation policy (see above). In addition, those CE countries which have a lower level of property insurance coverage among homeowners should consider introducing a stand-alone catastrophe insurance to homeowners and small business owners, which can be backed by a dedicated reinsurance capacity at the country or in the case of smaller economies (such as Slovakia) at the regional level. As has been demonstrated by the international experience, such programs can provide highly affordable coverage by realizing the benefits of country-wide risk diversification, economies of scale and the ability to obtain better pricing terms

from the global reinsurance market. The first country wide catastrophe risk pool in an emerging market known as the Turkish Catastrophe Insurance Pool (TCIP) has been pioneered and successfully launched with Bank's assistance by Turkey in 2000. The work on a similar program for the countries of South Eastern Europe has reached a fairly advanced stage. Once created, the SECE CRIF will enable insurers selling a stand-alone catastrophe insurance cover to receive access to a dedicated reinsurance capacity on highly attractive terms.

Enhancing the ability of local regulators to assess the solvency implications of insurers' catastrophe risk exposures. Although the study documented a considerable level of technical sophistication on the part of CE insurance supervisors in monitoring and regulating insurers' risk exposures to natural disasters, the capacity of CE insurance regulatory bodies in catastrophe risk management would benefit from further investments in regulatory (risk assessment and monitoring) tools and specialized staff training.