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Earthquake Insurance in Turkey



History of the Turkish Catastrophe Insurance Pool

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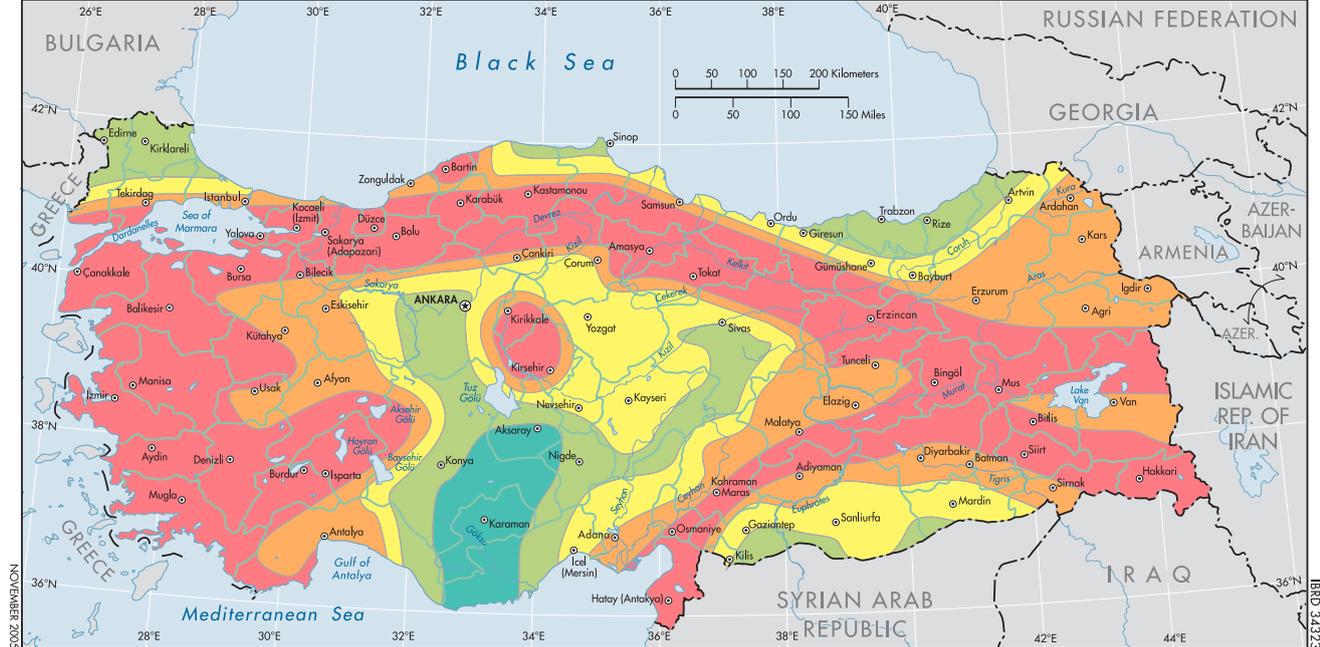
*Note: This seismic hazard map of Turkey divides the country into five risk zones, with potential hazards ranging from 1, the highest, to 5, the lowest, reflecting an evaluation of seismic activity, faults, and earthquake history (figure 2.4). These zones bear no relation to administrative divisions or geographical characteristics.

TURKEY SEISMIC HAZARD ZONES



- PROVINCE CAPITALS**
- NATIONAL CAPITAL
- RIVERS
- PROVINCE BOUNDARIES**
- INTERNATIONAL BOUNDARIES

**Province names are the same as their capitals.



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Eugene Gurenko
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THE WORLD BANK
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Piotr's vision of integrated disaster risk management for
Turkey, in which catastrophe insurance received proper
recognition, has become the World Bank's model of
emergency assistance to disaster-prone nations.*

Introduction

Turkey is located in one of the most active earthquake (EQ) and volcanic regions in the world. More than 95 percent of the country's land mass is prone to earthquakes. Large-scale earthquakes can occur at any time in areas that encompass 70 percent of the population and 75 percent of industrial facilities. Since 1894, direct property and infrastructure losses arising from earthquakes have frequently exceeded \$5 billion (current US\$) and, in the case of the 1939 Erzincan earthquake, have reached \$23 billion.

With a majority of the population living in these earthquake-prone areas, the persistent potential for large-scale natural disasters has become a fiscal and social issue for the Turkish government. This issue led to the establishment of the Turkish Catastrophe Insurance Pool (TCIP) in 1999. Aside from fiscal exposure, the main rationale for the creation of TCIP (DASK in Turkish) was a very low level of catastrophe insurance penetration among households. Modeled on the California Earthquake Authority (CEA) and the New Zealand Earthquake Commission (EQC) but adapted to local realities, the TCIP is a public sector insurance entity providing catastrophe risk insurance for Turkish homeowners. A genuine public-private partnership (PPP), the TCIP has no public employees. All of its business functions—from sales to reinsurance to claim management—are subcontracted to the private insurance industry. The government's role is limited to providing contingent liquidity support in excess of the TCIP's overall claims-paying capacity. This support would only be triggered by

an event equivalent to an earthquake in Istanbul with a 200-year return period (technically, an earthquake with an exceedance probability of 0.5 percent).

The TCIP commenced operations in September 2000 in the aftermath of yet another devastating earthquake—Marmara in 1999. The four principal objectives of the program are to (1) provide earthquake insurance coverage at affordable but actuarially sound rates for all registered urban dwellings, (2) limit the government's financial exposure to natural disasters, (3) build long-term catastrophe reserves to finance future earthquake losses, and (4) encourage risk reduction and mitigation practices in residential construction.

Since the program began, insurance penetration for catastrophe coverage has more than tripled. Providing coverage to approximately 2 million Turkish homeowners (16 percent of the insurable housing stock), TCIP is now the largest insurance program in the country.¹

In only five years, the program built approximately \$200 million in its own reserves and secured nearly \$1 billion in total claims-paying capacity, primarily from the international reinsurance market on competitive terms. In addition, since its first reinsurance placement, and despite a hardening reinsurance market, the program achieved a 35 percent reduction in its reinsurance rates by the 2005 underwriting year.

The program has reduced significantly the government's fiscal exposure to EQ risk. In the wake of several small and medium-scale earthquakes over the last few years, the TCIP demonstrated its ability to pay claims quickly and fairly. It has promptly settled 6,000 claims amounting to \$6 million. Because of its low cost structure and well-managed reinsurance costs, the TCIP can provide EQ insurance coverage with a limit up to \$50,000 at an average annual premium of \$46. This price makes catastrophe insurance affordable for low-income urban homeowners.

The TCIP has realized cost efficiencies through introduction of a state-of-the-art underwriting information technology system driven by an Internet-based platform. This system allows over 10,000 insurance agents countrywide to access the TCIP's production system in real time. The introduction of the IT system enabled the TCIP to reduce the cost of issuing a TCIP policy to the lowest in the industry. Simultaneously, the

program receives real-time financial and risk accumulation data for all business written.

The TCIP has produced a massive shift in the public's awareness of EQ risk through a public information campaign, one facet of which is introduction of the concept of EQ risk management and insurance in school textbooks. In addition, the program has provided incentives for local builders to comply with construction codes, because it provides no insurance coverage for buildings without valid construction and occupancy permits.

In five years, the TCIP transformed itself from an unknown and controversial government-sponsored program to one of the most trusted brand names in the Turkish insurance industry. Moreover, it has led the World Bank to rethink the roles of ex-ante risk management relative to ex-post donor support. Turkey has received numerous emergency and rehabilitation loans from the World Bank and other donors to address its post-disaster reconstruction needs. Yet, as is now recognized, this type of lending has limitations:

- Because of country exposure limits and limited resources in an increasingly risky world, the World Bank and other multilateral institutions could not provide all the liquidity needed after catastrophic events.
- Due to their generally large size, emergency loans tend to crowd out other important lending programs, which have to be further postponed or considerably reduced in size.
- Excessive government reliance on retroactive lending and emergency donor relief can no longer be considered sustainable given that ex-post mechanisms have the potential to create a hazard moral climate and reduce incentives for active risk management.

In this context, the World Bank supported Turkey's earthquake insurance program to establish and expand national catastrophic risk management and risk transfer capabilities. The actual mechanism was a component of the Turkey Marmara Earthquake Emergency Reconstruction (MEER) Emergency Response Loan, negotiated after the 1999 Marmara event. Two of the authors of this book had undertaken some fortuitous preparatory work under the Turkey Emergency Flood

and Earthquake Recovery Project operation, which followed an earlier earthquake.

The MEER project financed two major activities: (1) technical assistance to the General Directorate of Insurance in establishing the TCIP and ensuring its operational efficiency and financial soundness for the first five years of its existence and (2) initial capitalization of the TCIP through a contingent loan facility. The project was the first World Bank project to introduce a comprehensive disaster-management framework that integrates financial risk management, disaster mitigation, and emergency preparedness. For the first time in the Bank's history, 50 percent of an emergency loan was directed to future-oriented investments in disaster mitigation, emergency preparedness, and financial risk transfer.

The TCIP's success has brought it worldwide recognition. Inspired by the TCIP's example, more than a dozen countries, including China, Colombia, Greece, India, the Islamic Republic of Iran, Italy, the Philippines, Romania, and nine island states of the Caribbean have begun technical and legislative preparation of catastrophe insurance programs. Taiwan (China) and Indonesia have recently introduced pooling and risk transfer arrangements.

Note

1. In Istanbul the program achieved insurance penetration on the order of 30 percent.

Abbreviations

AAL	average annual loss
CEA	California Earthquake Commission
DFA	dynamic financial analysis
ECA	Europe and Central Asia
EQC	New Zealand Earthquake Commission
ERL	Emergency Recovery Loan
GDI	General Directorate of Insurance
GSM	global system for mobile
HD	highly developed
HP	Hewlett-Packard
IBNR	[claims] incurred but not reported
IS	information system
IT	information technology
km	kilometer
LAN	local area network
LD	less developed
LEC	loss exceedance curve
M	magnitude
m	million
MEER	Marmara Earthquake Emergency Reconstruction
NAF	North Anatolian Fault
PML	probable maximum loss
PPP	public-private partnership

RAS	Riunione Adriatica di Sicurta
Res	residential
ROL	rates on line
SMS	short message service
SOE	state-owned enterprise
SSL	secured socket layer
TCIP	Turkish Catastrophe Insurance Pool
TEFER	Turkey Emergency Flood and Earthquake Recovery Project
TL	Turkish lira
WAN	wide area network
YTL	Yeni Türk Lirasi (1 YTL = 1 million TL)

Unless otherwise noted, all monetary denominations are U.S. dollars.

The Making of the Turkish Catastrophe Insurance Pool: Risk Reality and Risk Perception

Earthquakes in Turkey killed at least 18,000 people and left hundreds of thousands homeless between 1992 and 1999 alone (World Bank 2000). The most severe event occurred on August 17, 1999, as most of the country slept. A 7.4 magnitude (M) earthquake struck along the Anatolian fault in the northwest region of Turkey. Lasting 45 seconds, the event, with an epicenter 11 kilometers southeast of the industrial city of Izmit, was the largest to damage an industrialized area since the 1906 San Francisco and the 1923 Tokyo earthquakes (Erdick and Durukal 2002). The event resulted in the collapse of approximately 20,000 buildings, displacing more than 250,000 people and leading to an estimated 17,000 fatalities and 44,000 injuries.

Turkey's Exposure to Earthquakes

Since the Erzincan earthquake of 1939, which left 32,000 dead and 230,000 homeless, the Marmara event was the eleventh earthquake with a magnitude greater than or equal to 6.7 (see box 1.1). The probability is high that the Istanbul metropolitan area will experience an event with significantly more intense ground shaking than that of Marmara within the next 30 years (Bibbee et al. 2000).

Box 1.1 Source of Seismicity in Turkey

Most earthquakes in Turkey are a result of tectonic movement. The bulk of the Turkish landmass is located on the small Anatolian plate, which is caught by the major Eurasian, Arabian, and African plates, respectively. The northward movement of the latter plates against the relatively stable Eurasian plate squeezes the Anatolian microplate westward along the northern Eurasian plate. Earthquakes result from the ensuing collision along the North Anatolian Fault (NAF) zone. Similar in dimension and activity to the San Andreas Fault, the NAF zone constitutes the northern boundary of the Anatolian plate. The southeastern boundary of the microplate is formed by the northeast-trending East Anatolian Fault, which joins the more eminent northern fault at Karliovo.

The horizontal movement of the Anatolian and Eurasian plates against one another creates a pressure buildup over a long period that can be relieved only through earthquakes. These often simultaneously transfer pressure to other points in the fault system. Frequently, earthquakes along the Anatolian fault system originate near the surface, which makes them more intense and devastating.

Historical Seismicity

Located in one of the world's most seismically active continental regions, Turkey has a long history of frequent and destructive earthquakes. In the twentieth century Turkey endured approximately 111 earthquakes with a magnitude of more than 5.0 on the Richter scale (table 1.1). Fifty-five earthquakes of a magnitude higher than 6.8 occurred between 1932 and 1999, resulting in significant loss of life and damage to physical structures (Ambraseys 2002).

The more stable part of central Turkey has relatively few earthquakes, whereas the East Anatolian Fault Zone has moderate seismicity. The NAF zone has been the source of many damaging earthquakes during the twentieth century: 12 earthquakes ranging in magnitude from 6.5 to 7.9 have occurred in this zone over the last six decades.

Vulnerability of Residential Construction to Earthquakes

Most damage caused by earthquakes, especially to buildings, can be directly attributed to the effects of ground shaking induced by the passage

Table 1.1 Significant Seismic Activity during the Twentieth Century

Rank	Country	No. of fatal earthquakes in 20th century	Total fatalities	No. of earthquakes killing more than 1,000 people	No. of earthquakes killing more than 10,000 people	No. of earthquakes killing more than 100,000 people
1	China	170	619,488	21	7	2
2	Japan	84	169,525	10	1	1
3	Italy	45	128,031	6	2	
4	Iran, Islamic Rep. of	89	121,513	16	4	
5	Turkey	111	99,391	17	2	
6	Peru	62	76,016	3	1	
7	USSR (former)	44	75,813	8	3	
8	Pakistan	14	65,984	2	1	
9	Indonesia	66	43,992	5	2	
10	Chile	35	36,332	4	1	
11	India	21	33,329	3	3	
12	Venezuela, RB de	16	30,795	1	1	
13	Guatemala	16	25,345	2	1	
14	Afghanistan	15	23,312	4	1	
15	Mexico	48	17,625	3		

Source: U.S. Geological Survey.

of seismic waves. The ground movement displaces the foundations of structures, which, due to their inertia, tend to remain stationary. The stiffness of structures causes them to move in the same direction as their foundations, which allows the structures to return to the equilibrium position. In this way, the ground shaking sets up vibration in the structure, the nature of which will depend on the dynamic characteristics of both the ground motion and the structure itself. The vibration induces inertial forces in the structure that result in relative displacements between the different floors of the building (Kuzak, Campbell, and Khater 2004).

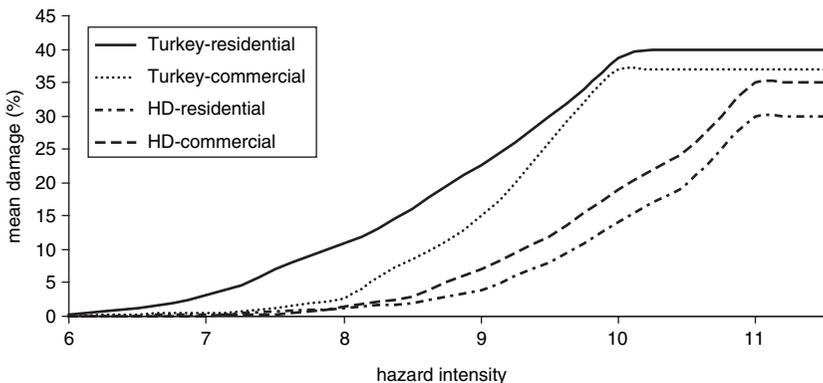
As with any natural disaster, the extent of earthquake devastation is a function of shock intensity and the vulnerability of structures subjected to the quake. The latter is of critical importance. For example, although the maximum intensities of ground shaking in Turkey during the Marmara event were significantly lower than those recorded in the 1994 Northridge earthquake in California or in the 1995 Kobe earthquake in Japan, the loss of human life was higher by at least one order of magnitude. Because the population density of these regions is similar, the higher death rate in

Turkey indicates that physical structures there are much more highly vulnerable than structures in California or Japan.

Figure 1.1 depicts aggregate vulnerability curves for residential buildings and commercial constructions in Turkey and in highly developed economies. Vulnerability is measured by mean damage factor, which is the ratio of the cost of repair to the total insured value. Vulnerability functions are defined as the type of structural system (for example, frame or walls), the method and time of construction, and the construction material. Typically, these functions are developed on the basis of an analysis of claims data from catastrophes throughout the world, engineering-based analytical studies, expert opinion, and laboratory tests. Figure 1.1 shows that buildings in Turkey are much more vulnerable than those in highly developed countries, where construction standards are higher and enforcement of building codes is stronger. A 9 magnitude earthquake would cause a mean damage of more than 20 percent of residential buildings and 15 percent of commercial buildings in Turkey, compared with 7 percent of commercial constructions and less than 4 percent of residential constructions in highly developed countries.

Although Turkey has a strict building code modeled after the 1997 California Building Code, enforcement remains a serious problem. Insufficient government supervision of the code and lack of proper hazard

Figure 1.1 Comparison of Aggregate Vulnerability Curves for Residential Buildings and Commercial Constructions in Turkey and Highly Developed Economies



Source: Munich Re 2005.

Note: HD = highly developed.

zoning were key drivers of economic damages and loss of life in the Marmara earthquake. Exacerbating the situation were the rapid economic growth and industrialization of the Marmara region, which during the past two decades has become a magnet for job seekers from rural areas. The resultant surge in demand for affordable housing in the region was met largely by the construction of inadequately engineered five- and six-story reinforced concrete buildings (Erdick and Durukal 2002). Many of these hastily built structures, called *gece kondu*, or “built overnight,” were constructed without government authorization on illegally occupied land and without proper consideration of seismic vulnerability in their design. Thus these buildings were rendered easily susceptible to collapse even by moderate earthquakes (Schmidt 2000).

The above-mentioned conclusions were reinforced by the observed widespread collapse of multistory reinforced concrete apartment blocks during the Marmara earthquake. In Marmara, these blocks are almost exclusively nonductile reinforced concrete frames with hollow clay brick infill. Combined with soft stories (usually lower levels used for commercial purposes, featuring large glass windows, and lacking proper support structures for the rest of the building), this construction material allows the “pancake” type of collapse responsible for a majority of fatalities and injuries (Scawthorn 2000). Additionally, 45 percent of the buildings in the four largest cities of Adana, Ankara, Istanbul, and Izmir are masonry (brick, adobe, or stone) houses, which have less seismic resistance than concrete buildings.

Economic Damage of Turkish Earthquakes

The economic cost of natural disasters to Turkey has been severe. The expected annual economic stock loss from earthquakes in Turkey is estimated to be US\$100 million. Of more importance, however, is the probable maximum economic loss from a single or several catastrophic events, which can be many times the expected annual loss (table 1.2). The cost of a 1-in-200-year event (an event with a 0.5 percent annual exceedance probability) is likely to be greater than \$11.4 billion, or 6.2 percent of the country’s GDP. The cost of a more frequent 1-in-20-year event (an event with a 5 percent annual exceedance probability) is likely

Table 1.2 Economic Direct Loss Potentials

Annual exceedance probability	Probable maximum economic loss (\$ millions)	GDP (%)
0.5	11,406.0	6.20
5.0	3,476.0	1.90
20.0	24.5	0.01

Source: Pusch 2004a.

to exceed \$3.5 billion. This potential severity suggests the inherent limitations of the average-cost budgeting approach to natural disasters adopted by many governments and underscores the importance of catastrophe risk transfer programs such as the Turkish Catastrophe Insurance Pool (TCIP).

Recent modeling work indicates that the Istanbul and Izmir regions are in the path of the western progression of earthquakes along the North Anatolian Fault. Furthermore, although there is some diversification of commerce and industry toward the eastern regions, the Istanbul metropolitan area easily represents the peak seismic risk accumulation in Turkey, because it accounts for over one-third of the national GDP (World Bank 2000). Compounding the risk are Istanbul's population increase (from 7.3 million in 1990 to an estimated 12 million in 2006) and the settlement of new inhabitants in illegally built, and hence uninsurable, buildings.

Role of the Government

A common rationale for disaster assistance and government intervention in disaster insurance markets is that private markets fail to provide socially adequate levels of insurance (box 1.2). In general, governments have reacted to this lack of insurance by creating the conditions for a private market to emerge (usually by acting as a reinsurer of last resort) or by establishing government-sponsored insurers (or pools of insurers) to provide coverage. The challenge is to make such disaster insurance programs actuarially viable. To do so requires four conditions: (1) wide coverage (sometimes through compulsory insurance), (2) reasonably fair pricing, (3) attention to the political economy realities inherent in the immediate postdisaster environment, and (4) encouragement of active risk management in communities.

Box 1.2 Supply- and Demand-Side Failures of Private Disaster Insurance Markets

On the supply side, the failure of private disaster insurance markets is driven mainly by correlated losses and ambiguity.

Correlated losses. The capacity of private insurers to bear risk hinges on their ability to diversify losses across many policies. When losses are uncorrelated across policies, insurers can reduce their risk by selling many contracts. Natural disasters affect many policyholders at once, because losses are positively correlated. Hence, insurers cannot reduce their risk by increasing the number of contracts sold. Therefore, they need to build up reserves to absorb this risk or to transfer this part of the risk to international reinsurance markets. A lack of financial capacity, limited access to international reinsurance, or both may preclude insurers from offering disaster insurance.

Ambiguity. Insurers may lack the information they need to estimate loss probabilities and thus accurately price disaster insurance policies. Uncertainty may lead insurers to over-load their premiums, making disaster insurance less attractive to potential policyholders, which typically results in very low catastrophe insurance penetration.

On the demand side, a variety of factors can reduce demand for disaster insurance.

Property values. Insurance can become unattractive when expected losses and required premiums become high compared to property values. Moreover, willingness to insure decreases when losses are expected to be frequent but modest in size in relation to the property value.

Cognitive failure. Consumers may underestimate the risk of loss or even ignore this risk.

Product design. Insureds tend to be sensitive to the expected value of indemnity payouts relative to premium rates charged. When insureds believe that the scope of coverage is too restrictive and that deductibles are too high, they may be more inclined to self-insure.

Ex-post public disaster assistance. The risk that a large catastrophe will lead to government intervention should reduce the demand for disaster insurance. Long-term subsidized programs reduce the effective cost of disaster losses to property owners.

Governments often are unable to withhold postdisaster reconstruction assistance from people who fail to buy private or public insurance. Politicians want to exercise their charitable impulses, and many taxpayers are sympathetic to helping disaster victims. The traditional role of the government as the “benevolent father” dispensing disaster relief at its discretion is difficult to change. In Turkey, for example, until March 2000, Disaster Law No. 7296 required the government to finance reconstruction of houses destroyed by a disaster.

Historically, most Turkish governments have taken little interest in the ex-ante management of disasters because of low perceived vulnerability levels and the infrequent manifestation of most severe hazards (Kaplow 1991; Kunreuther 1996). Moreover, Turkish governments may have responded to a disincentive: the apparent willingness of the international community to provide postdisaster funding for countries exposed to catastrophic events. The availability of free or inexpensive postdisaster donor funding discourages disaster-prone countries from pursuing ex-ante risk management, such as reinsurance and other market-driven risk transfer solutions. Indeed, the cost of risk-financing solutions offered by the private markets makes reliance on inexpensive ex-post aid and development banks’ postemergency lending rational. This disincentive poses a “Samaritan’s dilemma” (Coate 1995) wherein the provision of support reduces the capacity of the recipient to become more self-reliant.

As a consequence of underdeveloped domestic insurance markets and a lack of risk awareness or economic incentives to engage in ex-ante risk management, governments generally adopt reactive response approaches to natural disasters. These approaches often mean relying on domestic budgets, including diversion of resources from other projects, and on extensive financing from international donors. Emergency funding for reconstruction from international donors has become a linchpin of some governments’ strategies for funding disaster reconstruction. This emergency funding often is supplemented by emergency reconstruction lending programs from the World Bank and other multilateral development banks. In addition, due to overriding humanitarian considerations once a disaster occurs, the donor community finds it difficult to enforce its standing pledge to reduce ex-post assistance if ex-ante mitigation measures have not been implemented.

These issues notwithstanding, ex-post disaster funding from donors and international development banks should play an important role in the country's risk management strategy. However, overreliance on this approach has major limitations in terms of efficiency, effectiveness, and even equity.

Ex-post funding approaches are inefficient. A lack of advance planning and resource allocation prevents ex-post funds from being immediately available after a disaster: experience has shown that multilateral assistance can take a long time to disburse and that sometimes it does not disburse. The delayed response greatly increases the adverse social and developmental impacts of disrupted economic activity.

Ex-post funding approaches are ineffective. Resource allocation after a disaster may be ad hoc. Resources may be targeted to bureaucratic or political considerations rather than to expenditures and investments that are most likely to promptly restore economic activity. Diverting limited fiscal resources from development projects that would create high economic and social value, along with politically motivated, low-net-return purposes (such as middle-class housing), can have considerable opportunity costs and long-term adverse economic effects.

Ex-post funding approaches are insufficient. Most developing countries face ongoing fiscal constraints. Even with additional borrowing and grants from the donor community, the gap between the quantity of funds available and the funds needed for relief and reconstruction may be substantial.

Natural disasters tend to have the greatest impact on the poor. Scarce multilateral resources that could have been used for growth and poverty reduction goals are diverted by catastrophes, or more precisely, by the lack of appropriate ex-ante risk management, including disaster-risk-financing strategies. Hence, natural disasters tend to widen the income gap between the rich and the poor.

Role of the World Bank

Proactive ex-ante risk management often is lacking in disaster-prone countries. Therefore, the increasing frequency and severity of natural disasters over the last decade, combined with rapid urban growth in

Table 1.3 World Bank Emergency Reconstruction Lending in Turkey, 1992–9

Project	Date of event	Total amount of loan (\$ millions)
Erzincan Earthquake Reconstruction Loan	March 13, 1992	240
TEFER	May 21, 1998	369
MEER	August 17, 1999	505

Source: World Bank project data.

disaster-prone areas, poses challenges for governments, development banks, and aid organizations.

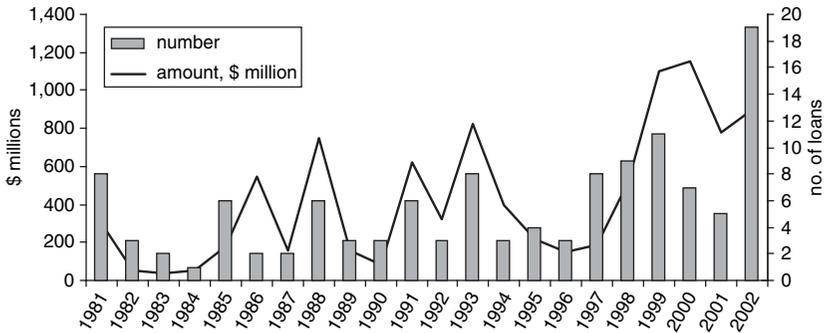
The main World Bank lending instrument to address countries' fiscal reconstruction needs in the wake of natural calamities has been the Emergency Recovery Loan (ERL). This instrument was developed in the late 1960s. In August 1995, the ERLs' scope was extended to cover both natural disasters and newly emerging needs for postconflict reconstruction. As a result of both this broader definition of ERL-eligible projects and the increased frequency and severity of natural disasters, the Bank's emergency recovery lending has increased substantially.

In the period 1980–2002, the World Bank was one of the major financiers of postdisaster reconstruction in developing countries. In this period it approved more than 100 reconstruction loans in excess of \$40 billion (figure 1.2). Approximately 11 percent of these ERLs were provided to Turkey and other countries in Europe and Central Asia (ECA) (figure 1.3).

Since the mid 1990s, it has become increasingly clear that exclusive use of ERLs has weakened countries' incentives to engage in proactive ex-ante catastrophe risk management. An overreliance on emergency donor funding and the increasing frequency and severity of natural disasters have led to more than a quadrupling of donor funding in the last decade.

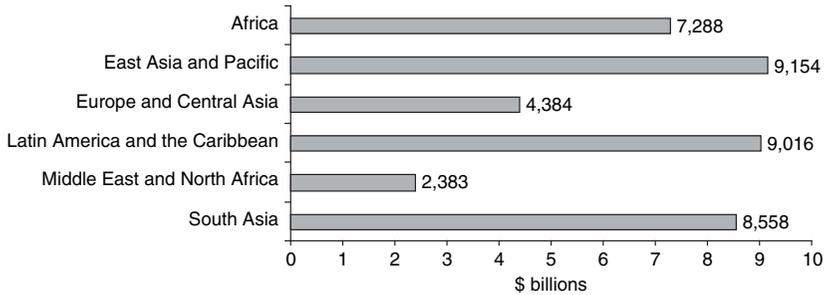
Over the same period, the World Bank initiated three large disaster-oriented ERLs for Turkey to address earthquake damage. In March 1992, following the Erzincan earthquake, the Bank made the Erzincan Earthquake Rehabilitation and Reconstruction Loan in the amount of \$240 million. In May 1998 the Turkey Emergency Flood and Earthquake Recovery Project (TEFER) was originated in the amount of \$369 million. The most recent, and perhaps most important operation, was the

Figure 1.2 World Bank Disaster-Related Lending, 1980–2002



Source: World Bank project data.

Figure 1.3 World Bank Emergency Lending, 1980–2002



Source: World Bank project data.

Marmara Earthquake Reconstruction Project (MEER) in the amount of \$505 million (table 1.3).

Ever-growing funding requirements for earthquake reconstruction began reducing World-Bank-funded investments in Turkey’s economic and social development. Awareness of this reality eventually convinced the government to support a feasibility study on disaster insurance, which led to the creation of the TCIP.

Turkish Public Relations and Communications Campaign

At the time of the Marmara earthquake, the Turkish public possessed little risk awareness and a rather hostile attitude toward all insurance products. Early in the TCIP’s development, the government launched a

countrywide public relations and education campaign to identify and address these and other obstacles to the program's use.

A significant segment of the Turkish population may be unaware of the availability of insurance, but many of those who are aware of the product have ill-conceived notions regarding its costs and benefits. For example, many Turks view insurance as a product for the rich. They perceive costs to be too high and homes insufficiently valuable to justify insurance.

Another problem is that many insurance companies initially responsible for selling policies had insufficient information concerning the TCIP. As a result, the public suspected the program could not be trusted.

A third problem is that many people did not understand the nature and workings of the TCIP. They questioned whether this obligatory class of insurance was simply a tax levied by the government. Many households that purchased earthquake insurance did not understand that they had to renew their policy each year.

Political economy imperatives have provided another challenge to establishment of an insurance culture. Until 2000, Disaster Law No. 7296 held the Ministry of Public Works responsible for replacement of all damaged residences. As noted above, the law established the government's paternalistic role as a provider of disaster relief and reduced households' incentive to purchase insurance or undertake mitigation measures. Just as households rationally expect the government to come to their rescue in the event of an earthquake, the government believes that it can rely on disaster relief from foreign donors.

Turkish Insurance Industry

The Turkish insurance market has existed since Riunione Adriatica di Sicurta (RAS) was established in 1862. In 2003 Turkey had the lowest rate of nonlife insurance penetration compared to peer countries in terms of GDP per capita (table 1.4).

In 1999, shortly before the Marmara earthquake, 41 companies were underwriting property and fire coverage (including earthquake coverage) in Turkey. However, most of these companies were ill-equipped for the task due to limited capital resources and insufficient risk management

Table 1.4 Nonlife Insurance Penetration in Turkey and Selected Countries, 2004

Country	Premiums (% of GDP)	Premiums per capita (\$)
Turkey	1.35	47.7
Mexico	1.80	106.5
Poland	3.02	162.2
Slovakia	3.38	210.6
Thailand	3.45	79.6

Source: Swiss Re 2005.

expertise. In addition, consumers widely believed many insurers would be unwilling or unable to pay claims in the event of a large disaster. This perception was in part validated by some companies' general claims performance.

The demand for catastrophe insurance coverage was further dampened by still-fresh memories of the unfair government treatment of holders of private flood insurance and the then-unattractive terms of coverage for natural disasters. Holders of private flood insurance were excluded from eligibility for government flood-victim support even though, in many cases, they would receive little under the rather restricted scope of coverage allowed by private policies. The earthquake coverage was offered with a 20 percent coinsurance of loss and a 5 percent deductible; premium rates were subject to a high reinsurer-driven tariff.

From the financial sector's perspective, provision of earthquake coverage by private insurers was untenable, because so few people had purchased the coverage and because the industry's earthquake reserves were dangerously low. As of December 31, 1997, Turkey's total accumulated industry earthquake reserves were approximately \$24 million. By contrast, the annual fire and engineering premium income, the greater part of which was earthquake related, was \$140 million. Given unfavorable tax treatment of earthquake reserves by Turkish accounting regulations and generous reinsurance exchange commissions available on catastrophe business written by local insurers, local companies found it considerably more profitable to cede most of the earthquake premium to foreign reinsurers (a move that did not require setting aside catastrophe reserves).¹ In the absence of this reinsurance-based "washing" of earthquake premiums, two-thirds of all such premium income would have been set aside in catastrophe reserves by law.

Whether all nonlife insurers have a true understanding of their financial positions has been questioned. For example, claims incurred but not reported (IBNR) provisions were not required and, as a result of their nontax-deductible status, were not set aside. Thus, the industry was not operating on a fully funded basis. Premium receivables from agents and policyholders often were greater than the companies' net assets. In other words, investment income was substantially lower than it would otherwise be, and insurers carried significant credit risk. The combination of these circumstances suggested that the private insurance industry was unlikely to increase catastrophe insurance penetration if left to its own devices.

Finally, a purely private sector approach to catastrophe coverage would have had to deal with the attempt of some insurers to underwrite only "good" risks, a tactic that would lead to coverage gaps in most disaster-prone areas, which usually have large concentrations of relatively poor people.

Despite the limited capital base, lack of underwriting expertise, and shortage of qualified personnel, the Turkish insurance industry clearly had the technical potential, both in terms of reinsurance expertise and distribution capabilities, to develop a nationwide catastrophe insurance program. Although the total excess of loss reinsurance capacity allocated to Turkey by the global reinsurance market was small—\$800 million, compared with, for example, \$2.4 billion for Mexico—the Turkish government and the World Bank believed that this amount could be significantly increased. After discussions with international reinsurers, they formed the view that, given a more efficient approach to underwriting and pooling of insured catastrophic risk by the Turkish insurance sector, the international reinsurance markets would be prepared to provide substantial additional capacity to support greater penetration of catastrophe insurance in Turkey. In global terms, Turkey historically had been allocated a fraction of 1 percent of available capacity; therefore the scope to increase the proportion of registered properties insured for earthquakes through private markets was substantial.²

At the time, one dominant local reinsurer, Milli Re, received compulsory cessions from local direct insurers of 10 to 15 percent of written premium, which positioned the company to understand the key issues involved in the operation of an insurance scheme with wide industry

participation. Aside from being viewed as a mechanism to save foreign exchange, the cessions created a strong negotiating base, and Milli Re continues to be a central source of technical advice. The company had the best database on exposures in the country and some of the best human capital in the industry. Owned by IS Bank, the second largest bank in Turkey, Milli Re presented itself early on as an excellent candidate to manage a national catastrophe pool.³

Marmara Earthquake

The Marmara earthquake dealt a heavy blow to Turkey not only in loss of life but also in direct economic damages. Most severely affected was the expansive area around Izmit Bay, including the four districts of Kocaeli, Sakarya, Bolu, and Yalova. The industrial heartland of Turkey, this region contributes more than 7 percent of the country's GDP (Erdick and Durukal 2002). Together with adjacent provinces, including Istanbul, which also were affected, the region accounts for approximately one-third of Turkey's overall industrial output. As a hub for energy industries, transportation, tourism, and manufacturing, the area directly affected by the Marmara earthquake is responsible for 14 percent of Turkey's total value-added industrial output. The region holds only 4 percent of Turkey's population but generates 16 percent of the country's total budget revenues.

Thus the Marmara earthquake severely affected Turkey's economic infrastructure, enterprise sector, social infrastructure, and financial systems. The energy, transport, and telecommunications sectors were particularly hard hit because of their high concentration near the epicenter. In addition to countless kilometers of underground cables that were destroyed or damaged, 3,400 electricity distribution towers and 490 kilometers of overhead cables were affected. Damage to refineries and pipelines led to environmental damage and required massive repair to both the structures and the ecosystem. Losses from fire damage were only partially covered by existing fire-after-earthquake insurance (table 1.5).

Much of Turkey's key transportation infrastructure also suffered severe damage. Over 60 kilometers of the Ankara-Istanbul highway were

Table 1.5 Selected Economic Indicators for the Marmara Earthquake Region

	Population (thousands)	Share in GDP	Share in industrial value added (%)	Per capita income (\$)	Share in budget tax revenues	Share in bank deposits (%)	Share in banking credits
Kocaeli	1,177	4.8	11.3	7,846	15.8	1.4	0.9
Sakarya	732	1.1	1.1	2,734	0.4	0.5	0.2
Yalova	164	0.4	0.7	4,966	0.1	0.2	0.1
Bolu	553	0.9	0.7	3,104	0.3	0.3	0.2
Bursa	1,959	3.5	5.0	3,434	3.0	2.4	3.2
Eskisehir	861	1.2	1.1	3,335	0.8	0.7	0.7
Istanbul	9,199	22.8	26.8	4,728	37.5	44.1	41.0
Kocaeli+Yalova+Bolu	2,626	7.2	13.8	5,243	16.6	2.4	1.4
Total of 7 cities	14,444	34.7	46.7	4,581	58.0	49.6	46.3
Turkey	62,866	100.0	100.0	3,031	100.0	100.0	100.0

Source: Turkish authorities.

destroyed. The Gebeze-Izmit-Arifye railroad and a major rail factory in Adapazari were devastated, as were ports and jetties in the area. The State Planning Organization estimated that \$600 million would be required to restore these sites.

The indirect economic impact on the private sector was significant. Small enterprises were affected more than larger enterprises. Microenterprises comprised most of the 15,000 businesses (many first-floor shops) that were physically destroyed and the 31,000 businesses that were damaged.

The indirect impact on the financial infrastructure resulting from the quake was also material. Losses arising from uninsured damage resulted in many nonperforming loans: total exposure of public banks in the region was estimated to be \$119 million. Cash loans outstanding of private banks in the region were estimated to total \$614 million. As of 1999, deferred schedules and reduced interest rates were being granted; the total expected amount of restructured loans is \$56 million, with \$42 million in additional subsidized credits.

Although estimates of overall economic losses from the Marmara earthquake vary significantly, both direct and indirect losses were clearly severe, totaling billions of dollars and amounting to up to 5 percent of GDP (table 1.6).

Table 1.6 Macroeconomic Costs of the Marmara Earthquake (percent GDP)

	TÜSIAD estimates ^a	SPO estimates ^b	World Bank estimates ^c
Direct costs	10.0	6.6–10.6	3.1–6.5
Housing	4.0	3.5–5.0	1.1–3.0
Enterprises	4.5	2.5–4.5	1.1–2.6
Infrastructure	1.5	0.5–1.0	0.9
Indirect costs	2.8	2.0–2.5	1.8–2.6
Value-added loss	2.0	2.0–2.5	1.2–2.0
Emergency relief expenditures	0.8	...	0.6
Total damage costs (rounded)	13	9–13	5–9
Secondary effects			
Current account losses	2.0	...	3.0
Fiscal costs	2.0	5.9	3.6–4.6
Job losses (percent of labor force in the region)	20–50

Sources: TÜSIAD (Turkish Industrialisation and Businessmen's Association) 1999; SPO (State Planning Organisation) 1999; World Bank 1999; and OECD staff estimates.

- a. TÜSIAD first estimated the value of the loss of national wealth by surveys of its members and in cooperation with SPO. It then estimated the associated loss of national income by assuming that economic activity in the region came to a halt for two to three months (with about \$50 million lost each day) because of loss of physical capacity, employee absenteeism, lack of water and energy, supply shortages, and transportation difficulties, which depressed overall output regionally as well as nationally.
- b. SPO estimated wealth losses on the basis of information given to the government from various sources (including a physical count of destroyed properties) and preliminary estimations based on certain assumptions.
- c. The World Bank used an enumerative technique to estimate physical damages (onsite inspections by Bank staff). The GNP impacts are estimated by (1) assuming that the percentage of value added lost due to disruptions to industry and services in the four most severely affected regions is 50, 30, 15, and 8 percent in the third quarter of 1999 to the second quarter of 2000, respectively; (2) further assuming that one-third of the disruptions in the first two quarters are offset by increased economic activity in other areas; and (3) multiplying the net disruption by the weight of the region (7.2 percent) in national value added.

The severity of the economic losses and the enormous loss of life caused by the Marmara event triggered the government to revisit its overall approach—little *ex-ante* risk management and heavy reliance on *ex-post* funding—to natural disasters.

Marmara Earthquake Emergency Reconstruction Project

Following the 1999 Marmara quake, the Turkish government asked the World Bank to prepare a two-stage program. The Bank's immediate

response was to amend eight loans to reallocate \$267 million for immediate assistance in reconstruction of housing and infrastructure, health, employment, training, and educational services in the Marmara region.

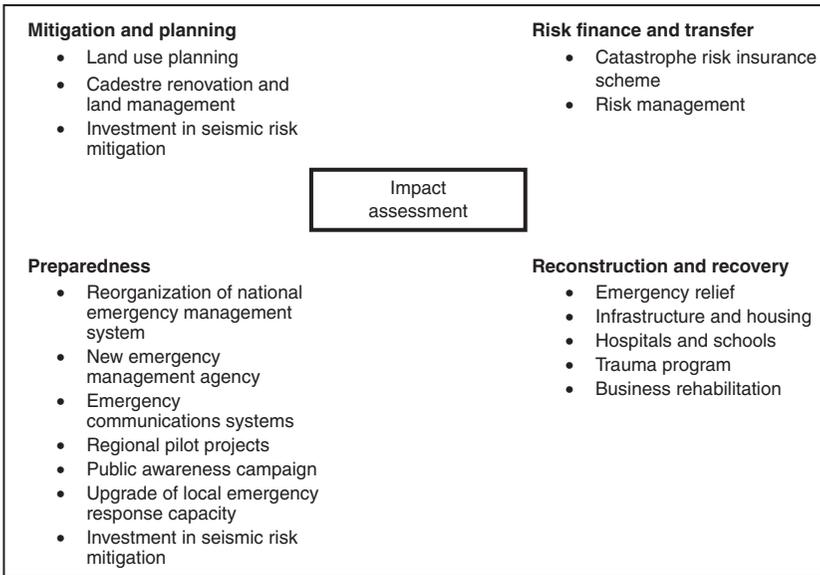
In the program's second stage, the Bank prepared an ERL of \$252 million. The government used these funds to finance private sector import requirements and budgetary support for priority actions under the government's recovery program. Key components included protection for earthquake victims and the Marmara Earthquake Emergency Reconstruction Project (\$737 million).

Most traditional disaster-response projects can be characterized as pure emergency reconstruction loans, but the MEER project introduced a comprehensive disaster-management framework. For the first time in the history of disaster reconstruction lending, a government emphasized ex-ante risk management and prevention. This comprehensive framework highlighted the World Bank's willingness to innovate in the face of a case of extreme economic devastation and in response to strong government interest in a catastrophe insurance program. The MEER project was cofinanced by the World Bank, the Turkish government, and the European Bank for Reconstruction and Development.

The MEER framework consisted of investments in the physical reconstruction of damaged infrastructure and buildings, in social and economic recovery, and in emergency preparedness, disaster mitigation and planning, and risk financing. The World Bank funded \$505 million for the MEER loan; donors contributed an additional \$1,290.75 million. Of the \$505 million provided by the World Bank, \$123 million was allocated to the Disaster Insurance Scheme, under which \$100 million in initial capital support went to the insurance pool through an uncommitted contingent loan facility and \$23 million went to technical assistance. The World Bank also took the lead in technical assistance to the Turkish Treasury's General Directorate of Insurance (GDI) to design a catastrophe insurance pool for Turkey (figure 1.4).

Approximately 50 percent of the ERL was directed to future-oriented investments in disaster mitigation, emergency preparedness, and risk transfer. To support this comprehensive risk management approach, the insurance component had four goals:

Figure 1.4 Framework of the MEER Emergency Response Loan



Source: Pusch 2004a.

- Creating an insurance mechanism to make liquidity readily available to owners of registered residential properties to repair or replace dwellings destroyed or damaged by an earthquake
- Reducing the government’s fiscal exposure to major earthquakes and lowering risks to the national economy from these events
- Ensuring the financial solvency of the pool after all but the most catastrophic of events, such as events of greater severity than the Marmara earthquake
- Reducing government financial dependence on the World Bank and other donors in the aftermath of major earthquakes.

The first of these goals resulted in the TCIP, which sought to efficiently leverage the capital resources and distribution capabilities of the private insurance and reinsurance industry while limiting future government financial participation in reconstruction of private dwellings. In this context, TCIP coverage was viewed as the most

affordable alternative (both for the government and households) to the previous government-lending program, which provided interest-free loans to the victims of natural disasters for home reconstruction purposes.⁴

Since the TCIP's launch, three of the four above-noted goals have been achieved: making liquidity readily available to owners of homes damaged or destroyed by natural disasters, reducing the government's fiscal exposure to earthquakes, and reducing the government's dependence on donors' financial assistance following earthquakes. The government is still working to ensure the financial solvency of the pool after all but the most catastrophic events; as of February 2006, reserves totaled approximately \$200 million.

The MEER project has demonstrated that the physical and financial impacts of natural disasters on national economies can be substantially reduced. This achievement has required a major policy shift from ex-post disaster funding to ex-ante disaster risk management.

Notes

1. Together with associated investment income, these reserves had to be held for 15 years before being released to accounting profit. Part of premium income allocated to catastrophe reserves could not be exempt from taxable income, and investment income earned on catastrophe reserves was subject to regular taxation.
2. In 1994, when reinsurance costs soared following disasters such as Hurricane Andrew in Florida, the Turkish insurance industry proposed that an earthquake fund be set up by the government to provide 25 percent proportional cover and to act as guarantor in the event that any insurance companies failed. The idea faded as reinsurance costs rapidly reduced when new capacity (particularly from Bermuda) emerged.
3. At the time of the Marmara quake, 51 of Turkey's 61 licensed insurers were associated with banking groups.
4. Legally, disaster-reconstruction loans had to be repaid to the government over long periods of time, up to 30 years, but with hyperinflation, the ultimate repayment equated to the cost of a "pack of cigarettes."

Objectives and Design: Political Economy and Technical Imperatives

After examining the existing international experience with catastrophe insurance funds (appendix 2), the government of Turkey concluded that the TCIP should (1) be compulsory for all homeowners, (2) offer coverage affordable for most Turkish homeowners, (3) be a true risk transfer program, (4) have sufficient claims-paying capacity to materially limit the government's fiscal exposure to catastrophe risk, (5) be able to build national catastrophe reserves over time, (6) encourage mitigation through risk-based premium rates and other venues, and (7) rely on the distribution and claims settlement capabilities of the Turkish private insurance market.

The government articulated the following core objectives for the TCIP scheme:

- Provide affordable and effective basic earthquake insurance coverage to all registered urban dwellings on a compulsory basis.
- Over time, build a fund capable of paying all but the most catastrophic insured losses from its reserves and reinsurance.
- Achieve financial sustainability in the long run, thereby reducing the government's obligation to provide postdisaster emergency relief to the owners of the registered Turkish housing stock.

- Provide strong incentives for ex-ante mitigation, including improvements in the enforcement of the construction code, and thereby promote safer construction practices.

To achieve these objectives, the government began work, with the World Bank's support, in the following areas:

- *Legal framework.* The government established the legal basis for a catastrophe insurance pool, thereby providing incentives for homeowners to purchase insurance and undertake mitigation activities.
- *Institutional structure.* The roles of government, the domestic insurance industry, international reinsurers, reinsurance brokers, and risk modeling companies were defined.
- *Earthquake insurance coverage terms and conditions.* The TCIP's insurance coverage terms and conditions were developed, and premium rates for different risk classes were established. This process considered affordability constraints; the extent to which the premium rates should be allowed to vary based on location and age of insured dwellings and the level of solidarity in the premium structure; and the key features of insurance contract design, such as the deductible, limits, and possible underinsurance penalties, with a view to making the TCIP policy attractive to consumers.
- *Risk financing strategy.* Risk financing decisions were reached on the initial minimum claims-paying capacity, risk retention level, amount of reinsurance protection to be obtained from international reinsurance markets, use of the World Bank contingent credit facility, and the role of government as reinsurer/guarantor.
- *Management and governance arrangements.* The TCIP's management and governance structure was developed, and key institutions and key operational personnel were identified.
- *Distribution and claims settlement.* Distribution and claims administration arrangements relying on the private insurance market were developed and agreed with private insurance companies.

The first four activities are reviewed below; the last two will be discussed in the next chapter.

Enabling Legal Framework

The exceptionally high public costs of the Marmara earthquake (on the order of \$6 billion) convinced the government to adopt a more fiscally efficient approach to financing earthquake losses (see chapter 1). This approach required an amendment to Disaster Law No. 7296, under which the government had an obligation to finance reconstruction of all dwellings destroyed by natural disasters. The law was amended at the end of 1999, and on March 27, 2001, the government's obligation to provide housing reconstruction credits for registered urban housing following an earthquake ceased. Affected homeowners who lacked catastrophe insurance coverage no longer would be given concessional reconstruction loans (which in practice had been grants). The new insurance scheme thus eliminated a major portion of the government's obligations under Disaster Law No. 7296 and gave citizens an incentive to undertake mitigation measures.¹

In the government's view, leaving catastrophe insurance coverage to consumer choice was simply not a viable solution in a country with an undeveloped culture of insurance.² On December 27, 1999, Governmental Decree Law No. 587 made earthquake insurance compulsory as of September 27, 2000, for owners of private dwellings built on registered land. (Owners of private dwellings in villages were exempted.) To provide a market-based alternative to the now-ended concessional loans for reconstruction, the new law authorized creation of the TCIP.

Structured as a public-private partnership, the program's sole business objective is providing affordable earthquake insurance coverage to 13 million Turkish households. Because it has no public sector employees, the TCIP has been exempted from all state regulations applying to government-owned enterprises.³

The TCIP can deny coverage to buildings built after December 27, 1999, that have no construction licenses or that are built on illegally occupied public land.

To reduce adverse selection against the pool (a business practice known as "cherry-picking"), Governmental Decree Law No. 587 made the TCIP the sole-source provider of coverage up to an initial limit of \$25,000. Insurance companies are not allowed to issue policies for

risks that are within the scope of coverage and under the limit provided by the pool. However, the companies can offer property coverage in excess of the TCIP's limit—\$62,500 as of February 1, 2006—as well as coverage for contents, debris removal, and personal accidents caused by natural disasters.

The decree law notwithstanding, enforcement of the requirement for compulsory earthquake insurance remains a major challenge. Despite having the power of the law in Turkey, the decree law falls short of a full-fledged statute enacted by Parliament. A key feature distinguishing a parliamentary law from a decree law is the availability of sanctions for noncompliance.

Since the TCIP's launch, some enforcement mechanisms have been implemented. For instance, homeowners must present a valid earthquake insurance policy in a government real estate registration office to register any real estate transaction. In addition, since April 2003 homeowners have had to present their insurance policy documents to open accounts for water and natural gas services. The same requirement is expected to be extended to electricity and telecommunications services.

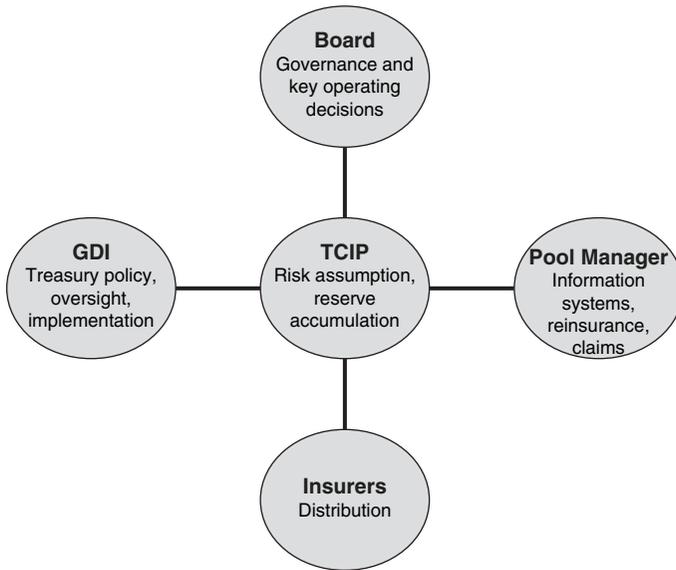
Institutional Structure

A key policy issue in the design of the TCIP was to determine the roles of the government, domestic insurance companies, international reinsurers, and the World Bank in the program's operation, financing, management, and governance (figure 2.1).

Government

The Turkish government played the central role in creating the TCIP. The General Directorate of Insurance (GDI) of the Turkish Treasury

- Developed and approved TCIP's regulatory framework.
- Provided major inputs in the program's institutional design.
- Was instrumental in conducting an active public information campaign.
- Ensured that at least minimal enforcement mechanisms were established.

Figure 2.1 TCIP Organizational Structure

Source: Authors.

- Spearheaded design and introduction of a state-of-the art information system.
- Engaged the pool managers.⁴

GDI was also intimately involved in preparing policy terms and conditions, developing the program's risk management and operational guidelines, and governing the program.

In determining the terms and conditions of insurance coverage as well as insurance premium rates and commissions, the GDI had to ensure that the coverage would be affordable for millions of homeowners without compromising the financing integrity of the program. More specifically, in setting the insurance coverage terms and premium rates, the GDI strived to achieve the following objectives:

- Maintain the TCIP's long-term financial viability.
- Increase the size of the TCIP's surplus to reduce its reliance on foreign reinsurance over time.
- Encourage homeowners' risk management and risk mitigation.

- Maximize sales penetration with affordable and easily comprehensible pricing.
- Promote the TCIP's operational efficiency.

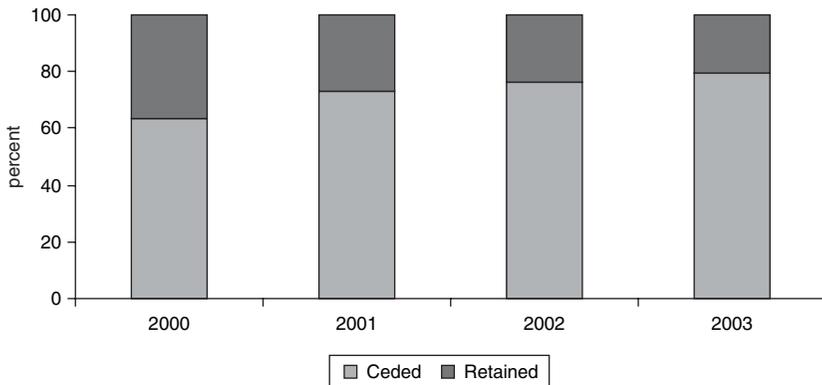
The GDI has achieved most of these objectives.

Domestic Insurance Companies

In many industrialized countries with severe earthquake risk, private domestic insurers are able to provide some catastrophe insurance coverage. In some countries, such as Japan, government supplements this coverage by providing additional reinsurance capacity.

In middle- and low-income countries, the domestic insurance industry is undercapitalized and unable to retain a significant portion of catastrophe risk. In Turkey, local insurers lack economic capital and mainly “front” for international reinsurers. Figure 2.2 shows the percentage of fire insurance premium ceded to reinsurance companies in recent years. This percentage has been increasing since 2000 and neared 80 percent in 2003. To create a new domestic source of reinsurance capacity in the Turkish market and prevent the outflow of earthquake insurance premium to other countries, nonlife insurers were required to give up 100 percent of relevant catastrophe risk to the TCIP. The subsequently agreed distribution commission was designed to compensate companies for providing their

Figure 2.2 Reinsured Fire Premium (% gross premium), 2000–3



Source: Milli Re 2005.

distribution and claim management services to the program. At a later stage, it was agreed that claim management would be carried out by specially trained claim adjusters directly recruited by the TCIP.

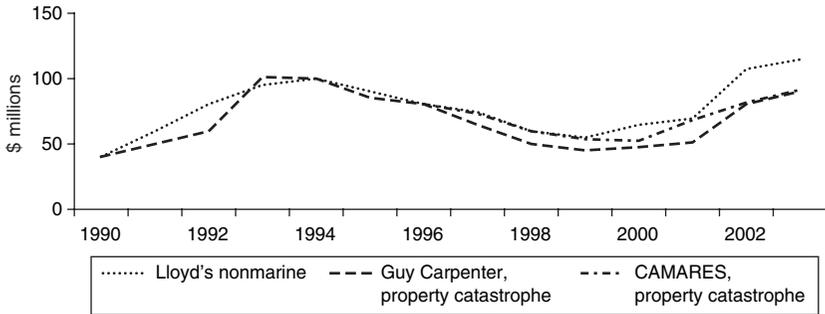
Compulsory earthquake insurance offered by the TCIP is sold separately from comprehensive householder insurance (a stand-alone product). Because 100 percent of risk written under the TCIP was to be transferred to the program, the government decided that every insurance company with a valid license, and regardless of its perceived capital strength, would be authorized to sell earthquake policies on behalf of the TCIP. To participate in the program, the companies had to agree to issue TCIP policies on a separate form with the TCIP logo. The form would be printed and delivered on request to authorized insurance companies in accordance with the previous production figures for such companies. The companies were required to distribute the blank form to their agents using their own internal control and security systems.

Insurance companies are required to pass on certain information about insureds and to collect and pay premiums, net of commission, to the TCIP in a timely manner. Their commission originally was set at 12.5 percent but one year later was increased to 17.5 percent in areas outside Istanbul to increase penetration in the less-disaster-prone parts of the country.

The TCIP fully collateralized its policy sales to reduce credit risk exposure to the insurance industry. This process required every participating insurance company to post a deposit of \$50,000 with the TCIP. This sum would be debited if premiums due were not remitted. This approach eliminated the problem of uncollectible accounts receivable, which is endemic to the Turkish insurance industry. But it also strained the relationship between the companies and the pool manager. This tension has dissipated as the companies have grown accustomed to the payment discipline.

International Reinsurance Market

The Turkish government recognized that the support of international reinsurers would be key to designing a successful national risk transfer program.⁵ With the technical assistance of the World Bank, the government worked with the international reinsurance market to develop the conditions under which the market would be prepared to accept the risk

Figure 2.3 Reinsurance Pricing Volatility

Source: Guy Carpenter 2004.

ceded by the pool. Through a broad consultation process led by the Bank, Turkey secured stakeholders' consensus on the ultimate structure of the TCIP. This agreement also ensured that reinsurers would commit sufficient reinsurance capacity on fair terms when the program became operational. As a result, even before beginning operation, the program was able to receive \$538 million of reinsurance protection on significantly better terms than those enjoyed by some peer programs in other countries. Since then, despite the hardening reinsurance cycle (figure 2.3), the TCIP consistently has improved the terms of its reinsurance placements.

In its 2004/5 reinsurance placement, the TCIP managed to achieve a 31 percent rate reduction compared with its first placement in 2000 (table 2.1). This success is largely attributable to Milli Re, the first pool manager, whose reinsurance skills and conservative investment approach were instrumental in making the program financially viable in its early days.

Table 2.1 Realized Rates on Line (ROL), Nov. 1–Oct. 30

	2000–1	2001–2	2002–3	2003–4	2004–5
Cover ^a (\$ million)	538	830	730	730	730
Retention (\$ million)	2	20	20	20	20
Realized ROL (%)	6.13	5.51	5.14	4.78	4.2 (est.)

Source: Milli Re 2005.

a. Including World Bank contingent facility.

World Bank

The World Bank's MEER project supported establishment of the TCIP. The Bank provided technical assistance to the TCIP management unit and to the Turkish reinsurance company, Milli Re, to

- Set up the TCIP's business and information systems.
- Carry out essential risk management studies.
- Draft operational, rating, and risk management guidelines.
- Conduct training for the senior staff of Milli Re and the Turkish government in operating a national catastrophe insurance program.

Since the program's launch, the World Bank has provided capital support to the TCIP through a contingent investment loan. This loan reduces reinsurance costs, which speeds accumulation of the pool's capital reserve fund, and serves as part of the pool's overall claims-paying capacity in the event of a major disaster. The loan is due to be closed in October 2006 (a 14-month extension was granted at the request of the Turkish government). It was increased at the end of 2003 from \$100 million to \$180 million, an action that will increase the relative growth rate of the reserve fund in the future, assuming no major disaster occurs. Milli Re has used the loan to offset pricing fluctuations in the reinsurance market (table 2.2). In its second year of operation, the TCIP availed itself of a World Bank loan, through the Turkish government, to meet reinsurance premium costs. Since then it has met reinsurance costs from premium receipts and accrued reserves.

Governance Arrangements and Management

The TCIP's governance arrangements ensure professional management and business viability through adequate representation of all the TCIP

Table 2.2 World Bank Contingent Facility

\$ million	2001–2	2002–3	2003–4	2004–5
WB share priority	15	15	20	20
WB share other layers	85	85	130	160

Source: Milli Re 2005.

board's major stakeholders: government, the insurance industry, and the scientific community. The board's composition is designed to eliminate political interventions and potential misuse of funds. The government selects and approves the seven members: one representative each from the Prime Minister's Office, GDI, the Ministry of Public Works and Settlement, the Capital Markets Board, the Turkish Insurance and Reinsurance Association, and the pool manager (Milli Re), as well as a prominent representative of the academic community.

Recently the board has taken on a somewhat more political shade. The pool manager's representative was removed, and the TCIP was defined as a state organization by the Public Tender Agency in October 2005. This increasing emphasis on the public aspect of the program suggests the need to consider alternative approaches to achieving a healthy partnership that ultimately will underpin the program's success (see chapter 4).

As noted above, the overall operational management of the TCIP was initially contracted out by GDI for five years to the largest national reinsurance company, Milli Re.⁶ In consideration for its services, Milli Re was to receive a management commission set as a percentage of premiums written. Under the program, the operational manager must ensure the day-to-day functioning of the TCIP and liaise between the TCIP and its key stakeholders. Milli Re was charged with the following contractual responsibilities:

- Ensure timely policy issuance and distribution, premiums collection, and claims adjustment and settlement.
- Implement risk sharing and the reinsurance plan.
- Ensure the sound investment strategy of the pool.
- Execute the public relations campaigns.
- Make suggestions to the pool's board regarding the efficient operation of the pool.

GDI retained the audit function and overall regulatory oversight functions. The financial audit responsibility implies that GDI would engage an auditing firm to periodically audit the financial books, records, and procedures of the TCIP, its subcontractors, or both and would issue an annual auditing statement of the program's financial position.

Earthquake Insurance Coverage Terms and Conditions

At the end of 1999, and nine months before creation of the TCIP, Turkey had slightly more than 600,000 earthquake policies in force through private nonlife insurers. Penetration was only 4.6 percent of the qualified market, primarily because catastrophe insurance coverage was offered as an optional endorsement to the homeowners (fire) policy. In effect, this arrangement limited the number of earthquake policies to the number of in-force primary fire policies. Although the bundling of natural hazards covers with fire policies is a common insurance practice with many advantages, it has one important disadvantage. By combining the two covers and selling them as a package to the consumer, an insurer makes catastrophe coverage subject to considerably higher affordability constraints. In practice, only better-off homeowners, a small market segment, can afford catastrophe insurance.

To remove affordability constraints, the government decided that the TCIP would offer stand-alone earthquake insurance coverage that would be marketed separately from the fire policies offered by private insurers.⁷ The growth of catastrophe insurance coverage in Turkey no longer would be limited by the general growth of property insurance penetration, which is highly correlated with the country's GNP. This design feature sets the TCIP apart from many of its peer programs in other disaster-prone nations. For instance, the earthquake cover offered by the California Earthquake Authority is made available as an optional endorsement to the homeowner's policy and cannot be bought separately. In the case of France's Cat-Nat and New Zealand's Earthquake Commission (EQC), catastrophe coverage also is linked to the purchase of underlying fire policies, making it highly dependent on the level of overall household insurance penetration. In France and New Zealand, property insurance penetration is well over 90 percent (although, in industrialized countries, underinsurance is an ongoing problem).

By focusing on registered urban dwellings, the program also drew a clear line between middle-class homeowners, who can afford insurance, and low-income homeowners, who reside mainly in rural areas. In recognition of this demographic, dwellings in rural settlements are excluded

from the requirement to purchase earthquake insurance and remain eligible for direct government support through soft loans.

TCIP Insurance Contract Characteristics

Coverage in excess of that provided by the TCIP can be obtained on a voluntary basis from private insurance companies if the value of a dwelling exceeds the TCIP policy limit (\$62,500 as of February 1, 2006) and if a compulsory earthquake insurance policy has already been purchased. To keep premium rates affordable, the TCIP does not cover dwelling contents, debris removal, and temporary living expenses. Its models, the California Earthquake Authority and the EQC, do cover these items.

The TCIP policy offers coverage on a first-loss basis, meaning that it does not impose underinsurance penalties when the value of a dwelling is significantly higher than the limit of coverage obtained from the TCIP. The sum insured is calculated by multiplying the size of the dwelling in square meters by construction prices per square meter, which vary for different classes of construction. These rates as of January 2005 are shown in table 2.3.

Construction prices for all classes of construction are adjusted periodically in line with changes in the construction cost index published periodically by the government. As of November 2004, the TCIP premium rates varied from 0.44 percent for a house built with a reinforced concrete and steel carcass located in earthquake zone 5, to 5.50 percent for a dwelling built with low-resistance material and located in earthquake zone 1 (table 2.4; earthquake zones are described below). Box 2.1 presents a formula for establishing a premium rate for a hypothetical dwelling.

Unlike the CEA, which imposes a deductible of 10 percent, the TCIP applies a minimum 2 percent deductible to the sum insured to avoid “penny claims” and reduce the pool’s administrative and reinsurance

Table 2.3 Sum Insured (as of January 1, 2005)

Type of construction	Square meter value (YTL)
A—steel, reinforced concrete carcass	380
B—amassed stone and brick	270
C—others	145

Source: Milli Re 2005.

Table 2.4 Compulsory Earthquake Insurance Premium Rates (percentage of sum insured)

Type of construction	Earthquake zones				
	1	2	3	4	5
A—steel, reinforced concrete carcass	0.220	0.155	0.083	0.055	0.044
B—amassed stone and brick	0.385	0.275	0.143	0.060	0.050
C—others	0.550	0.353	0.176	0.078	0.058

Source: Milli Re 2005.

Box 2.1 Setting TCIP Premium Rates

This numerical example illustrates the computation of TCIP premium rates.

Type of construction: reinforced concrete carcass

Earthquake zone: 2

Unit size in square meters: 100 m²

Sum insured: 100 m² x YTL 380 = YTL (square meter value) 38,000

Rate applied from tariff table: 0.155 percent (zone 2, construction category A)

Annual premium: 0.155 percent x YTL 38,000 = YTL 58.9

costs. Such a low insurance deductible makes TCIP cover highly attractive for homeowners.

TCIP Risk Pricing

A critical step in designing an insurance product is determination of the insurance premium, which must balance the product's affordability with the program's financial sustainability. Typically, the starting point is to estimate an affordable premium level and then adjust the scope of insurance coverage to ensure adequate pricing of the risk.

The TCIP follows a market-based approach to retain financial viability without any type of public subsidy. Underlying its pricing and management of earthquake risk are sophisticated catastrophe risk models. These models were used to perform scenario and probabilistic analyses and to report the corresponding risk measures (for example, average annual loss and probable maximum loss), which form the basis of financial management and pricing.

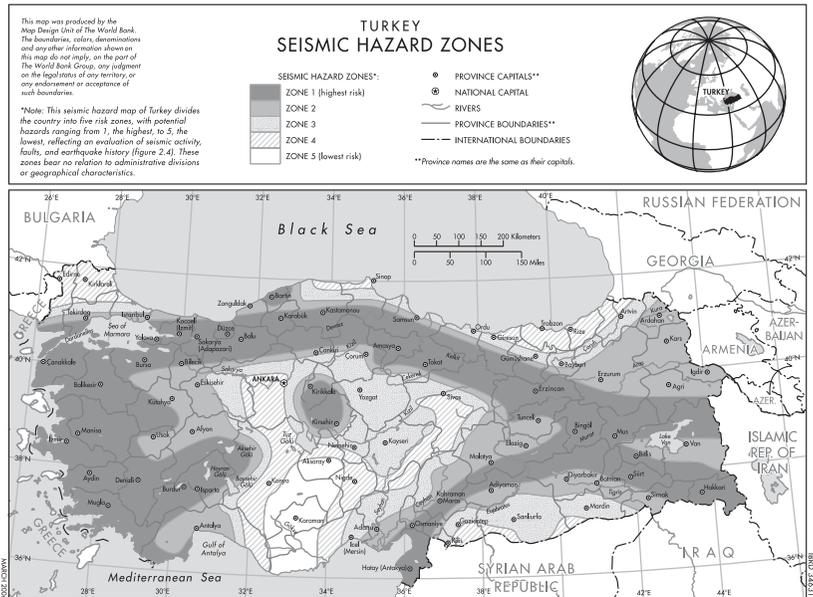
One key risk measure computed by the TCIP probabilistic earthquake risk models was the pure premium rate or average annual loss (AAL), which

represents the minimum premium that an insured must pay to cover future losses of the insurer. AAL is the expected loss per year when averaged over a very long period. In probabilistic terms AAL is a mathematical expectation.

The pure premium rate was “loaded” to cover administrative costs, profits, and a “risk charge” that accounts for the variability in the year-to-year claim experience. This last rate component covers the cost of the capital (including general reserves) that the insurer must set aside to remain solvent in the event of a major earthquake. The risk charge depends primarily on the probable maximum loss (PML) of a major earthquake for a selected return period and the cost of capital.⁸ Given the catastrophic nature of the risk insured, the variation coefficient of the program’s claims experience is expected to be rather high, thereby requiring significant catastrophe reserves.⁹ As a result, in the case of the TCIP, the risk charge happens to be the single largest premium cost component.

In addition to construction type, premium rates vary by geographical zone. The seismic map of Turkey divides the country into five risk zones with potential hazards ranging from 1, the highest, to 5, the lowest,

Figure 2.4 Earthquake Hazard Map of Turkey



Source: World Bank.

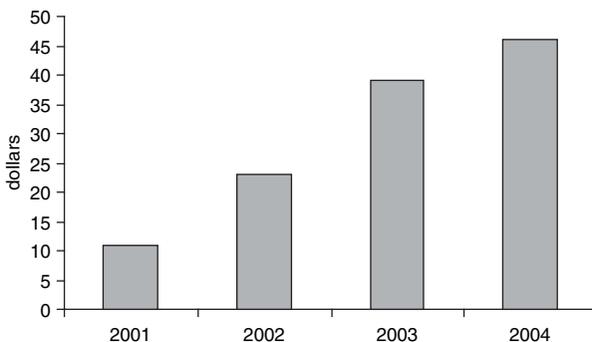
reflecting an evaluation of seismic activity, faults, and earthquake history (figure 2.4 and inside front cover). These zones bear no relation to administrative divisions or geographical characteristics.

One of the main advantages of the differential risk-based pricing adopted by the TCIP is that it considerably reduces the adverse selection problem in which only homeowners located in high earthquake risk areas would have an incentive to buy earthquake insurance. The challenge is to set rates at a level that will attract consumers in all seismic zones, while including a degree of cross-subsidization sufficient to keep premiums in the high risk zones at an acceptable level, that is, the application of the solidarity principle. The result is that TCIP earthquake insurance coverage has been priced to be affordable for even low-income homeowners (figure 2.5).

The average annual premium per household has increased as follows: approximately \$11 in 2001, \$23 in 2002, \$39 in 2003, and \$46 in 2004.¹⁰ These increases reflect, in part, a one-off rate increase in 2003 but are due primarily to increased replacement costs per square meter, higher insured limits allowed under TCIP policies, and high inflation rates.

The rates historically charged by the TCIP also appear to be consistent with the \$30 estimate provided by Seo (2004), who investigates how much premium policyholders are able to pay for catastrophe insurance cover. Overall, the average premium rate historically charged by the program has been consistent with the estimate of AAL provided at the end of 2002 by EQECAT, an international risk modeling consultancy. According to EQECAT, the AAL for the TCIP's portfolio in 2002

Figure 2.5 Average Individual TCIP Insurance Premium



Source: Author's calculations from Milli Re 2005.

was 1.24 percent, which roughly corresponds to the average premium of \$30 dollars charged by the program for a typical dwelling valued at \$25,000.

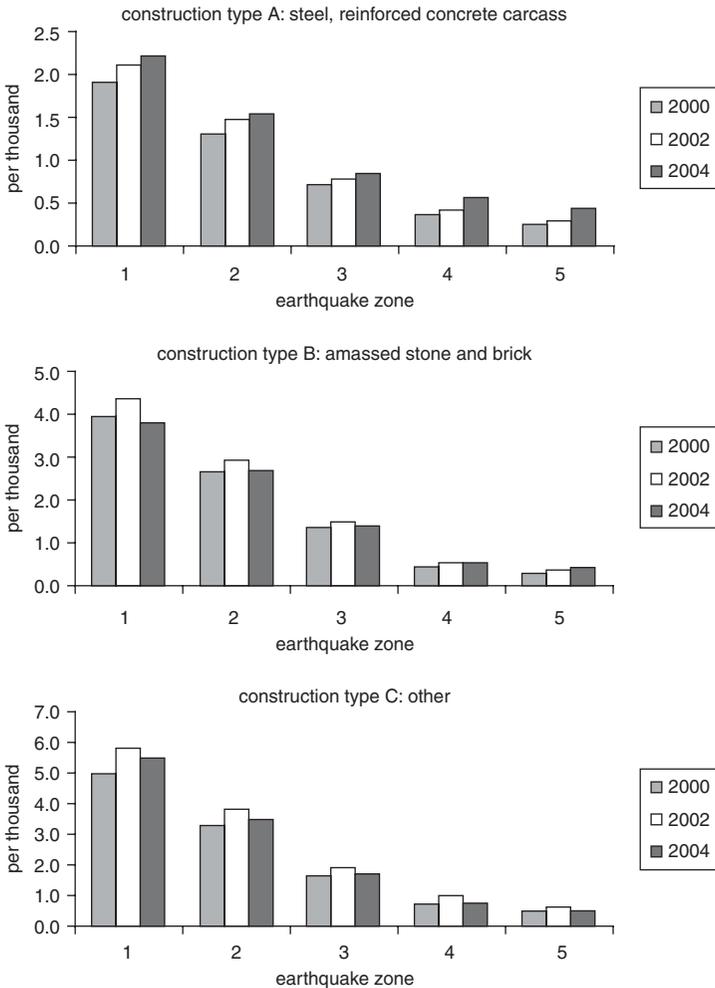
To remain solvent, the TCIP must adjust premium levels when they fall behind inflation or are insufficient to cover operational costs. Since 2000, premium rates for construction type A (buildings made of a steel or reinforced concrete carcass) have increased between 16 percent (zone 1) and 76 percent (zone 5) (figure 2.6). During the same period, rates remained flat for construction type B and decreased slightly for type C, which accounts for the smallest share of insured dwellings.

Risk Financing Strategy

The TCIP's risk financing strategy optimizes the relationship among premium levels, policy coverage, and creditworthiness. The pool is estimated to be able to cover a 1-in-200-year event without becoming insolvent. Its objective is to achieve a solvency level that would enable it to survive a 1-in-250-year event at an acceptable confidence level. Although the program does not yet have a credit rating, its implied rating based on the overall amount of its claims-paying capacity is estimated to be BBB+ (S&P rating system).

EQECAT has developed a special probabilistic earthquake risk model to determine the minimum amount of the pool's claims-paying capacity and the required pure premiums. Using historic earthquake data and information about the location of insured properties and their vulnerability to earthquakes, the model produced an aggregate loss exceedance curve (LEC) that allowed quantification of maximum TCIP losses for a given return period, for example, 50 years.

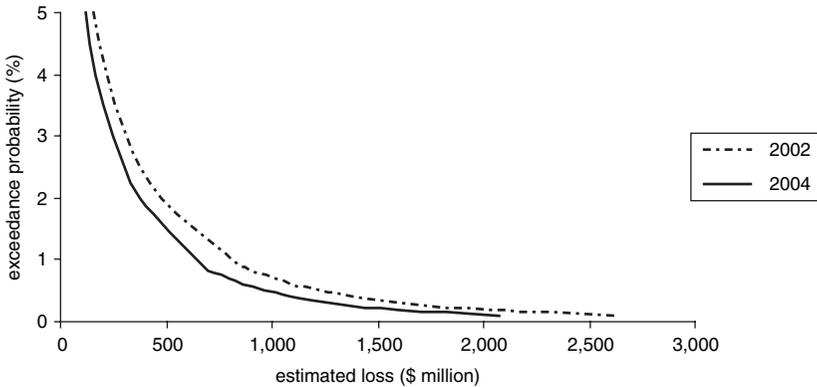
Figure 2.7 depicts a LEC based on the TCIP portfolio as of October 31, 2002 (Kuzak, Campbell, and Khater 2004), and recalibrated to the TCIP portfolio as of October 31, 2004. In 2002 the claims-paying capacity of the TCIP was approximately \$800 million, meaning that it could meet claims caused by a 1-in-100-year event in most cases. In 2004 the TCIP portfolio was more diversified so the LEC in 2004 was below that in 2002. In addition, the TCIP claims-paying capacity had increased to

Figure 2.6 TCIP Premium Rates for Construction Types A, B, and C, 2000–4

Source: Authors' calculation from Milli Re 2005.

almost \$1 billion, ensuring that the TCIP could survive an earthquake in Istanbul with up to a 250-year return period.

A key issue addressed by TCIP Manager Milli Re was the sourcing of the pool's claims-paying capacity. Millie Re had to determine how much risk the pool should retain and how much should be covered by external capital providers such as reinsurers and the World Bank. The decision had

Figure 2.7 TCIP Portfolio Loss Exceedance Curve

Source: Kuzak, Campbell, and Khater 2004; authors' calculations.

to balance the program's overall creditworthiness considerations against the importance of building internal reserves through higher risk (and premium) retention.

Initially, because the program's own reserves were low, Milli Re decided that the pool would retain just enough risk to be covered by the World Bank contingent capital facility; the rest would be transferred to the international reinsurance market. Contingent debt proved to be a useful instrument for financing catastrophe pool loss exposures, particularly in the first years of operation, when rapid buildup of surplus is required. The contingent capital facility provided by the World Bank also helped the pool to deal effectively with the fluctuations and cycles of the reinsurance market.

Reinsurance has been the main source of the TCIP's claims-paying capacity from the beginning (table 2.5; box 2.2). To accommodate the growing number of homeowners participating in the program, the terms of the TCIP's reinsurance agreement provided for the possibility of adding new layers of risk coverage in the course of an underwriting year.

The original design of the TCIP program envisioned no government financial commitment to the program. However, in a heated public debate, the government was accused of being financially irresponsible to prospective policyholders. Subsequently, it had no choice but to renounce its original intention to let the TCIP prorate claims in case of an earthquake causing insured losses in excess of the pool's financial resources.

Table 2.5 TCIP Total Claims-Paying Capacity in Millions of Dollars, 2001–5

	2001–2	2002–3	2003–4	Nov. 2004– Apr. 30, 2005	May 1–Oct. 30 2005
Self-retention	24.4	25.1	49.5	101.1	101.1
Reinsurance	725.0	645.0	600.0	580.0	769.0
World Bank	85.0	100.0	150.0	180.0	180.0
TOTAL	834.4	770.1	799.5	861.1	1,050.1

Source: Milli Re 2005.

Since then, the government has become the pool's reinsurer of last resort: the government would provide additional claims-paying capacity to the program if its funds are insufficient to meet all claims in case of a very large catastrophic event. However, there is no change in the Decree Law on this issue, so this guarantee must be seen as conditional. Today, with the TCIP's overall claims-paying capacity approaching \$1 billion, allowing the pool to absorb 1-in-200-year event losses, its contingent call on government financial resources has been somewhat reduced.

Box 2.2 TCIP Reinsurance Tender

The pool's approach to reinsurance buying has become considerably more sophisticated. To determine the optimal amount of reinsurance and the appropriate structure of the reinsurance program given affordability constraints, the TCIP evaluated the bids using a stochastic scoring model based on the TCIP earthquake model and a simplified dynamic financial analysis (DFA) model. DFA uses computer simulation techniques to project a company's income and balance sheets through a multiyear period, typically 10 or 20 years. The scoring model estimates the probability of TCIP solvency for a one-year period, taking into account recoveries from a specified reinsurance program and the premium charged for such a program. The reinsurance program that received the highest score was selected for final negotiations.

The TCIP's reinsurance tender may have been the first instance of a stochastic model's use to identify the most cost-effective reinsurance proposal for a major risk pool. Given the relatively unique competitive/cooperative nature of the reinsurance sector, only experts on reinsurance markets should apply such an approach.

Source: Authors.

The TCIP has consistently maintained a level of solvency that would make it highly likely to survive an earthquake in Istanbul with a 100-year return period. Although the amount of claims-paying capacity maintained by the pool has remained relatively stable, its composition has changed considerably (table 2.5). In the first two years of the program's operation, reinsurance accounted for more than 80 percent of claims-paying capacity, while the program's own funds (reserves) were almost negligible. By the end of 2004, the level of reserves had risen to almost 12 percent, while reinsurance accounted for 67 percent; the World Bank contingent capital facility covered the balance.

The first two years of the TCIP's operation coincided with what was reportedly the country's worst economic crisis. Nevertheless, the TCIP has overcome its initial overdependence on reinsurance by building its own reserves, which at the end of 2004 neared \$100 million. TCIP funds now increase by more than \$60 million per year in nondisaster years.

Investments are subject to constraints and asset allocation criteria, which take into account the underlying purpose of reducing financial risk to the TCIP and, ultimately, to its policyholders. Since 2004 professional asset managers have been employed to manage a significant portion of the TCIP's assets. The TCIP has invested its premiums in low-risk, highly liquid assets, which it holds in a segregated trust or an escrow account, thereby protecting them from any possible creditor action or other use.

The TCIP's current and targeted claims-paying capacity—1-in-200-year and 1-in-250-year return periods, respectively—are broadly in line with industry norms. This capacity gives the program an adequate level of economic capital without burdening policyholders with excessive costs. Observers note that the TCIP is currently in a fortunate situation: its capital costs have remained relatively low due to ongoing capital support from the World Bank, and Turkish earthquake risk still accounts for a small fraction of reinsurers' global earthquake risk exposure. Should rates of earthquake insurance penetration rise considerably, the TCIP may face much higher implicit reinsurer capital costs.

Notes

1. In 2003 the government undermined incentives for Turkish citizens to buy TCIP coverage or undertake mitigation measures by waiving the provisions of the law and declaring all victims, insured or not, of two earthquakes eligible for government support.
2. An ongoing public information campaign and the TCIP's demonstrated ability to settle claims quickly and efficiently has significantly increased the public's awareness of and willingness to use earthquake insurance.
3. This special regulatory status has recently been challenged (see chapter 4).
4. A second manager was appointed after a competitive five-year tender in 2005.
5. The authors specifically acknowledge the prominent role played by Munich Re and Goldman Sachs in the consultation process and express their appreciation for their professional support.
6. In the recent public tender, the five-year management contract was awarded to Guarantee Sigorta, a member of a bank assurance group with strong systems and marketing capacities.
7. This practice amounts to wholesaling international reinsurance pricing to the general public, with a smoothing buffer.
8. In the case of the TCIP, the PML is defined as the largest likely loss to insured dwellings from an earthquake with a 150-year return period. Under this definition, the annual probability of losses from any single catastrophic event exceeding the given PML estimate would be equal to 0.66 percent.
9. The variation coefficient is the ratio of standard deviation to mean.
10. The average annual premium is defined as the ratio of written premiums to the number of policies sold.

Operational Logistics and Corporate Financial Framework: Key Challenges

The TCIP is by far the largest government insurance program in Turkey. Despite its impressive accomplishments, the program has been unable to provide catastrophe insurance coverage for the majority of Turkish urban dwellings. As of February 1, 2006, it provided coverage to over 2.2 million Turkish homeowners, or approximately 17 percent of the insurable housing stock.

Understanding the TCIP's successes and ongoing challenges necessitates an understanding of the economic, social, and political environment in which the program has been operating, as well as the many issues it has encountered. These issues can be grouped in five major categories: (1) the country's economic environment, (2) the availability of political support and the country's legal framework, (3) the TCIP's corporate governance, (4) the TCIP's operating approach and challenges, and (5) consumer attitudes and education.

Economic Environment and the 2001 Financial Crisis

Until recently, Turkey has been known for its unstable macroeconomic environment and a highly skewed distribution of income. These factors have been among the major economic constraints to development of the financial sector, including nonlife insurance.¹ Even though Turkey's

average per capita income based on purchasing power parity is relatively high (\$6,700 in 2003), the majority of the Turkish population lives on less than \$700 a year (World Bank 2003). The 2001 financial crisis, which saw a 9.1 percent decline in the size of the economy, widened these disparities in income. The crisis led to a dramatic decrease in personal incomes as well as to other financial and psychological damage that lingers. The crisis left approximately 1.2 million people jobless, and thousands of businesses had to close down or downsize.² The impact was felt by the entire country and all social groups: skilled, unskilled, educated, and uneducated alike. The crisis also highlighted the fragility of the banking system, which suffered from disintermediation due to a lack of confidence by depositors and users of financial products, including insurance.

The launch of the TCIP in late 2000 coincided with the 2001 economic crisis, which became a major handicap for the program's growth and development for at least its first two years of operation. The public's focus shifted from treating the wounds of the earthquake to shouldering the damages of the financial crisis. Fear of earthquakes and concerns about the future became secondary to feeding one's family.

Legal Framework

One of the main objectives of Decree Law No. 587, the legislation that laid the legal foundation for creation of the TCIP, was to reduce the government's fiscal outlays on reconstruction of private dwellings in the aftermath of earthquakes. Expenditures were to be reduced through risk internalization by urban homeowners through the payment of an affordable insurance premium and subsequent efficient risk transfer to private reinsurance markets.

Decree Law No. 587 came into effect on December 27, 1999. The tariffs and related regulations were published in Official Gazette No. 24164 on September 8, 2000.³ To encourage homeowners to comply with the decree law's requirement to buy earthquake insurance coverage, the government amended Disaster Law No. 7269 to eliminate its legal obligation to replace destroyed urban dwellings through provision of heavily subsidized reconstruction loans. But the government has yet to present a

full-fledged earthquake insurance law, which (unlike a decree law) can impose sanctions for noncompliance, to Parliament. Moreover, Parliament twice has passed special earthquake assistance legislation enabling uninsured homeowners to apply for government funds in the aftermath of earthquakes. This lack of political will to accept insurance as a preferred way of funding private sector losses continues to be one of the most prominent obstacles to the TCIP's efforts to expand earthquake insurance penetration.

Although these efforts are also frustrated by the government's limited fiscal resources, a well-publicized long wait for postdisaster subsidies, and general uncertainty surrounding the amount and the timing of government assistance, deferral of the earthquake insurance law remains a more major hurdle to the TCIP's ability to efficiently provide earthquake insurance coverage to the majority of Turkish homeowners. The World Bank estimates that enactment of the law would increase the number of TCIP policies by at least 500,000. An additional 300,000 eligible households would enter the scheme if the Housing Development Authority (HAD) were obliged to work with the TCIP, which can offer lower costs and more security than any domestic competitor.⁴

Another political economy issue arises from the TCIP's creation as a special legal public entity, designed to be exempt from all taxes, levies, and charges and, where appropriate, prudential and accounting requirements for government-owned entities. Two new laws, the Public Financing and Supervision Law and the Procurement Law for State-Owned Enterprises, both of which increase government oversight of the finances and operations of state-owned enterprises, could negatively affect the TCIP. But their impact on the TCIP—which unlike other state-controlled companies has no public employees, no explicit public capital, and no formal government ownership and is funded by the premiums of private citizens—remains unclear. As noted in earlier chapters, the TCIP has been managed by a private reinsurance or insurance company, and its premiums are collected by insurance companies and their agents. Professional surveyors already active in the market perform loss adjustment services, and a private advertising company organizes promotion. Observers' main concern with increased state involvement is that the TCIP's ability to transfer earthquake risk to the international reinsurance market may be jeopardized if the program is made subject to the new laws.

To prevent potential misuse of funds, Decree Law No. 587 specifies that TCIP resources may be used only for compensation payments, reinsurance payments, administration costs, the commission paid to the company acting as the pool administrator, scientific studies, consultants advising on relevant areas of pool administration, public relations, company commissions, loss determination procedures, or repayment of state funds provided in advance to the pool. Despite initially pessimistic predictions regarding the feasibility of keeping the TCIP's funds separate from those of the government, the considerable reserves accumulated by the program have been well managed to date. However, if classified as a state entity, the TCIP would be required to place its funds with nominated state banks, thus negating its purpose.

The decree law requires that a prudential approach be taken in weighing the pool's resources and potential obligations. The law does not explicitly state that, in the event of unexpected losses, government liquidity would be unavailable as a last resort, which in effect makes the government the reinsurer of last resort. However, as already implied, any potential claim on the state is viewed as a low-probability event.

Corporate Governance

Decree Law No. 587 describes the roles of the Treasury and the General Directorate of Insurance, the TCIP Board, and the operational manager.

Role of the Treasury and the General Directorate of Insurance

The Treasury is responsible for defining provision of the TCIP's insurance coverage, which is reflected in the general conditions, tariffs, and instructions of TCIP policies. The Treasury is also responsible for determining the commission payable to insurers, their agents, or both as well as for overseeing earthquake insurance premium rates to be charged by the TCIP. Any increase in TCIP premium rates in excess of that indicated by the annual official construction cost index is subject to the Treasury's approval.

In establishing the terms of insurance coverage, premium rates, and commissions, the Treasury strives to

- Maintain the financial viability of the TCIP.
- Increase the size of the fund to reduce the TCIP's reliance on protection purchased from third parties, for example, reinsurance.
- Encourage mitigation of earthquake risk through improved standards of construction for domestic dwellings.
- Encourage Turkish homeowners to purchase TCIP policies through attractive pricing.

Premium rates and commissions are set within the parameters established by underwriting guidelines and are published annually in the Official Gazette of the Government of Turkey. In setting rates and commissions, the Treasury relies on the opinion of the TCIP board.

The GDI is responsible for auditing the books, records, and procedures of the TCIP, as well as for ensuring the accuracy of its annual financial statements. The board is responsible for selecting qualified insurance companies to market the TCIP's policies. As of March 2005, 32 insurance companies had been authorized to sell earthquake insurance policies on behalf of the TCIP. The written agreement between the TCIP and each authorized insurer contains a provision enabling the TCIP to cancel the agreement immediately should the insurer fail to fulfill its obligations under the agreement.

In the TCIP's first years of operation, the Treasury played a pivotal role in

- Developing the program's state-of-the-art information and technology systems.
- Training the pool manager's staff.
- Organizing nationwide public education campaigns.
- Implementing a system of checkpoints to ensure the public's compliance with the requirements of Decree Law No. 587.

Without the Treasury's active involvement in development of the TCIP's key functions, the program's future would have been far from certain.

Role of the Board

The TCIP's board, in consultation with the GDI and the operational manager, determines the broad goals of the TCIP (box 3.1). The board establishes the program's operational objectives regarding policy sales and volumes, renewal ratios, costs and expenses, claims-handling capacity and response times, marketing effectiveness, and minimum standard of claims-paying capacity for reinsurance purposes.

The board is responsible for ensuring that the TCIP has sufficient financial and human resources to carry out its functions and meet its objectives.

The board has the authority to appoint the individuals and companies that are authorized to adjust claims presented by policyholders to the TCIP.

Before each financial period, the board establishes a budget and cash flow projection that enables the TCIP to implement its operational strategy and achieve its operational objectives as envisaged in the business plan for that financial period while sustaining the pool's liquidity.

In consultation with the Treasury, the board also approves the TCIP's asset management strategy. This strategy—combined with the purchase of adequate protection through reinsurance and contingent debt—aims at bolstering the TCIP's claims-paying capacity in the face of its insurance obligations in a worst-event scenario. The board has authority to appoint asset managers to invest funds accumulated under the TCIP.

The board has enhanced the TCIP's reputation in the eyes of the Turkish public. It has worked with a public relations consultant, and several of its members, including the CEO of the initial operational manager, have become frequent guests on widely watched national television programs.

Role of the Operational Manager

The government decided to outsource all operational tasks to private insurers. This decision necessitated engagement of a manager to handle all technical and administrative tasks in the TCIP's daily operations. The government considered whether to leave selection of the manager to international competition or to appoint Milli Re, the largest reinsurance company in Turkey, under the strict supervision of the GDI for the first five years. The government strongly preferred the latter option because

Box 3.1 Responsibilities of the TCIP Board

In Decree Law No. 587, the board was charged with the following major responsibilities:

- Establish the main principles of TCIP's operations and approve the program's annual business plan.
- Formulate the principles and procedures regulating the performance of the TCIP operational manager.
- Identify the insurance companies authorized to write compulsory earthquake insurance for and on the account of the TCIP and create the program's minimum compliance requirements.
- Determine the principles and procedures guiding payment of claims and ensure timely payment of eligible claims.
- Approve the risk management and the reinsurance plan.
- Establish investment allocation guidelines and procedures for investment of the TCIP's reserves and surplus.
- Attend to public relations and publicity campaigns.
- Take measures to ensure that all buildings subject to earthquake insurance are covered by insurance.
- Approve the TCIP's annual financial, operational, and audit reports.

(1) it had close ties to Milli Re, whose board always had a government representative; (2) Milli Re had been Turkey's only national reinsurer and pool manager for 70 years; and (3) Milli Re's seasoned and highly qualified management was well known for its intimate knowledge of the Turkish insurance market. At the time, Milli Re provided almost 40 percent of reinsurance capacity to the local insurance market and had close connections with the international reinsurance market.

Milli Re was appointed operational manager of the pool through a contract with the Treasury Undersecretariat under the authority granted in Decree Law No. 587. Beginning August 8, 2000, Milli Re would operate the TCIP under the instruction and guidance of the board for five years.⁵

The main responsibilities of the operational manager are to

- Facilitate active sales of TCIP policies through available distribution channels.
- Manage policy portfolios and monitor the TCIP's receipt of premiums.
- Ensure adequate and cost-efficient reinsurance protection for the program.
- Manage loss adjustment and claims settlement processes to ensure the expedient payment of claims after an earthquake.
- Maintain an IT database with the TCIP's policies and claims and all supporting accounting and accumulation control information.
- Manage the TCIP's business relationships with insurance companies, agents, service providers, and consultants.
- Provide regular management information as and whenever instructed by the board.
- Operate the TCIP in a secure and cost-efficient manner.
- Make suggestions to the board on ways to improve the effectiveness and efficiency of the TCIP.
- Maintain a call center to respond to queries from insurance agents and homeowners regarding earthquake coverage.

For providing these services, the operational manager receives a management fee determined by the size of the insurance premium written by the TCIP.

Insurance Operations

An important step in institutionalizing the TCIP's operational practices was to prepare its operating guidelines. The guidelines set the standards of performance for the operational manager and the TCIP's service providers in day-to-day matters such as the characteristics of the TCIP

earthquake insurance policy, the risk underwriting process, sales of TCIP policies, the claims-handling process, financial management, and IT systems. Each of these matters is detailed below.

TCIP Policies

TCIP policies are printed by the operational manager and sold by authorized insurance companies and their agents throughout the country. Two types of TCIP policies are available: a continuous form (the initial form), and an A4 form (introduced subsequently to facilitate operations for agents).

The TCIP policy period is one year. Unless otherwise specified, the cover commences and terminates at noon in Turkey on the commencement and termination dates written on the policy.

Buildings and units subject to compulsory earthquake insurance are as follows:

- Independent units falling under the scope of Law 634 on flat ownership.
- Buildings constructed as dwellings on lands subject to private ownership and registered in the deed.
- Independent units within these buildings used for commercial, office, and similar purposes.
- Dwellings constructed by the state, with credits provided by the state after natural disasters, or both.

The following buildings are not included within the scope of the compulsory earthquake insurance:

- Buildings owned by public establishments and institutions.
- Buildings constructed within the settlement areas of villages.
- Buildings used entirely for commercial and industrial purposes.
- Buildings constructed after December 27, 1999, without any construction license granted within the framework of the relevant regulations.

Owners of commercial and public buildings are not required to buy earthquake insurance, but they can voluntarily purchase it from private companies. The provision to exclude government-owned residential buildings from the scope of coverage is being revised to ensure that these buildings are included in the program.

Because homeowners living in villages typically have low incomes, insurance coverage in rural areas would be difficult to provide. Moreover, the government had not envisioned compulsory insurance coverage in villages, which frequently have no municipality and thus no building inspection system. Therefore, dwellings in rural settlements remain eligible for direct government support.⁶

Because the TCIP is a tool for promoting construction of safe housing through compliance with building codes and construction standards, it cannot insure recently built buildings that do not comply with building codes.

Under the TCIP, all material damage to insured buildings (including damage to the foundations, main walls, combined walls that separate independent units, ceilings and floors, stairs, landings and platforms, corridors, roofs, and chimneys) caused directly by an earthquake (including fires, explosions, and landslides following an earthquake) are covered up to the insured value. The following risks are excluded from the cover:

- Cost of debris removal, loss of profit, business interruption, foregone rent, alternative residence and business office expenses, third-party liabilities and the like, and any other indirect losses.
- All kinds of movables, goods, and the like.
- All bodily damages, including death.
- Request for moral indemnities.

If a false claim is discovered, the TCIP has the right of recourse against the insured (1) for the whole of the paid or to-be-paid indemnity in cases in which a false declaration is made intentionally and (2) for the amount of the indemnity exceeding the percentage between the premium collected and the premium to be collected in cases in which a false declaration is made unintentionally.

Risk Underwriting

The TCIP's premium tariff is determined by the Treasury Undersecretariat in consultation with the Association of the Insurance and Reinsurance Companies of Turkey and international insurance organizations, and in accordance with insurance pricing techniques and conditions prevailing in Turkey. The tariff is built on three components:

- *Type of building or unit to be insured.* Buildings are classified under three categories:
 1. Steel reinforced concrete carcass (buildings with steel or reinforced concrete carcass carriers).
 2. Amassed stone and brick (noncarcass buildings, carrying walls made of materials such as rubble, ashlars, bricks, or concrete bricks with or without holes and upholsters, floors, stairs and ceilings of concrete or reinforced concrete).
 3. Other (wood, adobe, or other buildings that cannot be classified under the above groups).
- *Earthquake intensity zone.* As was shown in figure 2.4, the Ministry of Public Work and Settlement has identified earthquake hazard zones in Turkey. These zones reflect seismic activity, faults, and earthquake history and range from level 1 (highest potential hazard) to level 5 (lowest).
- *Sum insured.* This sum is equal to the square meter of the dwelling multiplied by the square-meter value indicated in the Compulsory Earthquake Insurance Tariff and Instructions published by the Treasury Undersecretariat.⁷ The sum is adjusted to reflect construction costs. The maximum amount of cover for a dwelling is TL 85 billion (approximately \$62,500).

Rates to be applied to the sum insured are detailed in the previous chapter (table 2.4). The program has 15 rating categories as determined by 3 types of construction and 5 earthquake zones. Although a larger number of rating categories might have been more technically accurate, the main philosophy underlying the TCIP policy has been to provide coverage on terms that can be easily understood by the majority of homeowners.

Engineering surveys of units and buildings for which TCIP coverage is requested are not possible because of the large number of potentially insurable units (over two million). Moreover, such an underwriting procedure would have been costly and thus would have made the TCIP premium less affordable for Turkish homeowners. Thus, in pricing and underwriting the business, the TCIP has to rely on the portfolio approach typically practiced by reinsurers of catastrophic risk.

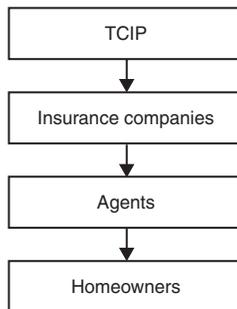
The TCIP policy is a “first-loss” contract—that is, losses are to be paid after applying a 2 percent deductible but without any underinsurance penalties up to the sum insured. Losses occurring within consecutive 72 hours are attributed to a single event.

Sales of the Policies

Although insurance companies and their agents assume no risk under the TCIP, their role is fundamental to the program’s success. Acting as intermediaries in the sale of TCIP policies throughout the country, insurance companies and their agents directly influence the volume of TCIP’s policy sales and the public’s perception of the program. Figure 3.1 summarizes the marketing process.

As of March 2005, 32 insurance companies were authorized to sell TCIP policies, and each had deposited a credit guarantee sum of \$50,000 into its TCIP account. These companies earned a 12.5 percent commission in the TCIP’s first year of operation.

Figure 3.1 TCIP Marketing Process



Source: Authors.

Because insurance penetration grew mainly in earthquake zones 1 and 3, the TCIP decided in the second year to boost sales in less disaster-prone areas by increasing the commissions payable to insurance companies for policies sold outside zones 1 and 2. As of March 2005, TCIP had paid insurance companies a commission of 12.5 percent of the policy premium in Istanbul and 17.5 percent outside Istanbul and zones 1 and 2.

Table 3.1 shows the distribution of the TCIP portfolio by regions since the program's establishment. The current TCIP portfolio remains unbalanced; more than 50 percent of the insured dwellings are located in the highly seismic and vulnerable Marmara region (zone 1).

Policies in force reached their highest level in 2001 at 2,430,000, representing 18.7 percent of total insurable dwellings. However, after this peak, the number dropped due to Turkey's worsening economic situation and the public's realization that no penalties would be imposed for non-compliance with the requirement for mandatory earthquake insurance coverage. As of September 2005, the total policy number was approximately 2.22 million, a penetration rate of about 17 percent, which represents a slight increase from the 16.5 percent figure recorded in February 2005 (table 3.2).

According to some insurance company managers, one reason for stagnant insurance penetration is insufficient efforts by the TCIP and the government to increase awareness of the merits of the TCIP's earthquake insurance coverage and to change many consumers' view that the TCIP insurance policy premium is a tax. Marketing efforts of insurance companies may also be to blame. Seventy percent of TCIP policyholders fail

Table 3.1 Distribution of TCIP Portfolio by Region

Region	12/31/2001	12/31/2002		02/01/2005
		(%)	12/31/2003	
Marmara	50.9	54.7	53.6	51.5
Central Anatolia	19.6	17.4	16.9	17.2
Aegean	16.2	15.4	16.3	16.5
Mediterranean	6.3	5.8	6.0	6.4
Black Sea	4.8	4.6	4.5	5.0
East Anatolian	1.2	1.2	1.5	2.0
South East Anatolian	1.0	1.0	1.2	1.4
TOTAL	100.0	100.0	100.0	100.0

Source: Mille Re 2005.

Table 3.2 Regional TCIP Insurance Penetration since the TCIP's Inception (percent)

Region	12/31/2001	12/31/2002	12/31/2003	11/28/2004	02/01/2005
Marmara	29.84	28.07	26.16	25.52	26.43
Central Anatolia	21.34	16.61	15.37	15.84	16.61
Aegean	16.92	14.09	14.25	14.58	15.33
Mediterranean	9.27	7.47	7.24	7.91	8.55
Black Sea	9.11	7.63	7.16	7.95	8.34
East Anatolian	4.68	4.06	4.86	6.68	7.18
South East Anatolian	3.25	2.86	3.25	3.96	4.09
Turkey	18.69	16.38	15.57	15.80	16.51

Source: Milli Re, 2005.

to renew their policies on their expiration, perhaps because most insurers fail to dispatch renewal notices, a problem that the TCIP's new operational manager will address.

The insurance companies are requested to have the policyholder fill in all the information related to the policy and to transmit such information promptly (real time) to the TCIP in the electronic medium (online transfer).

The companies cannot offer their own earthquake insurance cover unless the TCIP's cover for housing units (up to \$62,500) is used. However, private earthquake insurance can be written for the part exceeding the sum insured under the TCIP policy, provided that the TCIP policy has already been purchased.

TCIP policies are printed by the operational manager and are delivered on request to authorized insurance companies in accordance with previous production figures. Authorized insurance companies distribute blank forms to their agents using their own internal distribution mechanisms.

At the policy-buyer's request, the agent electronically enters the insured's policy data in the TCIP database, which calculates the price of the policy and the commission and registers the policy sale. The agent can access a TCIP screen with an assigned username and password. Policy numbers are generated automatically and assigned by the TCIP system on completion of the online sale. The policy number also can be viewed as a dwelling's ID number. The agent prints the policy details and the ID number on the TCIP form and obtains the client's signature and premium payment. Once signed by the applicant, the policy is activated for one year.

The program provides for two types of amendments: those that affect the premium and those that do not. The changes are printed together with the data that are still valid, as in issuing a new policy. The amended policy has an endorsement number and an endorsement type code in addition to the originally assigned policy number.

The authorized insurers are expected to demonstrate diligence in ensuring the successful renewal of their clients' TCIP policies. They are required to advise each policyholder at least one month in advance that the policy is about to expire and that renewal is necessary. In renewing a TCIP policy, the agent uses the policy number to retrieve the policy record from the database and enters any additional changes on the risk.

Authorized insurance companies and their agents issue compulsory earthquake insurance policies on the Internet or through their real-time data transfer systems. Accounting settlements are based on the data they transfer to the TCIP's central IT system. The companies draw up statements of account related to a certain month in the first week of the following month and pay net balances (gross premiums less commissions) before the end of the month.

Claims Handling

Claims under the TCIP are managed by the operational manager. According to the contract between the TCIP and the authorized insurance companies, the latter offer support and assistance to ensure prompt loss adjustment and settlement whenever required by the former.

When an earthquake occurs, several factors influence the TCIP's claims management. These factors include distance of the earthquake to the operational manager's headquarters, means and time of access to the earthquake area, weather conditions in the area, number of insured units in the area, initial estimation of damaged units, and the extent of damage. As soon as an earthquake occurs, officers of the TCIP Operational Manager arrive at the Claims Management Center, where the staff is reinforced, if necessary, by transferring staff from other departments. Information on insured units in the earthquake area is retrieved from the computer database. Channels

for claim notification are announced through mass media, and posters displaying these numbers are faxed to agents of the insurance companies located within the earthquake area.

Affected homeowners can notify the TCIP of their claims through ordinary mail, electronic mail, facsimile, direct phone lines, and the operational manager's call center, where staff from different departments have been trained to receive claim notices and enter them in the computer records.

Loss adjustment is one of the most critical aspects of the relationship between the TCIP and its clients. Speed, consistency, and homogeneity in loss adjustment sustain public confidence in the program.

The basic task of a TCIP loss adjuster is to determine the cost of compensating for the amount of loss. The program retains loss adjusters already employed by the insurance industry. Its efforts to recruit more loss adjusters have been frustrated by the small number of individuals who have the technical knowledge and experience needed to adjust earthquake losses. In 2003 the TCIP board decided to address this problem by launching a special training program that emphasizes the TCIP's "first-loss" policy and targets individuals and institutions lacking professional loss adjustment experience but possessing the needed technical knowledge.

Loss adjustment begins when the TCIP receives and classifies a sufficient number of claim notices, which are promptly assigned to loss adjusters. The station to be set up in the earthquake area will be in constant contact with the loss adjusters in the area, and additional loss assessments may be requested from a loss adjuster for claim notices received at a later time.

The replacement value of a building is the basis for determining the indemnity amount. The latter is calculated on the basis of the cost of constructing an equivalent new building on the date and at the place at which the loss occurred. However, the indemnity amount can in no way exceed the insured amount.

The TCIP must inform the insured of the loss and indemnity amount within the shortest possible time following receipt of documents on the loss amount.

The loss adjuster who has investigated the damaged building fills in a loss adjustment report. Once the TCIP and the insured reach agreement

on the full amount of indemnity, that amount is to be paid within 30 days. Because compulsory earthquake insurance provides base-level coverage and in effect supersedes government aid, some observers suggest the TCIP could strengthen its public support by making prepayments, which later would be deducted from the full indemnity.

Indemnity or advance payments are remitted by the fastest form of bank transfer to a bank branch that the insured can easily reach. The insured signs a letter of discharge to receive his or her indemnity payment.

According to the general provisions of the Compulsory Earthquake Insurance Policy, the insured is obliged to take certain actions when a dwelling is damaged as a result of an earthquake:

- Inform the TCIP, the insurance company, or both of damage within 15 working days of becoming aware of it.
- Give permission to TCIP officials, authorized bodies of the TCIP, or both to enter the damaged building using reasonable means and taking any measures likely to reduce the loss.
- On the TCIP's request, submit without delay all the information and documents that are useful in determining the loss amount.
- Within a reasonable and appropriate time, submit a written note indicating the estimated loss amount to the TCIP, its authorized bodies, or both.
- Inform the TCIP of earthquake coverage other than the compulsory coverage for the insured dwelling.

The cause, characteristics, and amount of loss in the buildings insured under the compulsory earthquake insurance are fixed by agreement between the parties according to the findings of the TCIP's loss adjusters or authorized bodies. If the parties do not come to an agreement on the loss amount, arbiters determine it.

The TCIP may cancel the contract if the insured makes alterations in the insured dwelling contrary to legislation within the insurance period.

If the loss is total, the insurance expires by payment of indemnity. If the loss is partial, the sum insured decreases to the extent of the indemnity amount paid as of the date of risk occurrence. If the sum insured

decreases, it can be increased by collecting additional premiums from the insured for the period. The additional premiums would start on the date on which the damaged dwelling is restored to its original condition and would continue to the policy expiration date.

Financial Management

The TCIP's income comprises insurance premiums, income from investments, and reinsurance recoveries. Expenses include claims payments, claims-handling expenses, reinsurance premiums, commissions paid to insurance companies and their agents, the operational manager's fee, advertising and public relation campaigns, administration and operation of the TCIP, debt service on the World Bank contingent capital facility, and other small miscellaneous expenses. The TCIP's income is exempt from any taxes, duties, and charges.

The TCIP required sensitive financial management in its early stages (table 3.3). Premium written (in current prices) increased by 72 percent between 2001 and 2002 (mainly because of a two-digit inflation rate close to 45 percent) and by 46 percent between 2003 and 2004. Reinsurance costs have decreased since 2002 by more than 50 percent in relative terms, demonstrating the TCIP's ability to rely less on international reinsurance (and thus more on its own reserves) and to negotiate better pricing terms over time. The negative result in 2002 reflects the lack of political support for a necessary but politically difficult increase in insurance premium rates to bring them in line with increased construction costs: the rate increase was implemented in early 2003, markedly reversing the pool's financial deterioration and bringing about an impressive bottom-line improvement in 2003 and 2004. All annual surplus generated by the program is used to boost its earthquake reserves.

Management of TCIP assets is based on principles set out in investment guidelines proposed by the board and approved by the Treasury. In 2003 the pool retained a professional investment advisor to manage its surplus funds in accordance with its investment guidelines. Because the composition of the TCIP's investment portfolio is crucial to the program's ability to pay claims quickly and in full, investment choices should be immune to a loss in value in the event of a large earthquake—the time at which the TCIP would be selling assets to meet its claims.

Table 3.3 TCIP Statement of Income, as of October 28, 2004 (TL billion, current prices)

	2001	2002	2003	2004 ^a
Premiums written	38,103.2	65,605.1	86,305.3	126,208.4
Premiums earned	38,125.7	61,798.0	79,395.8	105,342.0
Net investment income	14,975.7	16,436.8	25,810.8	22,265.0
Net foreign exchange income	4,227.4	445.3	3,130.0	-518.1
Other income	0.0	4.2	3.3	4,235.7
Total income	57,328.8	78,684.3	108,339.9	131,324.5
Reinsurance costs	31,052.2	60,630.9	49,392.5	26,124.5
Claims incurred	176.0	2,543.5	5,849.5	1,244.9
Direct costs	178.6	250.4	803.4	1,111.6
Promotion	247.7	3,583.1	4,366.6	3,820.6
Outsourced costs	9,063.5	12,375.6	16,337.1	23,872.9
Taxes and other costs	878.1	2,290.9	6,338.6	4,674.2
Total expenses	41,596.2	81,674.3	83,087.7	60,848.7
Net reserve accrual	15,732.6	-2,990.0	25,252.2	70,475.8

Source: Milli Re 2005.

a. Full accrual accounting was adopted only in 2001.

Investments are chosen to meet liquidity, preservation of principal, and rate of return criteria. The TCIP Operational Manager chooses investment instruments in accordance with the asset allocation guidelines approved by the GDI (term deposit in Turkish lira, treasury bonds, securities) and the investment strategy based on prevailing market conditions. For domestic holdings, the credit rating must be the highest available in Turkey. The investment grade of all securities in the portfolio must be at least an A according to the Standard & Poor's classification. Total investment exposure to one single issuer must not exceed 10 percent of total portfolio assets (except for treasury bonds). The maturity of instruments other than treasury bonds and government bonds should not exceed 181 days.

Table 3.4 shows the TCIP's balance sheet since inception,⁸ during which period reserves have been invested almost exclusively in Turkish government bonds and bank deposits. The TCIP's assets almost quintupled between 2001 and 2004, while the accrued reserve almost quadrupled (all at historical prices). Although inflation accounted for a large part of these increases, the recent appreciation of the Turkish lira against the U.S. dollar has solidified most of these gains in dollar terms.

Table 3.4 TCIP Balance Sheet since the Pool's Inception, 2000–4

Asset (TL billion)	12/31/00	12/31/01	12/31/02	12/31/03	12/31/04
At bank	1,610.9	32,027.5	70,079.5	63,373.1	80,939.43
Other liquids	22.7	3.3	0.2	0.5	5.1
Government bonds ^a	3,569.7	6,030.8	26,252.9	52,652.1	117,841.4
Other investments	12.7	111.4	998.9	0.0	3,450.8
Insurer receivables	812.5	1,596.5	3,193.6	6,844.0	9,422.8
Other receivables	109.7	503.1	127.9	139.2	1,870.2
Written-down equipment	0.0	32.3	3,107.2	3,050.0	2,284.2
TOTAL	6,138.2	40,304.9	103,760.2	126,058.9	215,813.9
Liability (TL billion)					
Bank line of credit	0.0	0.0	63,095.4	53,882.3	52,059.0
Creditors	4,828.9	5,114.7	4,613.0	3,076.6	52,847.2
Tax liability	0.2	0.3	0.7	4.8	10.6
Accrued reserves	1,309.2	35,189.9	36,051.1	69,095.2	110,897.2
TOTAL	6,138.3	40,304.9	103,760.2	126,058.9	215,813.9

Source: Milli Re 2005.

a. Government bonds plus other investments.

Reinsurance

The TCIP Operational Manager made premium projections regarding the volume and spatial composition of the TCIP's first-year premium (particularly, the percentage of premiums written in earthquake zones 1 and 3) before deciding on a risk transfer strategy. These projections were used to determine probable maximum loss, the amount of reinsurance coverage the TCIP would need in its first year of operation (November 1, 2000, to October 31, 2001), and likely pricing.

Subsequently, the operational manager placed an excess-of-loss reinsurance cover with reputable international reinsurers for the first year of the TCIP's operations. This reinsurance program had the following characteristics:

- It was intended to be for one year, but the operational manager had the right to cancel the cover at the end of the first six months, taking into account the penetration and the exposure experience of the compulsory earthquake insurance program.

- The first three layers were attached at the beginning and ran for 12 months, whereas the other three layers were attached quarterly and ran for 9, 6, and 3 months respectively.
- Premium adjustment was based on the TCIP's average aggregate premium written at the end of the period.
- An option fee was paid to the reinsurers to reserve their capacity.
- A consortium of the world's four biggest reinsurance brokers placed the reinsurance cover.
- Sixty highly rated reinsurers, including Munich Re, Axa Re, and the Lloyd's Syndicate, agreed to commit their reinsurance capacities to the TCIP.

In the second year of the program's operation (November 1, 2001, to October 31, 2002), the reinsurance program was financed by the World Bank, which necessitated the consortia of reinsurers' brokers and reinsurers to participate in a competitive bidding procedure. Despite the September 11 events, which drastically reduced reinsurance capacity and considerably increased reinsurance premiums across the board, the TCIP tender was well received by the reinsurance market. Two major consortia of major international reinsurers—one led by Willis/Guy Carpenter and one by AON/Benfield Greig—submitted qualified bids. EQECAT, an independent risk modeling company, evaluated the bids according to the procedure outlined in the bidding documents. The winning bid offered \$730 million of reinsurance capacity on terms more favorable to the TCIP than the terms offered by the losing bid.⁹ Both bids signaled the market's endorsement of the pool's risk management and risk underwriting practices.

The successful placement of this program was a major achievement for the GDI and Operational Manager Milli Re, supported by the World Bank's Financial Sector Vice Presidency.¹⁰ Since then, the pool has enjoyed significant annual reductions in the online rate charged by its reinsurers. In 2004 this rate was almost 30 percent less than that charged in the first year of the TCIP's operations.

Figure 3.2 synthesizes the 2001–5 annual reinsurance placement of the TCIP's operation. The program maintained a relatively constant level of risk retentions (approximately \$20 million) and claims-paying capacity (\$990 million) in its first five years. However, over the last several years, the *composition* of TCIP's claims-paying capacity has changed. Since 2004 the TCIP has made a determined effort to reduce the amount of reinsurance it buys and to become more reliant on its own surplus and on the contingent debt provided by the World Bank. This strategy appears to have borne fruit.

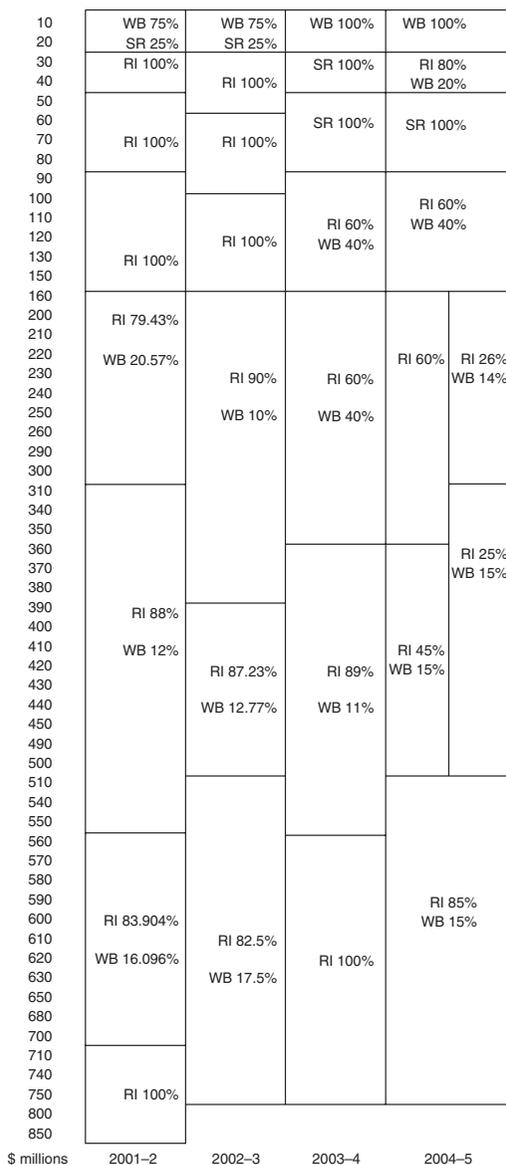
It is worth mentioning that the reduction in the level of reinsurance protection does not affect the TCIP's ability to meet insurance obligations. In 2004, for instance, the overall amount of the program's claims-paying capacity was sufficient to survive a 1-in-200-year event. This capacity corresponds to the minimum investment grade credit rating for catastrophe reinsurers. In the absence of a major earthquake during the next three to five years, the program is likely to become largely self-sustaining.

Information Technology System

In the wake of the 1999 Marmara earthquake, the Turkish government and the World Bank were anxious to launch the TCIP. To achieve major increases in earthquake insurance penetration, ensure secure and timely payment of premiums, improve the quality of risk management and financial reporting, achieve fair pricing and prompt settlement of assessed claims, implement an appropriate investment policy, and accumulate adequate funds, the TCIP urgently needed to implement an efficient financial and management information system. However, a short deadline worked against the immediate availability of a fully integrated system. This deadline necessitated outsourcing of many business processes and operating systems to existing banking and insurance entities until a permanent system could be established.

An Internet-based pilot system was implemented. Initially designed as the main and only Web-based centralized TCIP production system, the Metaxsan program was used by many insurance companies to sell policies. Although over 300,000 policies were sold through this system,

Figure 3.2 Percent of Annual Reinsurance Agreements under the TCIP, Nov. 1–Oct. 31, 2001–5



Source: Authors' calculation from Milli Re 2005.

Notes: This example illustrates the logic of the above figure. For instance, in 2004–5, the \$20 million coverage in excess of \$20 million (100 percent financed by the World Bank) was provided jointly by reinsurers (80 percent) and the World Bank (20 percent). SR = TCIP self-retention, RI = reinsurance consortium, WB = World Bank contingent debt.

numerous deficiencies with the interface were detected. This “alternative system,” as it came to be called, also had limited growth potential and was not fully integrated with other TCIP information technology systems. The latter problem delayed transmission of policy data between insurance companies and the TCIP while considerably raising transaction costs. In the interim, however, the Metaxsan system, which required relatively little maintenance by the TCIP, offered the best available centralized data control capability for the pool.

One of the immediate goals of the TCIP and the Turkish government was to establish an Internet-based central policy production center providing flexible, scalable, secure, and controllable services. The primary objective of the system was to enable the effective sales and tracking of obligatory earthquake insurance policies over the Internet, to use the Internet along with traditional sales channels, and to provide effective damage control when necessary.¹¹

On February 26, 2002, Hewlett Packard (HP) Turkey was awarded the contract to develop the TCIP Information Systems Project, to be completed in two phases. The first phase was completed within four months of the contract signing. As the main contractor, HP Turkey was responsible for delivering all products, providing the necessary services and training, and managing the project from the signing of the contract through completion.

The TCIP Information Systems Project was designed to create a wide-spread sales channel with real-time control and monitoring from a single center. This channel, in turn, increases the efficiency of damage monitoring and payment systems. Additionally, compared with the previous system, the new design provided more flexibility for the insurance companies, which were the main sales channel for the policies.

The TCIP Information System (figure 3.3) has generated wide-ranging benefits for both the Turkish government and the Turkish insurance industry. The system has allowed the government to securely manage TCIP data from a single center. In addition, it provides an accurate and reliable shared address bank. Finally, it offers a successfully working and scalable model for future similar projects.

The operating strategy adopted by the TCIP, largely at GDI's insistence, enables the program to deal directly with agents in writing and renewing business and remittance premiums.¹² The new high-performance system,

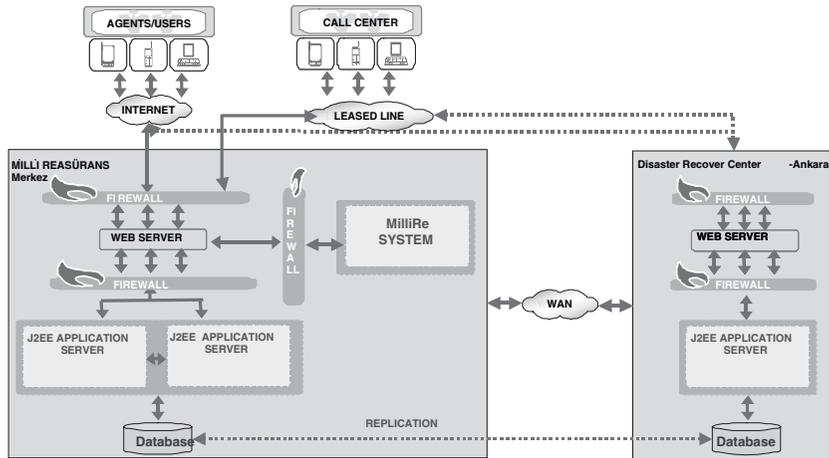
managed through the central database of the TCIP information systems, controls the sale of policies directly through the Internet for most companies. However, a real-time data transfer function also is incorporated in the system. This function is designed for large insurance companies that have invested in their own IT systems and want their agents to use them. Insurance companies whose agents use their corporate systems to sell TCIP policies are required to connect to the TCIP central system to receive policy and serial numbers in real time. The operating system supporting both modes of operation rests on a state-of-the-art Internet-based IT network administered by the operating manager.

The TCIP's IT system allows for real-time online policy sales, premium booking, and claim advice through the Internet. In other words, it provides for policy production, claims management, financial management, reporting, and other management support functions. Furthermore, the system collects all relevant statistical data, taking into account the location of the policyholder (earthquake zones, urban, rural) and the building being insured (type, number of stories, age). Quick and accurate access and analysis of these data are essential to the optimal portfolio management of the TCIP.

The system supports Web access as a distribution network and produces policies in real time through the central database and application software after central approval. Using interactive SSL (secured socket layer) techniques, a predefined user (an authorized insurance company or agent) provides a username and password to access a general policy screen and enters the necessary information. This innovation will enable use of SMS (short message service) technology within the GSM (global system for mobile) framework for policy renewals and claims advice.

To secure against loss of the database in the event of a major earthquake, a disaster recovery center has been set up in Ankara to act as a backup system. This center provides functions such as replication, analysis, and inquiries, while acting as a "mirror site" to ensure the TCIP's continuity and performance.

According to figures from February 2004, 9 insurance companies use the TCIP's real-time data transfer method, while 18 transfer data through the Internet application. Currently, up to 10,000 policies are

Figure 3.3 The TCIP's Current Information Technology System

Source: HP Turkey 2004.

sold or renewed daily through the TCIP's IT system with very low transaction costs, which total approximately TL 30,000. An "online data transfer"-based transaction is answered within 0.02 seconds on average, evidence of the system's speed and efficiency. This award-winning project with a \$100 million e-business platform presents a worthy model of e-government transformation in Turkey.

Consumer Demand for Earthquake Insurance

In 1999 Turkey was a middle-income country emerging from its worst-ever recession. The public had little awareness of earthquake risk and little trust in the insurance industry. To gain consumer confidence, the TCIP would have to invest heavily in public education and marketing campaigns. Since 2002 the program has spent an average of \$3 million per year to counter misunderstandings about the compulsory component of the TCIP, the amount of premiums to be paid, use of the collected funds, and operation of the pool.

An increasingly positive attitude toward the TCIP has been observed. The largest-ever increases in the number of policies sold in 2004 (43.5 percent and 24.5 percent, respectively) occurred in the eastern and

southeastern Anatolian regions, which are economically and socially the most disadvantaged regions of Turkey. The policy count for 2005 was a record million.

This increase tends to confirm growing public confidence in the program as well as the effectiveness of educational and awareness-raising PR campaigns conducted by the advertising agency hired by the TCIP. Nevertheless, earthquake insurance penetration remains relatively low, on average 17 percent across the country and about 27 percent in the most disaster-prone areas.

Prejudice and Misunderstandings

Participation in the TCIP program was initially stymied by established prejudices and lack of information about the program. Even before the program began operating, incomplete information led to criticism and speculation. Many people presumed that the TCIP was another state-owned enterprise (SOE) and that the compulsory earthquake insurance was just another kind of tax. Newspaper columnists and TV news anchors raised concerns that the earthquake insurance premiums would be used to finance the administrative expenses of this state-owned insurance giant. Some people claimed that the government would tap into the pool to fund part of the public budget deficit or to subsidize other government-supported programs. On March 28, 2001, approximately six months after the introduction of the TCIP, one columnist raised his concerns in *Aksam* (a daily Turkish newspaper): “Instead of leaving the earthquake insurance to the private insurance firms, this burden is now loaded on the government’s shoulders. In an era where we cry out for privatization of existing SOEs, now it looks like we are going to have another SOE.” The columnist went on to point out that Turkey’s Board of Privatization of SOEs had become an SOE.

Lack of Confidence

In a survey of public opinion about the TCIP conducted by Cozum Advertising in 2002, respondents raised numerous concerns, most of which can be summarized in the following remarks:

- “How do I know I will get paid in full or at all if an earthquake damages my home?”
- “How long will it take me to get paid, if ever?”
- “In how many installments will I get my money?”
- “If an earthquake damages thousands of residences, will the system have enough money to pay all the policyholders?”
- “How do I know that the money collected will not be spent for something else or used to finance other government programs?”

The public’s lack of confidence in the TCIP owed to two factors. First, because the program is compulsory (although in name only), people assumed that it was an SOE and that premiums amounted to a tax. Many believed that the TCIP would be inefficient and ineffective and that its funds would be used for purposes other than earthquake insurance, leaving the pool with insufficient resources to pay claims.

Second, the TCIP’s insurance product was not well understood. Even today, a significant portion of the Turkish population apparently does not know what insurance is and how it works. Many consider it to be too complicated and intimidating, do not know how to buy insurance policies, and believe it would be too difficult to file a claim and collect payment. Furthermore, most people still perceive insurance to be a luxury product that they cannot afford.

Lack of confidence in the TCIP has been reduced somewhat as the program has delivered what it promised. After an earthquake on February 3, 2002, in Afyon, a city in western Turkey, the Hurriyet News Agency reported that policy numbers in the area jumped from 5,000 to 13,000 because noninsureds observed that the TCIP had made prompt and full payments to 1,090 program participants.

Lack of Awareness of Earthquake Risk

Even though 96 percent of Turkey lies in an active earthquake zone, most people had never thought about whether their homes would survive an earthquake. This lack of awareness of earthquake risk was evidenced by the small portion of homes—less than 3 percent—insured against the risk.

Turkey's construction industry was also oblivious to earthquake risk. A massive migration of labor from small towns in the east to big cities in the west since the mid-1980s accelerated the industry's growth. This growth was fueled by double-digit inflation, which encouraged people to buy property as an inflation hedge. Comforted by the strong demand for housing and a strong political lobby, builders constructed homes without paying much attention to building standards. In the absence of effective interventions by municipal authorities, newly developed industrial cities outside of Istanbul soon were filled with non-earthquake-compliant high-rise buildings, leading to the deaths of thousands of people in the 1999 Marmara earthquake.

If ever there was a time to introduce compulsory earthquake insurance in Turkey, it was in the aftermath of the Marmara event. Delay of the TCIP's introduction until the end of 2000 and the financial crises that occurred soon after apparently dampened the public's desire to participate in the program.

“Benevolent Father” Syndrome

When the roots of the resistance of certain social segments to some instruments of the market economy in Turkey are examined, two particular aspects stand out.

One is the historical relationship of Turks to the state. Throughout the centuries, the Turkish people have had a unique relationship with the head of state. Under this system, the center dominated; peasants agreed to do military service when circumstances required and paid a proportion of their crops as tax. Most land belonged to the state, and the privilege of owning land was granted by the central authority. In return, the state protected the “subjects” and ensured that they were not exploited by merchants or moneylenders. This relationship was established during the rule of the Ottoman Empire (1299–1923), in which the sultan was not only the ruler of the empire but also the *caliph*, or religious leader of Muslims. Consequently, except in cases such as certain philanthropic foundations, there was no explicit guarantee of property rights for a long period. Indeed, property could be confiscated at any time.

Reforms in the nineteenth century initiated changes in this rigid structure, but a lack of adequate capital formation and entrepreneurship hindered system transformation. The founding of the new Turkish Republic in 1923 was a milestone in the development of private enterprise. However, the 1929 Great Depression led to a diversion: a hybrid system was created through introduction of state-owned enterprises. Some of these SOEs were profitable and supported the private sector by investing in productive activities. However, continuous tax and debt amnesties granted by the various governments reinforced the state's "benevolent father" image and persuaded many Turkish people that government would compensate their losses from natural disasters in the same way.

Changes made by the new republic have introduced more analytical behavior to people living in metropolitan areas. However, people living in rural areas continue to adopt a more traditional behavioral pattern that prevents them from taking control of their lives. Some Turks believe that God has predetermined one's fate and that this fate should be accepted.

Promotion

The TCIP has initiated many projects to increase awareness of its presence. These projects have included documentaries on national and local television channels, radio spots, announcements in newspapers, public meetings, an educational movie for elementary school pupils, and a variety of publications. Other promotional efforts include the TCIP General Coordinator's attendance at national and international conferences and seminars and regular tours to Anatolia by the program's advertising agency (Cozum Ajans) and Milli Re. In Isikara, after consultative activities that included meetings with nongovernmental organizations, visits to local officials, presentations to regional agencies, and interviews on local TV stations, it was agreed that TCIP information brochures would be distributed with water bills.

However, the most effective promotional tool has been the TCIP's payment of claims on time and in full after a disaster. By the end of 2004, the program had paid over 8 trillion TL in claims to 4,931 people (all for relatively small-scale earthquake incidents).

Table 3.5 Advertising Campaign and TCIP Participation, 2000–5

Key dates	Number of policies sold
11/30/2000	31,803
03/13/2001	502,896
03/30/2001	1,004,021
12/31/2001	2,444,512
04/04/2002	1,726,583
03/23/2005	2,156,905
04/30/2005	2,138,068

Source: Milli Re 2005.

Table 3.5 draws a parallel between some key dates in the promotion of the TCIP and the number of policies sold. The alternative system allowing the issuance of policies outside the Internet system was introduced on November 30, 2000. The responsibility of the state to provide credits for reconstruction after earthquakes was abolished on March 27, 2001. The number of policies in force reached 2.4 million on December 31, 2001. But when the government provided disaster relief to uninsured households following the Afyon earthquake in 2002, the number of policies decreased to 1.7 million. In April 2002 the TCIP launched an information campaign in the media that appears to have reversed the portfolio decline.

Notes

1. Hyperinflation in particular has until recently inhibited the growth of long-term savings through life insurance and pensions.
2. See Annual Report of the Turkish Insurance and Reinsurance Companies Association 2001.
3. The decree was enacted on December 27, 1999. However, the article authorizing policy sales did not become effective until a later date due to the need to complete preparatory technical work and adequately inform prospective policyholders in advance about this compulsory insurance.
4. The HAD was specifically exempted from the decree establishing the TCIP.

5. The results and implications of the quinary tender for the TCIP's ongoing management are discussed in chapter 4.
6. Rural properties typically cost substantially less than urban properties to replace.
7. The current square meter values by type of construction are (A) TL 380 million, (B) TL 270 million, and (C) TL 145 million.
8. The annual accounts, transactions, and expenditures of the TCIP are audited both by the Treasury Undersecretariat and an independent auditing firm appointed by the TCIP Operational Manager.
9. The online rate was 10 percent lower than that paid in 2000.
10. One clear lesson is that procurement should be at the level of the broker and not include the actual reinsurance placement.
11. The General Directorate of Insurance and the TCIP decided to outsource this undertaking and sought proposals with the following specifications: (1) a Java-based, high-performance application designed to operate through the Internet; (2) a high-performance central database; (3) an open, scalable, and fault-tolerant IT infrastructure; (4) a high-performance, expandable, and reliable LAN and WAN structure; (5) migration of the data in the legacy system to the new system; and (6) training and consulting services to operate the system.
12. This system was not a competitive issue while Milli Re was the operating manager.

Future Challenges: Threats and Opportunities



The TCIP faces both continuing and new operational, political, and legal challenges. These challenges and options for meeting them are described below.

Insurance Penetration

As noted in previous chapters, the TCIP almost quadrupled the level of earthquake insurance penetration that the private insurance market had achieved on its own. In the 2002–4 period, the penetration level held steady at approximately 2 million policies and in 2005 it reached 2.5 million, representing one-fifth of all eligible residential dwellings in Turkey. Nevertheless, in the absence of major regulatory or structural changes in the program’s design and implementation, this penetration level is unlikely to increase significantly. The most plausible scenario is that TCIP policy sales, like sales of other private insurance products, will grow a little faster than annual increases in the level of GDP per capita.¹

Attainment of a higher level of earthquake insurance penetration is dependent on

- Limiting government's future bailouts of uninsured homeowners to the provision of structured relief.
- Securing the insurance industry's cooperation through appropriate incentives.
- Ensuring adequate claims-paying capacity.
- Developing a regulatory framework consistent with a genuine public-private partnership.
- Finding additional distribution channels to reach the underserved.

Political Support

The TCIP has received only lukewarm political support within Turkey, as evidenced by the still-pending enactment of the Earthquake Insurance Law and the rapid passage of special-purpose laws after two recent earthquakes. As noted in previous chapters, the latter authorized government financial assistance to uninsured homeowners to rebuild destroyed or damaged dwellings.

Given relatively low insurance penetration levels outside Istanbul, politicians are understandably tempted and have some superficial justification to bypass the TCIP and provide politically popular postdisaster reconstruction assistance. Rapid growth in penetration would reduce political pressure on the government to provide reconstruction aid to affected homeowners. The authors believe a penetration level greater than 30 percent is a meaningful interim target.² A critical step in reaching this target is enactment of the Earthquake Insurance Law, which the General Directorate of Insurance estimates would increase the number of policies in force by at least 0.3 million to 0.5 million.

Theoretically, earthquake insurance is mandatory for registered housing in Turkey under Decree Law No. 587. As noted in previous chapters, this measure has proved relatively toothless, because a decree law cannot impose sanctions. Although some minimal forms of enforcement have been implemented—gatekeepers have been introduced through the property registration process and the activation of certain utility services—these measures cannot guarantee that premiums will be renewed annually.

Ideally, a parliamentary law with appropriate sanctions would be enacted.³ The most obvious sanction would be a credible threat of very limited access to government funds following a disaster (access comparable to that under the U.S. flood insurance scheme). If such a law cannot be passed, a necessary fallback would be to require earthquake insurance for all who take out mortgages. Given the nascent stage of mortgage lending in Turkey, this process would take time to be effective, but implementing it sooner rather than later is desirable if only to protect the balance sheets of the debt holders.

Disaster-prone countries need to establish disaster relief mechanisms that enable politicians to appear in a favorable light by exercising some control over emergency funds while following aid allocation rules agreed in advance. But even with such mechanisms in place, political pressures in the aftermath of natural disasters may lead to poorly planned fiscal expenditures and result in extreme moral hazard, whereby citizens see no benefit in mitigating or controlling risk. A better strategy is to acknowledge the political economy reality and institutionalize the inevitable political response to disasters in a way that provides institutional incentives for communities and citizens to engage in ex-ante risk management.

In Turkey this strategy could be achieved by creating a special fund, partially funded by the TCIP, from which the government could withdraw supplementary emergency resources. These funds would not be available for reconstruction but could be used for emergency repairs. This innovation was noted in a report of the Procurement of Resources and Insurance Committee of the Earthquake Council in October 2004.

If the TCIP is to achieve its objectives, political economy issues cannot be ignored. In the likely event that the Earthquake Insurance Law is not introduced to Parliament, the opportunity should be taken to withdraw it from the Prime Minister's office, to negotiate with the relevant parties, and to introduce a law that has a good chance of passing. Such a law is likely to involve a structured relief program that could be supported by donors. Such a program would provide immediate financial assistance to victims of natural disasters and their communities. It should be designed to provide sufficient incentives for private homeowners to participate in the TCIP's insurance program.

Securing Insurance Industry Cooperation

The limited operational and financial involvement of the Turkish insurance industry in TCIP operations continues to impede the TCIP's insurance penetration. Under the current program design, the insurance industry is reduced to the role of distribution agent responsible for selling policies and collecting insurance premiums. Risk retention and inclusion of the TCIP premium in the companies' overall premium production numbers is not allowed by the regulator.

The TCIP pays relatively high commissions to insurance companies, albeit on a relatively small average premium of approximately \$50.⁴ Nevertheless, insurance companies put little effort into motivating their insurance agents to sell more TCIP policies, because they see no potential upside from this line of business. Insurance agents are also reluctant to actively market TCIP policies, because they receive, at best, only half of the commission payable by the TCIP (insurers receive the rest as a service fee). Preliminary calculations by the World Bank suggest that, in areas outside Istanbul and Izmit, and so long as the TCIP policy remains a stand-alone policy, insurance commissions may be insufficient to cover even the fixed agency costs of issuing a policy.⁵

Several TCIP design modifications could increase the cooperation of the insurance industry and thus the program's insurance penetration. One such modification would be to allow approved insurers to incorporate the TCIP's terms and conditions in their homeowners' policies and to retain a small part of the TCIP's premium. This change could increase revenues per policy and enhance the profitability of the TCIP business line for insurers, who could use the additional income from reinsurance exchange commissions to increase the share of the TCIP commission to their agents. In areas with low premium rates, the insurance commission also could be restructured to include a minimum flat policy fee to be retained by the intermediary to cover agents' fixed costs. Similarly, the proposal documentation could be reexamined to simplify processes at the customer interface. A second modification the TCIP should consider is providing special incentives to insurers and insurance agents to reduce the extremely high policy nonrenewal rate, which is currently 70 percent.

Another efficient and cost-effective way to increase the level of policy renewals is to sending renewal notices by mail or in an SMS format to

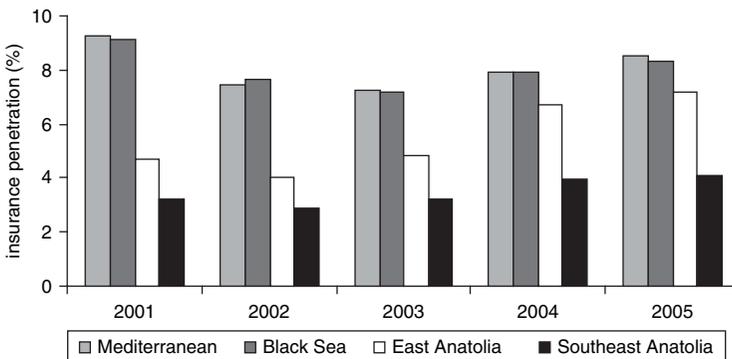
customers whose policies are about to expire. The low rate of policy renewal appears to be the focal point of attention for Guarantee Insurance, the TCIP's new operating manager. As a member of a large countrywide financial firm with advanced electronic banking and marketing capacity, Guarantee Insurance is well-positioned to address the problem through creative marketing and financial incentives.

Additional Distribution Channels

Despite recent modest growth in insurance penetration outside Istanbul, Ismir, Ankara, and several other major urban centers, insurance coverage in rural areas has remained low (figure 4.1). It varies from approximately 9 percent in the Mediterranean part of the country to approximately 4 percent in southeast Anatolia.

To some extent, rural areas' low insurance penetration can be explained by income and education levels, which are considerably lower than national averages. However, at least part of the problem apparently lies with relatively thin insurance infrastructure in some parts of the country. In the absence of developed insurance-agency networks, alternative distribution channels may become a viable alternative. For instance, the TCIP could consider marketing its policies directly to consumers through mobile sales offices that can serve several communities at a time. It also could consider teaming up with commercial banks and state-owned banks that provide financial services to local communities.

Figure 4.1 TCIP Insurance Penetration in Rural Areas, 2001–5



Source: Authors.

Regardless of the channels developed and the future role of private sector insurers, the TCIP will need to ensure that consumers can purchase pure stand-alone earthquake contracts if they wish.

Risk Management Challenges

A primary objective of the TCIP has been maintaining its claims-paying capacity.

Accomplishments

The program has been successful in securing adequate reinsurance protection from international reinsurers at competitive prices. Since its launch, the cost of the TCIP's reinsurance protection has decreased by 35 percent in relative terms. This significant savings on the cost of reinsurance was achieved without compromising the program's overall claims-paying capacity, which at approximately \$1 billion will enable the program to survive most catastrophic events with a 200-year return period. The reinsurance cost savings in combination with the capital support provided by the World Bank contingent line of credit has enabled the TCIP to build nearly \$200 million in earthquake reserves to date. This total compares favorably with the \$25 million in special earthquake reserves for the whole Turkish insurance industry before the program's launch in 2000. In addition to increasing solvency, the buildup of catastrophe reserves has reduced the amount of reinsurance that the TCIP buys from the commercial reinsurance market. The ultimate effect is reduced costs of earthquake insurance coverage for Turkish homeowners.

Legislative Challenges

The program's present claims-paying capacity remains below that for similar state-sponsored earthquake insurance programs in the United States and other developed nations. The California Earthquake Authority has a claims-paying capacity sufficient to withstand a 1-in-800-year event

(critics of the CEA point out that this capacity may be on the high side). A better comparison would be with a BBB+ rated reinsurer, which is expected to have a claims-paying capacity that would enable it to survive a 1-in-250-year event.

To strengthen its claims-paying capacity, the TCIP could buy more reinsurance on commercial terms, which is likely to translate into increased premium rates, or, to keep the rates intact, it could rely on cheaper sources of risk funding such as the World Bank contingent capital and its own reserves. According to the operating manager, the \$180 million facility from the Bank saves the program \$7.7 million in reinsurance premium per year and generates \$1.5 million in additional investment income. In the absence of major earthquakes, the TCIP presumably would be in the position to add at least another \$50 million or so (from net premium and financial income) to its reserves annually. At this pace—and in the absence of a significant increase in its reinsurance costs or a major jump in insurance penetration—the TCIP should approach an insurance credit rating of A without rate increases by 2010 or 2011.

A major increase in insurance penetration is contingent on three factors: the country's growth rate, development of a national mortgage lending industry, and the potential enactment of the pending Earthquake Insurance Law. Any one of these factors is likely to give policy sales a major boost. The latter, as noted above, would likely result in an almost immediate 0.3–0.5 million jump in the TCIP's insurance penetration, which would require additional claims-paying capacity to cover new policyholders. To obtain this additional capacity, and to continue to offer insurance coverage at the present rates and credit quality, the pool would have to buy additional reinsurance and continue building its reserves at an even greater pace. Under this scenario, an ongoing contingent capital facility may become desirable to maintain the program's solvency at acceptable levels.

Regulatory Challenges

A short-term issue arises from newly proposed legislation that would classify the TCIP as a state organization.

As a special public insurance entity, the TCIP has been exempted from all state regulations applying to government-owned enterprises, has no public sector employees, and obtains its income directly from the private

citizens of Turkey. The government's financial support to the program has been contingent on the occurrence of a highly unlikely catastrophic event causing insured losses in excess of \$1 billion.

As noted in chapter 3, the TCIP's status may change due to enactment of two laws on state-owned enterprises: the Public Financing and Supervision Law and the Procurement Law for State-Owned Enterprises. These two laws potentially expose the TCIP to a range of audit, accounting, and procurement requirements. Although appropriate for genuine governmental entities, these requirements almost certainly would sound the death knell of a quasi-market insurer such as the TCIP, which is a genuine public-private initiative.

Article 68 of the Public Financing and Supervision Law makes TCIP expenses subject to government supervision. Article 70 provides scope for imposing large fines on the pool's managing company. Article 78 provides scope to apply state tax to up to 15 percent of the program's earnings. Article 81 removes all other exemptions.

Rigid application of the Public Financing and Supervision Law could endanger the operational viability of the TCIP, which since its inception has been managed according to best market practices. It would particularly threaten the TCIP's ability to place annual reinsurance cover on global reinsurance market terms and thus ensure the program's financial viability. Formalizing the TCIP's explicit (and tacit) exemption from the Public Financing and Supervision Law and reinforcing its public-private partnership status while maintaining rigorous corporate governance standards are crucial.

Potential Ways Forward

To conclude, several actions could be taken in response to each of the five main challenges facing the TCIP today.

Gain More Political Support

The program is likely to benefit from greater political support among the members of Parliament and government agencies. Such support can

be achieved by creating a structured program of government relief that coordinates closely with the TCIP's objectives. To provide incentives for Turkish homeowners to acquire earthquake insurance, the amount of postdisaster assistance for house repairs could be set at a figure significantly lower than the TCIP's insured policy limits.

In addition, a special risk management and mitigation fund could be created and at least partially funded by the TCIP to promote mitigation and catastrophe risk management in Turkey. This fund could finance individual risk assessments of household dwellings, assist in low-income homeowners' acquisition of earthquake policies, and promote the concept of risk management in schools.

Enlist the Cooperation of the Insurance Industry

To enlist a greater level of support by the insurance industry, the TCIP could

- Enable insurance companies to count the TCIP insurance premiums as part of their gross premium in their annual financial statements.
- Allow insurance companies to offer TCIP cover as part of their homeowners' policy, provided that the companies clearly display the TCIP logo and make a disclaimer that the mandatory earthquake coverage is underwritten by the TCIP.
- Facilitate homeowners's access to pure (stand-alone) TCIP policies by licensing several insurance companies to market only TCIP stand-alone policies.
- Allow insurance companies to retain up to 10 percent of TCIP business on a quota-share basis subject to a solvency test and provision of sufficient collateral.
- Give insurance agents and insurance companies incentives to achieve a certain level of policy renewals. (The program could also give its policyholders reduced premium rates for renewing their policies.)

An alternative way to improve coordination with the local insurance market, along with the program's overall operational efficiency, is to

transform the TCIP from a direct specialized insurance writer to a catastrophe reinsurance pool. This pool would serve the local market and other reinsurers on a compulsory cession basis. That is, insurance companies selling TCIP policies would be required to cede up to 90 percent of the premium (and risk) on the excess-of-loss basis to the pool, which would be administered by a reputable private reinsurance or insurance company.

Risk Management Challenges

The TCIP has made great progress in building its catastrophe reserves and bringing its claims-paying capacity to a level commensurate with the minimum investment grade rating. In light of potential increases in demand stemming from continuing economic growth or enactment of the Earthquake Insurance Law, the TCIP will have to increase its claims-paying capacity and its reserves. In June 2005, after a jump in policy sales, and for an extra reinsurance premium, the program converted its U.S.-dollar-denominated reinsurance protection into a similar amount of protection denominated in euros. The effect of the conversion was an immediate 30 percent increase in the program's claims-paying capacity. This development highlights two observations—one regarding the program's credit rating and the other regarding the World Bank contingent facility.

To maintain the amount of claims-paying capacity needed for an A rating, the TCIP would have to buy at least 300 million more dollars of reinsurance or build that much in reserves. At the current pace and in the absence of major earthquakes, either option will take at least five to six years. The latter approach is likely to be a better option, because it would enable the program to keep costs in check and, hence, maintain rates at the current affordable level. In this context, it may be desirable for the program to receive a formal rating from either Standard & Poor's or Moody's to formalize its risk management objectives. Such a rating also would enable the TCIP's major stakeholders to track the program's progress and better understand the TCIP's risk capital needs.

In light of the objective of attaining an A rating, and in the context of growing demand for TCIP policies, long-term provision of the World Bank contingent capital facility makes sense. The facility was recently

extended to cover the full November 2005 to October 2006 renewal period. At the end of this period the TCIP board will have the opportunity to recommend to the government that the \$180 million be drawn down. If the draw-down occurs, the World Bank will effectively be providing a solvency note to the program.

Regulatory Challenges

Conversion of the TCIP into a special status nongovernmental reinsurance entity, as proposed above, could prevent the program's potential bureaucratization. While maintaining the current status of the program as a special insurance entity exempt from taxation, the new legal status of the TCIP would explicitly recognize the program's nongovernmental nature. This new status might necessitate amendment of the current corporate governance arrangements, including the composition of the board and the current line of reporting, although the existing arrangements can in principle coexist with the program's status as a nongovernmental entity.

Alternative Policy Sales Channels

In the absence of well-developed insurance infrastructure in certain parts of Turkey, it may be desirable to supplement traditional channels for TCIP policy sales—that is, insurance agents and companies' representative offices. Alternative distribution channels might include mobile sales offices as well as local commercial and state-owned banks. Such channels are likely to considerably increase the level of earthquake insurance penetration in rural areas.

Notes

1. World Bank projections show that by the end of 2010 TCIP sales may increase by 34 to 48 percent, representing a total annual level of 2.9–3.3 million policies.
2. This level was attained in Colombia, where earthquake insurance is mandatory only in cases in which mortgage finance is involved.

3. Compulsory catastrophe insurance has precedence elsewhere, for example, in Switzerland.
4. TCIP insurance commissions are 12.5 percent outside Istanbul and 17.5 percent in Istanbul.
5. One estimate of agency overhead costs produced a figure of \$50 per hour.

English Translation
of Governmental Decree Law
No. 587 on Compulsory
Earthquake Insurance
as Published in Official Gazette
No. 23919 (December 27, 1999)

Purpose

Article 1—The purpose of this Decree-Law is to determine the principles and procedures for taking out Compulsory Earthquake Insurance by building owners or usufructuaries in order to ensure compensation of their material losses due to the loss or damage of the buildings in an earthquake.

Scope

Article 2—The independent sections covered by the Law No. 634 on Flat Ownership, the residential buildings constructed on the immovable which are registered with real estate registration office and which are subject to private ownership, the independent sections in such buildings which are used as a place of business, office or for similar

purposes, and the dwellings whose construction is contracted out by the State or which are constructed by the credits extended by the State due to natural disasters are subject to Compulsory Earthquake Insurance.

The buildings which belong to public establishments and the buildings constructed on village settlement areas are not subject to Compulsory Earthquake Insurance under this Decree-Law.

Definitions

Article 3—In this Decree-Law, the below terms have the following meanings:

- a) Minister or Ministry: The Minister or Ministry to whom the Treasury Undersecretariat reports,
- b) Undersecretariat: The Treasury Undersecretariat,
- c) Pool: Turkish Catastrophe Insurance Pool,
- d) Board: Management Board of Turkish Catastrophe Insurance Pool,
- e) Compulsory Earthquake Insurance: The compulsory insurance that covers the material losses to be caused directly or indirectly by an earthquake, up to the amount to be specified according to Article 10.

Turkish Catastrophe Insurance Pool

Article 4—Turkish Catastrophe Insurance Pool having public legal entity near the Ministry has been established in order to effect insurance and to fulfil the other tasks assigned to it under this Decree-Law.

The Pool is not subject to the Public Accounting Law No. 1050, The Law No. 3346 on the Supervision of the Public Economic Enterprises and Funds by the Turkish Grand National Assembly, the Exchequer and Audit Department Law No. 832, the Public Procurement Law No. 2886, the Law No. 6245 on Travel Expenses/Allowance.

Insurance premium receivables of the Pool are collected according to the provisions of the Law No. 6183 on the Procedure of Collection of Public Revenues.

The annual accounts, transactions and expenditures of the pool are audited by the Undersecretariat.

Tax Exemption

Article 5—The Pool and its revenues are exempt from all kinds of taxes, levies and charges.

Management of the Pool

Article 6—The Pool is managed by the Turkish Catastrophe Insurance Pool Management Board consisting of a total of seven members, one being the Chairman.

The technical works of the Pool and operational management are contracted out by the Undersecretariat to an insurance or reinsurance company, with the capacity of the Pool Manager. The contract is prepared for a term of maximum five years, and can be renewed according to the same procedure.

Turkish Catastrophe Insurance Pool Management Board

Article 7—The Board members consist of the following persons:

- a) One member to be designated by the Undersecretary (Prime Ministry), at least at Deputy Director General level, to represent the prime Ministry,
- b) One member from the General Directorate of Insurance, at least at Deputy Director General level, to represent the Undersecretariat,
- c) One member experienced in natural disasters, at least at Deputy Director General level, to represent the Ministry of Public Works and Settlement,

- d) One member experienced in fund management, at least at Head of Department level, to represent the Capital Markets Board,
- e) One member having at least 7-year experience in insurance and reinsurance fields, to represent the Association of Insurance and Reinsurance Companies of Turkey,
- f) One member who has graduated from civil, geophysical, geological engineering or equivalent disciplines with at least 7-year experience in the field of earthquakes, to be designated by the Undersecretariat,
- g) One member to represent the Pool Manager, at least at Deputy General Director level.

Board members are appointed by the Minister upon recommendation of the Undersecretariat. The Minister designates one of the members as Chairman.

Board members have a term of office of five years and may be appointed twice at most.

In the case of the Board members leaving the establishments they represent, their Board membership will end. For the replacement of the members whose memberships end for this reason or another, the related establishment designates a new member within two months and the new member is appointed according to the above procedure. Those members appointed as such complete the term of office of the persons whom they replace.

Board members should meet the conditions stated in items 1, 4, 5, 6 and 7 of paragraph (A) of article 48 of the Civil Servants Law No. 657.

The Board convenes with the attendance of at least five members and adopts its resolutions with at least four members voting in the same direction.

The Chairman represents the Board, and the resolutions adopted by the Board are executed by the Pool Manager.

The Chairman and members of the Board are paid the same amount of wages and other benefits as the chairman and members of board of the public economic enterprises.

Duties of the Board

Article 8—The duties of the Board are as follows:

- a) To determine the policies on the operation of the Pool and to arrange a work plan,
- b) To determine the working principles and procedures of the Pool manager,
- c) To determine the insurance companies authorized to write compulsory earthquake insurance for and on account of the Pool, and the principles and procedures they are to comply with, by obtaining the opinion of the Undersecretariat thereon,
- d) To determine the principles and procedures regarding the payment of claims, and ensure their earliest settlement,
- e) To approve risk management and reinsurance plan,
- f) To determine the principles and procedures for the investment of the Pool resources,
- g) To decide to carry out public relations and publicity campaigns,
- h) To take measures required to ensure that all buildings subject to the compulsory earthquake insurance are covered.

The Board may commission scientific research and studies on matters falling under its field of duty, and may employ a Turkish or foreign consultant under a special contract for a term limited to project period if it deems it necessary.

Imperativeness of Effecting Insurance

Article 9—It is compulsory for the owners or usufructuaries, if any, to take out earthquake insurance for the independent units and buildings within the scope of this Decree-Law.

The residential buildings and independent units to be constructed after the date of issue of this Decree-Law are subject to the Compulsory Earthquake Insurance, within one month from the permission of settlement or from their inhabitation, provided that the building license is obtained within the framework of the relevant legislation.

At least one month before the expiry of the insurance policy, the concerned insurance company notifies the policy holders that the policy will expire and that it is necessary to renew the insurance policy with a registered letter, telegram or through a notary public. In case the insurance policy is not renewed within one month from expiry, the Pool's responsibility arising out of insurance expires.

Insurance Coverage, Tariffs and Instructions, Commissions

Article 10—The amounts to be covered, general conditions, tariffs and instructions, the principles and procedures of payment of premiums, and the commissions to be paid to the Pool Manager and to the authorized insurance companies with regard to the compulsory insurance are determined by the Ministry and published in the Official Gazette.

In determining the insurance premiums, the following factors are taken into account: square meter of the building, construction category and quality, geological characteristics of the plot of land on which the building is erected, earthquake risk, and similar factors.

The State's Obligations Foreseen in the Legislation on Disasters

Article 11—The State's obligations to extend housing credit and to have buildings constructed arising from the Law No. 7269 on the Measures to be taken and Aids to be Provided due to the Disasters Affecting Public Life and other laws are abolished upon the Pool's making a claim payment regarding the material damages resulting from the losses and damages in the buildings within the scope of the insurance due to an earthquake.

Those who do not hold a valid Compulsory Earthquake Insurance pursuant to Article 9 of this Decree-Law shall not be eligible under the legislation on disasters for any compensation from the State regarding the losses to be met by this insurance.

Determining and Monitoring Those Obligated to Take Out Insurance

Article 12—Those who are obliged to take out insurance are determined by the Pool. During this procedure, the Pool makes use of the records of the relevant Governorate or Municipality and Real Estate Register Offices.

Official departments cannot affect any procedures, including real estate registration, related with the buildings subject to this insurance unless it is documented that the Compulsory Earthquake Insurance has been taken out and the related premium has been paid.

Change of Beneficiary

Article 13—Upon the change of the beneficiary, the insurance continues with the new beneficiary.

Obligation of the Insured

Article 14—The owner who causes or allows the building and each independent section thereof to be altered contrary to the related design and in a way that will affect the load-bearing system, loses his entitlement to compensation in as much as the actual loss arises or increases because of such reason.

Subrogation of the Pool

Article 15—By paying compensation, the Pool legally subrogates the insured to the extent of the paid amount.

Subrogation may not be asserted to the prejudice of the insured.

Areas the Pool's Resources May Be Used

Article 16—The resources of the Pool can only be used by the Pool in the direction of the following objectives:

- a) Claim payments regarding the buildings insured by the Pool,
- b) All expenses required for management and operation of the Pool and the commission to be paid to the Pool Manager,
- c) Payments regarding protection secured from reinsurance, capital markets, etc.
- d) Payments regarding the scientific research and studies to be commissioned by the Pool on matters falling under its field of duty,
- e) Payments regarding consultancy services (reinsurance, investment, risk modelling, etc.)
- f) Payments regarding public relations and publicity campaigns,
- g) Commissions to be paid to authorized insurance companies,
- h) Payments regarding loss adjustment procedures,
- i) The Pool's repayment of the advance payments received from the State.

Insufficiency of the Pool's Resources

Article 17—By taking into account its total obligations from insurance and its resources, the Pool secures protection at sufficient level and as required by the insurance technique, through reinsurance, capital markets etc. However, where the insured loss exceeds the expected level and this outstrips the Pool's resources and the protection secured, the loss that arises is paid to those entitled thereto at the ratio of the aggregate of the Pool's resources and the protection amount to the total claim amount that must be paid under the compulsory insurance.

Regulation

Article 18—The working principles and procedures of the Board are determined by the regulation issued by the Ministry.

Provisional Article 1—The Chairman and members of the Board are appointed within three months from the date this Decree-Law comes into force. Three members, to be identified as a result of drawing lots among the members appointed for the first time (excluding the Chairman and the representative of the Pool Manager), are to be replaced at the end of the third year according to the provisions indicated in this Decree-Law.

Effectiveness

Article 19—Article 9 of this Decree-Law comes into force 9 months after its date of issue; article 11 hereof comes into force 15 months after its date of issue; while the other articles hereof come into force on the date of its issue.

Execution

Article 20—The provisions of this Decree-Law are executed by the Council of Ministers.

International Experience with Catastrophe Funds

Government intervention in catastrophe insurance markets may be rational from two perspectives, even if the basic conditions for the emergence of an insurance market exist.

The first perspective emphasizes the high cost and limited supply of private capital (Cutler and Zeckhauser 1999). According to proponents of this view, a shortage of risk-bearing capital leads to an inadequate supply of insurance capacity. This inadequate supply keeps prices high relative to projected losses for low-frequency high-severity events, which is socially suboptimal. In 1994, for instance, catastrophe reinsurance premiums were more than seven times the expected loss; that multiple has dropped to between four and five.¹

Proponents of the high cost/limited supply rationale for government intervention also contend that government, with its vast capacity to tax and borrow, has an advantage over private insurers in bearing catastrophe risk because it does not need to hold explicit capital to pay off claims and avoid bankruptcy. To free insurers from the costly burden of holding huge amounts of capital, these proponents suggest that government act as a residual provider of reinsurance for “mega-catastrophes.” The government could set premiums below those charged by private insurers, thus lowering the cost of insurance while protecting taxpayers from losses.

The second perspective on government intervention emphasizes insurers’ heightened uncertainty about the frequency and size of future losses after Hurricane Andrew, the Northridge earthquake, and the

World Trade Center attacks and hence insurers' unwillingness to commit capital by underwriting coverage. Proponents of this view suggest that government should intervene to supply insurance while insurers reassess risk after a disaster. But insurers argue for a temporary government role because in time they usually are able to recalibrate their estimates and reenter the market.

Current international developments in insurance accounting and tax regimes make accumulation of long-term reserves virtually impossible for insurers, who are forced to use reinsurance and related risk-transfer mechanisms, including state-sponsored catastrophe pools. IFRS 4, the new international insurance reporting standard, explicitly bans equalization and catastrophe reserves from published accounts. Few, if any, countries allow such reserves to be accumulated out of pre-tax income, even when the reserves are mandated.

Actual experience has shown that mounting uninsured losses from natural disasters presses governments in disaster-prone countries and regions to find practical solutions for catastrophe risk management and spurs the formation of national and regional catastrophe insurance programs. The Turkish government, with the help of the World Bank, investigated numerous national catastrophe risk management programs operating successfully in eight countries. The underlying rationale for these programs has been to address the challenges faced by the private insurance markets in insuring the risk of natural disasters. Table A2.1 lists the most well known of these programs. They include the Florida Hurricane Catastrophe Fund (FHCF), the California Earthquake Commission (CEA), the New Zealand Earthquake Commission (EQC), CatNat in France, the Taiwan Residential Earthquake Insurance Pool (TREIP), and the Japanese Earthquake Reinsurance Company (JER).

At the time of the Marmara Earthquake Emergency Reconstruction operation, the CEA (Box A2.1) and the EQC (Box A2.2) were the premier examples of catastrophe funds. The Turkish government studied both programs as potential prototypes for the TCIP. Responding to a market failure to provide adequate insurance coverage for residential properties in earthquake-prone areas, these programs found ways to provide affordable, yet actuarially sound, catastrophe insurance covers for homeowners. Both

Table A2.1 Government-Sponsored Catastrophe Insurance Programs

Name of fund	Country	Year established and risk covered
Catastrophe Naturelles (CatNat)	France	1982; All natural disasters except windstorm, ice, and snow
Japanese Earthquake Reinsurance Company (JER)	Japan	1966; Earthquake, tsunami, volcanic damage
Earthquake Commission (EQC)	New Zealand	1994; Earthquake, tsunami, volcanic damage, landslide
Norsk Naturskadepool	Norway	1980; Floods, storms, earthquakes, avalanches, tidal waves
Consortio de Compensacion de Seguros	Spain	1954; Earthquakes, tidal waves, floods, volcanic eruptions, cyclonic storms
Florida Hurricane Catastrophe Fund (FHCF)	USA	1993; Windstorm during a hurricane
Hawaii Hurricane Relief Fund (HHRF)	USA	1993; Windstorm during a hurricane
California Earthquake Authority (CEA)	USA	1996; Earthquake
Taiwan Residential Earthquake Insurance Pool (TREIP)	Taiwan (China)	2002; Earthquake

Source: Gurenko and Lester 2003.

Note: None of the above-mentioned insurance programs insures public infrastructure assets; nor does any provide or finance emergency relief services.

programs have developed rather elaborate and well-diversified programs of risk financing, including standby liquidity facilities and industry participation. Both programs have considered the use of capital market instruments.

Design Features of Catastrophe Insurance Programs

A closer look at the above-mentioned national insurance programs reveals some major similarities. Most programs (1) tend to provide coverage against a specific natural hazard; (2) tend to have a regional focus; (3) provide cover mainly for dwellings and contents; (4) have premium rates that tend to reflect the characteristics of the risk, with an element of solidarity involved; (5) as a rule, receive no direct government subsidies; (6) to various degrees, encourage retrofitting and safer construction practices by offering premium discounts, although mitigation is not typically their major focus; and (7) rely on distribution and servicing capabilities of private primary insurance companies and their agents.

Box A2.1 California Earthquake Authority

The CEA was established by the California legislature in 1995 following the 1994 Northridge earthquake, which cost \$12.5 billion in insured losses and triggered an insurance availability crisis. Designed to preserve the state-mandated offer of earthquake coverage, the CEA required the participation of 70 percent of California homeowner insurers before it could begin operation. Insurers choosing not to participate are required to offer their own earthquake coverage to residential policyholders. The CEA commenced operation in late 1996 and allowed the policyholders of all participating insurers to purchase earthquake coverage directly from it. As of September 2004, the program insured approximately 724,000 policyholders, generating approximately \$393 million of written premium annually.

According to its legal mandate, the CEA is neither a state agency nor part of the California Department of Insurance. It is a public instrumentality of the state of California operating pursuant to the California Insurance Code. It is subject to regulation by the state insurance commissioner and is directly accountable to its own governing board, which consists of California's governor, treasurer, and insurance commissioner; the president of the California Senate and the Speaker of the State Assembly hold nonvoting seats.

The CEA offers a scaled-down policy covering homes and certain apartment buildings, but not other structures such as swimming pools and garages. Contents coverage is limited to \$5,000; additional living expenses are capped at \$1,500. The standard deductible on the home and its contents is 15 percent and is applied to the total loss, not to each coverage. The CEA also offers supplemental coverage that decreases the deductible to 10 percent and increases contents coverage to as much as \$100,000. Factors used to determine premiums include the location of the dwelling, the year it was built, and the type of construction. The current premium rates lie between 1.1 per million and 5.25 per million.

The pricing model takes information from every CEA earthquake policy and simulates earthquakes of varying magnitudes in various locations throughout the state. The model accounts for (1) type of home (house, condominium), (2) construction method (wood-frame, masonry), (3) age of construction, (4) soil types, and (5) proximity to faults. To determine

(Continued)

Box A2.1 (*Continued*)

the earthquake risk for an area, scientists and engineers at the CEA's computer modeling firm take data from a variety of highly respected sources. The computer model scientifically estimates the "average annual loss" to the CEA by estimating losses within each postal (ZIP) code. In other words, given its book of insurance policies, on average, how much insured earthquake loss is expected to befall the CEA? The combined losses for all ZIP codes produce the appropriate statewide rate. Regional differences in rates are established by comparing expected losses from one ZIP code to another. Those who live in a ZIP code close to an earthquake fault or with predominantly poor soil can expect to pay more than those on firm soil, away from faults. Finally, using information the insured provides, the model accounts for the structure's age and construction type. The resulting rate determines the premium for a CEA policy. Depending on its date of construction, a house that has been retrofitted may be entitled to a 5 percent premium discount. The CEA's actuaries place ZIP codes that present similar seismic risk into "rating territories." Although the risk is not exactly the same for each ZIP code in a rating territory, the risks are similar enough to justify the territorial grouping. This method of establishing rating territories produces rates that are more affordable for all. Affordable rates, in turn, permit the CEA to meet its goal of offering sound earthquake insurance to all Californians.

The CEA sells its policy through its participating insurers, who offer coverage to homeowners, mobile home owners, condominium owners, and renters throughout California. It also provides retrofit assistance to help people protect their houses against earthquakes.

The CEA funding plan totals approximately \$6.73 billion, which should enable the fund to survive a 1-in-800-year event. Structured in layers, the fund is made up of monies from premiums, contributions from an assessment on member insurance companies, borrowed funds, reinsurance, and returns on invested funds. No public funds are pledged or available to cover CEA-insured losses. If an earthquake causes damage greater than the CEA's claims-paying capacity, a very unlikely possibility, policyholders will be paid on a prorated basis. The prorated claims would be calculated on the basis of the total amount of expected claims compared to the remaining available funds.

Box A2.2 New Zealand Earthquake Commission

The New Zealand Earthquake Commission has its origins in an insurance pool set up in 1941 to address war damages. It later was expanded to cover earthquake damages and in 1993 became the Earthquake Commission. The EQC is an instrumentality of the government of New Zealand and holds the Natural Disaster Fund, which pays claims. In addition to managing the fund, EQC buys international reinsurance and has a government guarantee to pay all claims.

EQCover is compulsory for all residential property owners who buy fire insurance through private insurers. Nonresidential property owners are not required to hold EQCover. Private insurance companies add a flat EQC premium to the cost of the fire insurance and forward the premium to EQC.

The cost of EQCover is \$0.5 per \$1,000 of property value, up to a maximum of \$100,000 for dwellings, \$20,000 for contents (as of February 2005, 1 NZ\$ = 0.716 US\$). With a goods and services tax of \$7.50, the maximum cost per year of the EQCover is \$67.50. Premiums are flat and do not vary according to geographic location or dwelling type. Additional coverage can be provided by the private insurance company through which the EQCover has been purchased.

EQCover covers 99 percent of every claim over \$20,000 in property; claims under \$20,000 have a \$200 deductible. Land damage is covered at 90 percent for claims over \$5,000; claims under \$5,000 have a \$500 deductible.

The fund responsible for paying claims is funded both by the compulsory EQC levy assessed on the purchase of fire insurance for residential properties and investment income. The EQC has invested in New Zealand fixed interest securities, and in an effort to reduce reliance on income subject to disruption by the same disasters it is insuring, has begun investing in international equities. In FY 2003, its income before reinsurance cost was NZ\$354.6 million, of which 88 percent came from investment income and 12 percent came from premiums. The EQC's reinsurance costs that year were NZ\$39.6 million. The fund claims-paying capacity stood at NZ\$4.5 billion, comprised of \$1.5 billion in capitalized reserves and \$3 billion in other reserves. The EQC was given an AAA rating (extremely strong) by Standard & Poor's in 2003.

In 2003 the fund paid out 4,793 earthquake claims totaling NZ\$17.822 million. These figures were considerably higher than figures for the past five-year average, which for earthquakes was 1,860 claims totaling NZ\$4.7 million.

Table A2.2 provides an overview of key design choices available to policymakers and insurance practitioners involved in the creation of

Table A2.2 Catastrophe Program Design Variables

Program variables	Design choices
Management	Public/private
Governance	Public/private/mixed
Funding	Public/private/mixed
Insurance vehicle	Insurance pool/reinsurance pool/insurance companies
Coverage	Buildings; contents; business interruption
Lines of business	Residential/commercial (SMEs)
Rates	Flat/risk-based/mitigation incentives
Distribution	Insurance companies/alternatives
Retentions by insurance companies	Zero to risk-based solvency margin
Geographical coverage	National/regional/intercountry
Participation	Compulsory/voluntary
Reinsurance	Private/public mix

Source: Gurenko and Lester 2003.

national catastrophe insurance programs. A more detailed discussion of these design options follows.

Management and Governance

Government or government-controlled entities manage virtually all catastrophe insurance programs mentioned in table A2.2; CatNat of France is the primary example. Government influence and control typically is exercised through appointments of senior program officers, including a chief executive officer and board members. In most cases, a special insurance entity is created to manage day-to-day business operations. Primary functions of the fund management companies typically include premium collection, claims management, asset management, and reinsurance placement. Risk management and investment functions are carried out in accordance with the guidelines established by the governing body.

Most of these special insurance entities tend to rely heavily on the distribution and servicing capabilities of primary insurers. Pool managers typically receive a management fee that varies widely—from 0.8 percent of net written premium in the case of FHCF to 2 percent in the case of JER—and that in some cases is contingent on achieving certain performance benchmarks such as attaining a certain level of insurance penetration.

In addition to direct involvement in the operations of a pool or through representation on the board, government has another important role to play as the reinsurer of last resort. For instance, the government of New Zealand guarantees that it will assume financial responsibility for meeting all the EQC's claims in excess of the commission's claims-paying capacity. However, the CEA enjoys no explicit guarantees from the state of California—one reason for its relatively costly reinsurance programs.

Funding

The primary sources of funding for catastrophe pools are insurance premiums or, in cases of pools acting as reinsurers, reinsurance premiums, reinsurance coverage from their own reinsurers, the pool's own surplus capital, assessments on private insurance companies, commercial backstop facilities, contingent credit lines, and (finally) direct government contributions in excess of programs' claims-paying capacity. In addition, some catastrophe insurance pools, such as CEA, have obtained access to international capital markets by issuing catastrophe insurance bonds (Box A2.1).

Insurance Vehicle

In addressing the inherent limitations of the private insurance market in extending catastrophe insurance coverage, countries have opted for specialized direct catastrophe insurance or reinsurance programs (table A2.3). In many respects, the local insurance market's level of development and ability to retain catastrophic risk has predetermined this choice.

Table A2.3 Insurance Vehicles

Fund	Insurance vehicle	Characteristics
EQC/CEA/HHRF	Insurance pool	Addresses inability of local market to expand insurance penetration and limited risk-retention capability
CCR/Norsk Naturskadepool/FHCF/JER	Reinsurance pool/company	Addresses direct insurers' lack of capacity to underwrite catastrophe risk; provides reinsurance at below-market rate

Source: Gurenko and Lester 2003.

Coverage

The above-noted catastrophe insurance programs offer coverage for buildings but typically limit or exclude coverage for contents. Only one-third of the programs cover business interruption. Several programs offer coverage of emergency living expenses in the immediate aftermath of a disaster.

All the programs offer residential catastrophe risk coverage, but only a few cover commercial risks. The focus on residential coverage can be explained by the political nature of the programs and thus their explicit social commitment to ensuring that adequate catastrophe insurance coverage exists for the population. As a rule, large commercial and industrial risks are well covered even in the least developed markets and thus rarely cause a public policy concern. Nevertheless, there is scope for extending catastrophe insurance coverage provided by catastrophe pools to small and medium-size enterprises, which often remain underinsured.

Rates

Because the primary objective of most catastrophe insurance programs is to ensure the availability of affordable insurance coverage for homeowners, their premium rates for worst risks tend to be capped. But some programs such as the EQC, Norsk Naturskadepool, and TREIP charge a flat rate irrespective of location or construction quality. The main advantage of a flat rate is administrative simplicity. The main drawback is that a flat rate takes the solidarity principle to the extreme, offering no mitigation incentives and possibly discouraging households at low risk of a disaster from participating. The majority of programs charge risk-based rates that depend on the property's location relative to hazards, age, and construction type (table A2.4). Despite considerable differences in pricing approaches, all examined programs appear to collect sufficient premiums to cover claims and expenses.

Voluntary versus Compulsory Programs

All catastrophe insurance programs are voluntary for homeowners in general, but not necessarily for insured homeowners. That is, some programs like EQC or CatNat automatically apply an additional catas-

Table A2.4 Rates Charged and Mitigation Incentives

Fund	Rate	Mitigation incentives
CatNat	9% of underlying policy (auto, fire) premium	Insurance companies can refuse to extend the "natural disaster" guarantee to buildings built in high-risk zones and built in violation of administrative rules in effect at the time of construction; this encourages mitigation
JER	Up to 5% of insured value, depends on location and construction type	None
Norsk Naturskadepool	Flat rate on insured values	None
Consortio de Compensacion	0.9 per million to 2.5 per million of insured value	None
FHCF	Premium based on location, construction type; premium remains constant, but coverage level changes	US\$10 million is earmarked for funding mitigation activities
HHRF	1.50 per million	Rate credits available for roof-wall and roof foundation clips and storm shutters
CEA	1.1 per million to 5.25 per million	Depending on construction age, a house that has been retrofitted may be entitled to a 5% premium discount

Source: Gurenko and Lester 2003.

trophe coverage premium surcharge to premium charged for a conventional homeowners insurance policy by private insurers. This surcharge entitles insureds to the additional catastrophe coverage provided by these pools. The level of insurance penetration achieved by effectively semicompulsory programs such as EQC or CatNat is considerably higher than the level achieved by programs with voluntary participation. Both types of programs, however, operate in economies in which the level of insurance penetration for property is approaching 100 percent. In the case of other less-developed insurance markets, a voluntary approach is unlikely to yield similarly satisfactory results.

Reinsurance

Some programs (CEA, Norsk Naturskadepool, and TREIP) rely on private reinsurance markets for their reinsurance coverage; others (CatNat,

JER, and FHCF) are backed directly by their governments. Still others (EQC) make use of both private and government reinsurance capacities.

Another critical consideration in the design and management of a reinsurance program is the level of reinsurance to be purchased. This decision has an impact on the expected survivability of a catastrophe insurance pool, on the speed at which it would accumulate its surplus, and on the affordability of reinsurance or insurance coverage it provides. Consider the CEA. Despite being among the safest insurance programs in the world, CEA is one of the most expensive ones because it maintains enough claims-paying capacity to survive a 1-in-800-year event. This risk management target represents a considerably higher return period than the 1-in-200-year event typically targeted by A-rated private reinsurers.

Note

1. According to estimates, in 1994 premiums for the highest layers of coverage (the lowest probability layers) were 20 to 30 times expected losses (Froot 1999).

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A child's pocket money will not save a home from destruction, but it will buy a TCIP policy to build a new home in the aftermath of a disaster.

A small investment in an insurance policy of the Turkish Catastrophe Insurance Pool (TCIP) would have reduced the extent of this child's deprivation after the earthquake. However, her parents did not invest in the affordable TCIP coverage; they lost their home and their life savings. During the winter, the family lived in a tent next to the ruins of their former home.

This tragic and realistic commercial, broadcast on Turkish television, has raised the public's risk awareness about the dire potential consequences of not investing in earthquake insurance.

Photo courtesy of Çözüm Advertising.

Between 1992 and 1999 alone, earthquakes in Turkey killed more than 18,000 people, left hundreds of thousands homeless, and caused billions of dollars in economic damages. In 1999, the adverse economic and fiscal consequences of the large-scale Marmara earthquake prompted the Turkish government to seek the World Bank's assistance to establish a catastrophe risk transfer mechanism capable of reducing the extent of government fiscal exposure to natural disasters and, at the same time, providing immediate liquidity to homeowners in the aftermath of natural disasters.

Launched in 2000, the Turkish Catastrophe Insurance Pool (TCIP) has become the first catastrophe insurance program in a middle-income country; it quickly grew into one of the largest catastrophe insurance pools in the world. Since then, the TCIP has become one of the most trusted brand names in the Turkish insurance industry, has received international recognition, and has inspired more than a dozen countries to consider the establishment of similar catastrophe insurance programs. Today, the TCIP offers cost-effective insurance coverage to more than 2.5 million households through an innovative public-private partnership.

This book presents a detailed account of the TCIP's history since its inception, covering the technical design, operating principles, and the main policy issues pertinent to the establishment of a large national catastrophe insurance pool. The lessons learned through the TCIP will benefit policy makers and insurers in low- and middle-income countries interested in catastrophe risk management at the country level.



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