Insurers in a changing world

Opportunities and risks in times of climate change, digitisation and inflation

DeNederlandscheBank

EUROSYSTEEM

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Content

Summary and recommendations

The Netherlands has a relatively saturated insurance market. The decline in sales of new life insurance products has put pressure on the revenue model of life insurers and made them more dependent on investment returns. The non-life market, after years of stabilisation, has recently seen modest growth in premium volumes and a gradual improvement in results in key sub-segments, such as fire and motor insurance. Insurers' solvency has gradually improved in recent years, but inflation and interest rate developments require insurers to be alert.

Competition is stiff, partly because foreign insurers and technology companies are entering the Dutch market. **In this increasingly pan-European insurance market, key points of attention are maintaining a level playing field between insurers and ensuring risk solidarity among policyholders.** The entry of foreign insurers and technology companies into the Dutch insurance market brings innovation and a more tailored and versatile product offering, partly because international risk diversification makes it possible to insure risks for which Dutch insurers provide little or no coverage. Foreign insurers and technology companies thus complement the Dutch insurance market. At the same time, the insurance market still needs insurers with knowledge of local conditions and domestic laws and regulations in order to cater for Dutch specific risks. As the insurance market becomes increasingly pan-European, a level playing field between insurers is essential, if only to protect policyholders' interests. Other key concerns for policymakers and supervisory authorities are preserving mutual solidarity among policyholders and wide accessibility of insurance. This applies particularly in the light of the possibilities offered by big data and artificial intelligence to assess risks increasingly at an individual level. There is a risk that competitive pressure or the entry of new operators into the Dutch market will lead to extensive risk selection, with insurers endeavouring to retain mainly profitable customers. This would not only have a negative impact on insurers that make less use of risk selection, perhaps for ethical reasons, but would also put pressure on financial inclusion, as groups with a higher risk profile would be excluded from coverage.

It is important that insurers respond proactively to new opportunities, especially in a relatively saturated market with stiff competition. Although the life insurance market is likely to remain under pressure in the years ahead, the planned reform of the pension system may provide opportunities for life insurers. Responding to new and changing risks facing society could provide opportunities for non-life insurers – opportunities to strengthen the future-proofing of their revenue model, but also opportunities to continue fulfilling their societal role by insuring society against the risks to which it is exposed.

Dutch households and businesses currently have limited insurance cover against new and changing risks, such as flood and cyber risks. Among the various climate-related risks to which Dutch society is increasingly exposed, flood risk has recently attracted renewed interest. Although the risk of flooding from major rivers and the sea is increasing, private insurance markets for these risks are strug-

gling to get off the ground. The reasons for this include a lack of awareness among households and businesses, anticipation of government support and the correlated nature of risks, which can make losses uninsurable for an individual insurer. The cyber insurance market faces similar obstacles. Although rapid digitisation and rising geopolitical tensions are making society more vulnerable to cyber risks, a lack of awareness and the potentially high claims burden for insurers constitute barriers to further development of the cyber insurance market. Moreover, the lack of data makes it difficult for insurers to conduct accurate risk assessments. The lack of properly functioning insurance markets for flood and cyber risks exposes society to uninsured losses. This entails uncertainty, leading to high consequential damage and puts pressure on the government to pay compensation.

Increasing resilience to flood and cyber risks requires a broad approach, with insurers and the government working together to achieve better insurance coverage for these risks. In the first place, increasing society's resilience to flood and cyber risks requires households and businesses to be more aware of the risks to which they are exposed so that they can take the necessary preventive measures themselves. Increased awareness will also enable them to make more informed decisions on the desirability of additional insurance. The creation of private insurance markets for these risks requires also more clarity from the government about the conditions under which it will pay compensation. This remains unclear at present, with regard to both cyber risks and the flood risk from major rivers and the sea. If the government states more clearly upfront what can be expected from it, the risks for insurers will be more predictable. Insurers can then market appropriate insurance products. For cyber risks specifically, prerequisites for the further growth of a private insurance market are a harmonised taxonomy and disclosure of data on cyber incidents, in both cases preferably at European level.

It is important that insurers manage the underwriting risks of flood and cyber risks properly, particularly when insurance coverage widens. DNB is responsible for overseeing this in its role as a supervisory authority. Risk exposures for non-life insurers increase when insurance coverage widens. From a prudential point of view, it is essential that insurers manage these risks properly so that they can meet their obligations to policyholders and the materialisation of these risks does not cause insurers to fail.

Key recommendations in this study:

- Current inflation levels lead to higher operating costs for insurers and confronts non-life insurers with increasing claims. DNB expects insurers to remain alert to the effects of inflation and interest rate developments and, where necessary, to adjust their policies to mitigate the negative impact on their financial position as far as possible.
- Further harmonisation of laws and regulations and their uniform enforcement by national supervisory authorities are prerequisites to ensure a level playing field between insurers. Proposals in this vein as part of the ongoing Solvency II review, such as minimum requirements for information exchanges between supervisory authorities, should be pursued.
- DNB considers it important that insurance is and will remain widely accessible. It is therefore essential that insurers, policymakers and regulators are mindful of the potentially negative effects of extensive risk selection on risk solidarity among policyholders. If the current legal framework – in which insurers themselves mainly get to decide which data and techniques to use for risk estimates – does not lead to socially desirable outcomes, more specific legal frameworks should be put in place at European level.
- Responding to new and changing risks will provide opportunities for insurers to strengthen the future-proofing of their revenue model and continue to fulfil their societal role – insuring society against the risks to which it is exposed.
- Government and insurers have a shared responsibility to make people more aware of the cyber and flood risks they are exposed to. This could enable households and businesses to take the necessary preventive measures themselves. To encourage a private insurance market for damage caused by river and marine flooding and cyber incidents, the government also needs to be clearer about the conditions under which it will compensate for damage. This will make risks more predictable for insurers and enable them to respond with appropriate insurance products.
- Better data disclosure and a shared taxonomy of cyber incidents is a prerequisite for further development of the cyber insurance market. The government has a role to play here by sharing incident data itself, promoting data sharing by market participants and working with the industry to develop a taxonomy of cyber incidents.
- It is vital that insurers manage the underwriting risks of cyber and flood coverage properly. This means that, where coverage is material, flood or cyber coverage must be part of an insurer's risk strategy, the risk exposure must be identified and measured and the risks must be managed satisfactorily.

Reader's guide

This report concerns the role of insurers in the economy and the part they play in insuring society against new and changing risks.
We examine the state of the Dutch insurance industry, the extent to which insurers are able to insure new and changing risks and the role that insurers and the government can play in the creation of insurance markets for new and changing risks. We begin with a brief outline of the economic and societal role of insurers (Chapter 1) before describing the main developments in the Dutch insurance market (Chapter 2). We then discuss the insurability (or uninsurability) of the risks to which society is exposed and the role that insurers and the government can play in improving societal resilience to these risks (Chapter 3). Chapter 4 then develops this theme further for flood and cyber risks.

This report considers the insurance industry from the perspective of two different roles of DNB. In our role as a supervisory authority, we make sure that insurers behave prudently and are able to fulfil their obligations and commitments. In our role as the guardian of monetary and financial stability, we strive for an insurance industry that works for the benefit of society and contributes to a resilient financial system and sustainable prosperity in the Netherlands. Both perspectives are covered in this report.

1 The societal and economic role of insurers

Insurers play an essential societal and economic role. This chapter describes the various channels through which insurers contribute to the smooth functioning of an economy.

First, insurers increase the resilience of households and businesses, and hence of the economy as a whole. When households and businesses take out insurance, they transfer the risk to insurers. This makes them less vulnerable to financial setbacks and reduces uncertainty, which has a positive effect on household well-being (Müller, 1981; Skipper, 1997). Insurers also contribute to stability from a more macro perspective. Insurance limits not only the direct damage suffered by households and businesses after an event, but also the extent of any consequential damage through timely compensation or timely intervention. This is particularly true in the case of natural disasters, where insurers play an important role through efficient claims settlement (OECD, 2021). Life insurers also offer households an opportunity to share the financial risks associated with early death or extended longevity. Life insurers thus help households to spread consumption over their lifetime.

Second, insurers promote economic activity and trade. Insurance gives households and firms confidence to invest and in some cases insurance is even a necessary precondition for economic activity (Acemoglu and Zilibotti, 1997). For example, households can only get a mortgage if they can also obtain property insurance. Many products and services, for example in the healthcare and pharmaceutical industry, can only be produced and sold if companies can take out liability insurance (Ward and Zurbruegg, 2000). Credit insurance, which protects suppliers against the risk of default by domestic or foreign buyers, also plays a vital role in national and international trade.

Third, insurers can promote risk prevention and encourage risk mitigation. The pricing of risks makes it easier for existing or potential policyholders to understand the consequences of taking or reducing risks. Although insurance does not necessarily lead to less risky behaviour (see below), insurers can use incentives in premiums or policy conditions to promote risk mitigation behaviour (Skipper, 1997). Familiar examples are the excesses in various non-life policies and the no-claims discount offered to motorists as the number of claim-free years increases. Insurers can also use their knowledge and expertise to encourage preventive action.

Fourth, insurers also contribute to the smooth functioning of the economy through their role as financial intermediaries. Like other financial intermediaries, insurers turn savings into investments. This is particularly true in the case of life insurers, due to the relatively long duration of their insurance contracts. Since insurers do this on a large scale, they are relatively well equipped to gather information on the projects they invest in, monitor these projects and make adjustments where necessary. In this way, insurers, like banks and pension funds, contribute to more efficient resource allocation in the economy.

Excessive practices may nevertheless occur in the insurance industry. For example, an insurer may abuse its knowledge by making the terms of an insurance policy unreasonably biased in its own favour and against the policyholder, potentially leading to legal disputes and loss of societal trust. Insurance may also involve moral hazard. After taking out insurance, policyholders may behave less prudently or even make dishonest claims. This could lead to a higher claims burden and higher insurance premiums for society as a whole. Finally, households and businesses may also be overinsured, for example if they have overlapping policies.

2 The Dutch non-life and life market at a glance

The Netherlands has a relatively mature insurance market that has continued to consolidate in recent years. This chapter examines the main developments in the Dutch life and non-life markets and outlines the changes in the insurers' playing field, partly as a result of increased competition from foreign insurers and technology companies.

2.1 Shrinking life market and saturated non-life market pose challenges

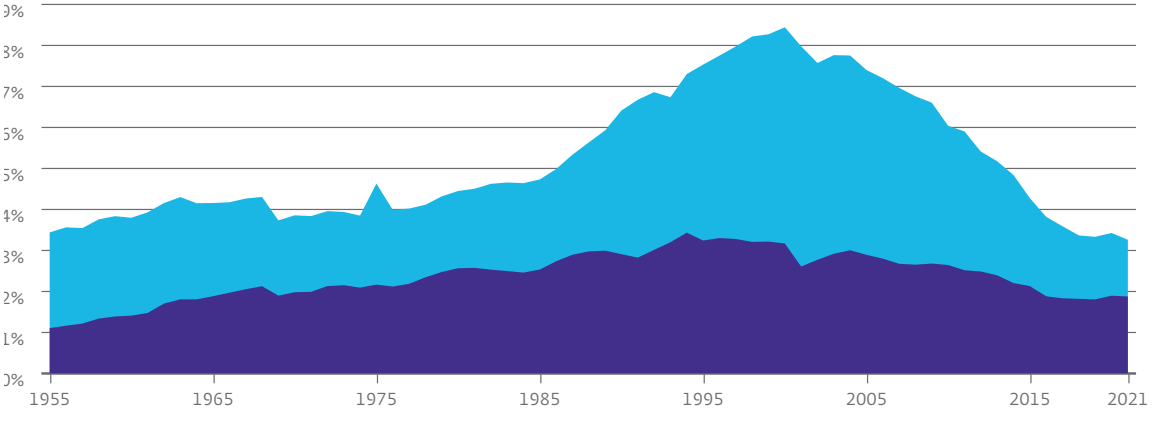
The Netherlands has a steadily shrinking life insurance market and a relatively saturated non-life insurance market.[1] The premium volume of Dutch life and non-life insurers was around EUR 28 billion in 2021.[2] Almost EUR 12 billion of this was generated by life insurers, with the remainder, over EUR 16 billion, generated by non-life insurers. The premium volume of Dutch life and non-life insurers thus amounts to over 3% of gross domestic product (GDP). Life insurers' premium volume as a proportion of GDP has been falling for some time, as can be seen in Figure 2.1. Since 2017, the premium volume attributable to Dutch life insurers has been even lower than the premium volume attributable to Dutch non-life insurers. It is notable that the Dutch life insurance sector is relatively small by international standards. This is largely because employees' compulsory pension accrual mostly takes place within pension funds. From a European perspective, the Dutch non-life insurance sector is in the middle of the ranking.

Declining premium income has made life insurers increasingly dependent on investment returns for their results. Market conditions for life insurers have changed dramatically since the beginning of this century. This is due among other things to the introduction of the Dutch Bank Savings Act (2008), which allowed banks to offer tax-friendly wealth accumulation products, and to subsequent restrictions to the favourable tax treatment of savings-linked and unit-linked insurance, with mortgage interest relief on new loans being limited to loans that are repaid in full in a maximum of 30 years (2013). The cost of life insurance also rose due to falling interest rates and increased life expectancy. Legal disputes concerning unit-linked insurance have also led to a loss of trust. Declining premium income has made life insurers increasingly dependent on the existing investment portfolio for their results. These results have fluctuated widely in recent years, with substantial outliers on the upside and downside, partly due to interest rate movements.

1 This report does not discuss health insurers, since the nature of the health insurance market in the Netherlands is very different as a result of the insurance and underwriting obligation, the definition of the basic health insurance package and risk equalisation, among other things.
2 These figures relate to the Dutch operations of insurers supervised by DNB. They do not include insurers established abroad and operating in the Netherlands through a branch or by providing cross-border services under a European passport. The same applies to the foreign operations of Dutch insurers supervised by DNB. Section 2.2 discusses foreign insurers.

Figure 2.1 Premium income of Dutch life and non-life insurers

Annual figures as a percentage of GDP



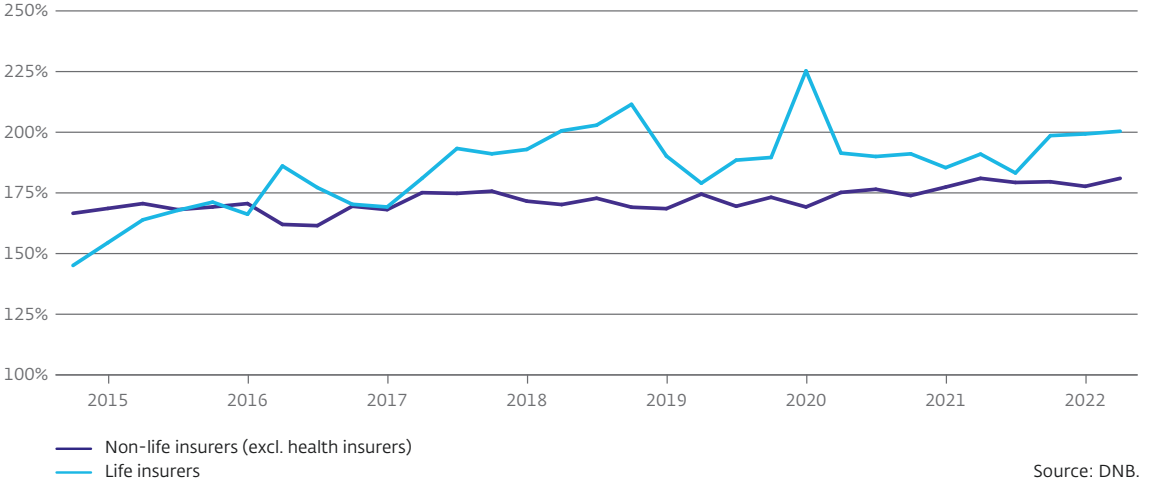
Source: DNB and Statistics Netherlands (CBS).

Note: This chart refers to the Dutch activities of insurers supervised by DNB.

The non-life market has seen modest growth in premium volumes and gradual improvements in results in key sub-segments. After years of stabilisation, Dutch non-life insurers' premium income has recently returned to modest growth. This is due to the need to insure new and larger potential losses such as solar panels and electric cars, higher premiums due to the increased claims burden and growth in the number of households (Dutch Association of Insurers, 2022). Underwriting results from fire and motor insurance, which are key sub-segments of the non-life market, have gradually improved in recent years. Although losses are still regularly incurred on third-party motor insurance, these have become less significant and can be more easily absorbed with the proceeds from fully comprehensive motor insurance. In the case of fire insurance, premiums since 2019 have consistently been sufficient to absorb claims and costs incurred by insurers. In the income segment of the non-life market, which includes loss-of-income insurance and cover for employers' continued payment of wages for the first two years of employees' sick leave, insurers have had alternating favourable and less favourable years. This is partly due to higher absenteeism as a result of COVID-19 and higher claims provisions set aside by insurers in response to the pandemic.

Although insurers' solvency has gradually improved in recent years, inflation and interest rate developments call for vigilance. Insurers' solvency has gradually improved since the introduction of Solvency II in 2016, partly due to cost savings and cuts in policy conditions for life insurance (see Figure 2.2). If this trend continues, the recent rise in interest rates may ease the pressure on the business model of insurers. This is particularly true for life insurers, due to the relatively long duration of their liabilities.[3] At the same time, current inflation levels pose new challenges for insurers (see also DNB, 2022). As in other sectors, inflation leads to higher operating costs for insurers. Non-life insurers in particular also face increasing claims costs, for example due to higher repair costs caused by rising prices. This applies less to life insurers, as their liabilities tend to be defined in nominal terms. Against this background, we expect insurers to remain alert to the effects of inflation and interest rate developments and, where necessary, to adjust their policies to mitigate negative impacts on their financial position as far as possible.

Figure 2.2 Solvency of Dutch insurers shows gradual improvement



Source: DNB.

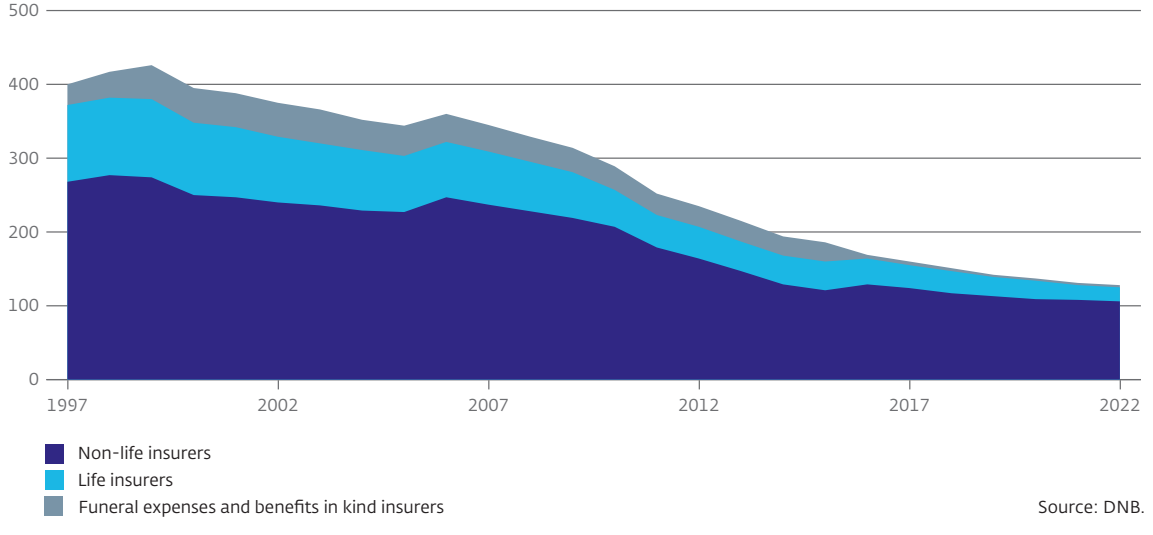
3 The extent to which interest rate developments affect the insurers' financial position depends on the extent to which insurers are exposed to interest rate risk, which is related to the difference in maturity between insurers' assets and liabilities. Insurers can use derivatives, such as interest rate swaps, to reduce interest rate risk.

2.2 Changing playing field: further concentration and increased competition from foreign insurers and technology companies

Consolidation in the Dutch insurance market has continued in recent years, leading to further concentration. The insurance industry has seen strong consolidation since the beginning of the century, as can be seen in Figure 2.3. The drivers of consolidation include increased pressure from laws and regulations, the need for cost control and insurers' limited access to the capital market (see also DNB, 2016). The wave of consolidation has further increased the market shares of the largest insurers. The five largest non-life insurers controlled more than 70% of the premium volume generated by Dutch non-life insurers in 2021. In the case of life insurers, the figure is even in excess of 85%. The Dutch insurance market is thus more concentrated than that of many other European countries.

Figure 2.3 Heavy consolidation in the Dutch insurance market

Numbers of insurance entities subject to DNB's supervision



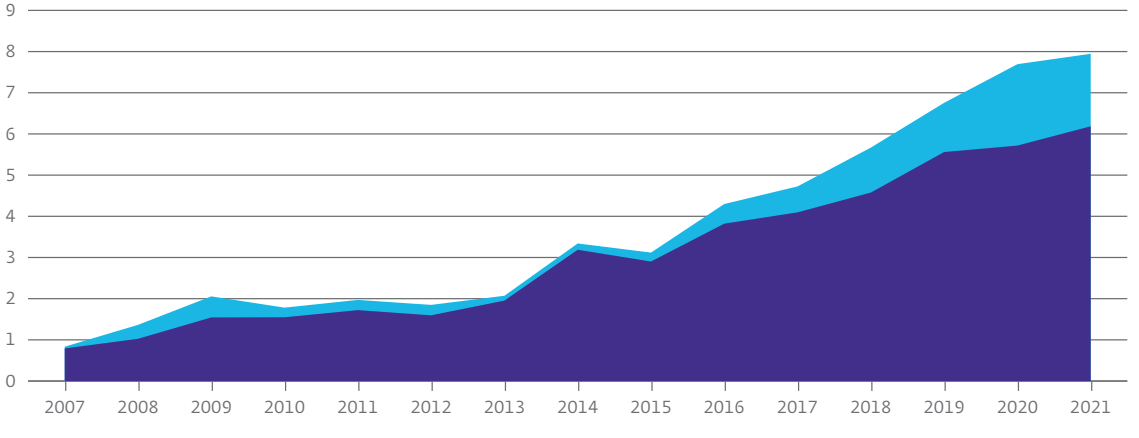
Source: DNB.

Note: The chart shows the number of licensed insurance entities. Individual insurance entities may be part of an insurance group. The non-life insurer category also includes health insurers. Data for 2022 refer to the second quarter. Of the 106 non-life insurers in the second quarter of 2022, 26 are health insurers.

Competition from foreign insurers has increased steadily in recent years. Figure 2.4 shows that the premium income of foreign insurers operating in the Dutch market has increased steadily in recent years.[4] In particular, insurers from Belgium, Germany and Luxembourg operate in the Dutch market through branches. Insurers from these countries collectively account for two-thirds of the premium income generated by foreign providers in the Dutch insurance market. The growth of foreign insurers in the life segment in recent years has been closely related to the longevity risk swaps that Dutch insurers have entered into with several foreign reinsurers. In the non-life market, growth in recent years has mainly been in contents, fire and liability insurance, especially in the business market. This includes cyber insurance (see Chapter 4). Box 2.1 looks in more detail at the increased presence of foreign insurers and technology companies in the Dutch insurance market and outlines some concerns and recommendations with regard to the level playing field between insurers and the risk that increasing competitive pressure, through extensive risk selection, will put pressure on the mutual solidarity and accessibility of insurance.

Figure 2.4 Sharp increase in premium income of foreign insurers

In EUR billion



Source: EIOPA, DNB.

4 With regard to data availability, a foreign insurer is defined here as an insurer that has its registered office abroad and therefore falls under the prudential supervision of a foreign supervisory authority. This insurer conducts insurance activities in the Netherlands through a branch or by providing cross-border services under a European passport. Insurers having foreign shareholders licensed in the Netherlands are considered to be Dutch insurers.

Box 2.1 Increasing competition from foreign insurers and technology companies in the Dutch insurance market

The Dutch insurance market has seen a growing number of foreign insurers and technology companies enter in recent years. These new operators stimulate competition, make the Dutch insurance landscape more diverse and thus complement the Dutch insurance market. At the same time, there is still a need for insurers with knowledge of local conditions and domestic laws and regulations, for example in the fields of social security, taxation and healthcare, with expertise to cater for more specific Dutch risks.

The presence of foreign insurers and technology companies in the Dutch market brings potential benefits for policyholders. Competition keeps insurers on their toes and thus helps ensure competitive premiums. The presence of these operators also increases the product range. For example, by spreading risks internationally, foreign insurers are able to insure risks for which Dutch insurers provide little or no coverage. They also offer completely new products, sometimes in collaboration with technology companies, as was the case with the introduction of cyber insurance. Technology companies can also help insurers to increase the efficiency of their operating processes and respond faster to changing customer demands.

In an increasingly European insurance market, a level playing field between insurers is essential, if only to protect policyholders' interests. European insurers operating in the Netherlands through a branch or by providing cross-border services under a European passport are supervised by the prudential supervisory authority in their home country. The entry into force of Solvency II in 2016 marked important progress in the harmonisation of capital requirements, operational management requirements and the transparency that insurers are required to maintain towards supervisory authorities and the public. A positive result of the recent review of Solvency II is that proposals are now being drawn up for further harmonisation, including with regard to disclosures of climate risks, and adjustments are being proposed to strengthen cross-border supervision, for example by introducing minimum requirements for information exchanges between national supervisory authorities. Further harmonisation of laws and regulations and their uniform enforcement by the various national supervisory authorities are preconditions for ensuring a level playing field between European insurers and protecting policyholders' interests, including in the case of cross-border services.[5]

5 EIOPA has previously recommended harmonising resolution regimes and insurance guarantee schemes (IGSs) to ensure a level playing field between insurers in Europe (EIOPA, 2020). Unlike neighbouring countries, the Netherlands has no IGS. An IGS can offer policyholders additional protection if an insurer runs into financial difficulties. Recent research by DNB shows that an IGS can be designed in such a way as to provide policyholders with affordable, additional protection with their insurance (see DNB, 2022).

Another key concern is that increasing competitive pressure may lead insurers to engage in more extensive risk selection. Personally tailored insurance premiums are still in their infancy in the Netherlands, according to research by the Dutch Authority for the Financial Markets (AFM, 2021). Increasing competitive pressure, however, may prompt insurers to use increasingly sophisticated pricing techniques, particularly to retain profitable customers. The scope to do so is greater, given the increased availability of data (big data) and technologies such as artificial intelligence to analyse data as a basis for judgements and predictions (see also EIOPA, 2021). When insurers can use extensive risk selection to select mainly profitable customers, their competitors that make little or no use of such techniques – possibly for ethical reasons – face having a higher proportion of loss-making policyholders in their portfolios. In that case, they too may be forced to make greater use of risk selection. A similar development may occur if new entrants in the Dutch market make greater use of advanced pricing techniques than established insurers. Experience outside the Netherlands shows that this is not merely a theoretical risk. Some UK insurers, for example, use big data and artificial intelligence to identify loyal policyholders with the aim of getting them to pay higher premiums when they renew. This has led to insurers who oppose this so-called loyalty penalty also feeling compelled to use it to maintain their competitive position (see FCA, 2020 and (AFM, 2021).

Extensive risk selection can also put pressure on mutual solidarity between policyholders and the accessibility of insurance. The latter occurs when groups with a higher risk profile are excluded from coverage or have to pay such high premiums that they are effectively excluded. Financial inclusion, ensuring that everyone has access to financial services and the economic system, then comes under pressure. The responsibility for deciding whether or not to use data and techniques lies primarily with the industry itself, and in the Netherlands it is exercised by means of self-regulation as part of the ethical framework on the use of data (see Dutch Association of Insurers, 2021). It is important that policymakers and supervisory authorities monitor developments closely. When the current practice of applying a legal framework comprising mainly open standards and industry self-regulation leads to socially undesirable outcomes, further legal constraints are required to safeguard policyholders' interests.[6] These should be introduced at European level to maintain a level playing field between insurers.

6 An example in which further constraints, in the form of non-discrimination provisions and/or prohibitions, have helped increase accessibility to insurance is the clean slate scheme for former cancer patients. Patients who were declared cured 10 years or more ago will no longer have to disclose that they had cancer when applying for life or funeral insurance.

Technology companies are also playing an increasing role in the insurance market, particularly in the non-life segment, although it remains modest for now. Compared to Asia and the United States, BigTechs such as Google, Apple and Microsoft play only a limited role in the European insurance market. Their involvement is mostly limited to collaboration with insurers, such as Google's partnership with Allianz and Munich Re in the provision of cyber insurance. Smaller technology companies, known as insurtechs, are playing a bigger role, both by entering the insurance market independently and through partnerships, including with foreign insurers. Lemonade, for example, a US-based insurer that uses chatbots and algorithms to handle customer contact, offers liability and contents insurance in the Netherlands. A number of insurtechs also operate in the Netherlands, providing insurance as authorised agents of foreign insurers or reinsurers and targeting segments such as freelancers, small businesses and meal delivery firms. In addition, an IT security company has been offering cyber insurance in the Netherlands since the beginning of this year as an authorised agent of a foreign insurer. These developments are blurring the boundaries between sectors. Traditional insurers increasingly face competition from new entrants, which could lead to fundamental changes in insurance markets (see DNB, 2021 for further analysis).

Against the backdrop of relatively saturated insurance markets and stiff competition, it is important that insurers respond to new opportunities. Although the life insurance market is likely to remain under pressure in the years ahead, the planned reform of the pension system may offer opportunities for *life insurers*. These include growth in portfolios of defined contribution schemes or buy-outs – taking over pension rights and entitlements from pension funds for a fee. It is essential that the underwriting risks of the new pension contract are well managed and that buy-outs are appropriately priced. Opportunities for *non-life insurers* lie in responding to new and changing risks, such as those resulting from climate change, the transition to a climate-neutral economy, changes in the labour market and increasing digitisation. Responding to new and changing risks is not only important for the future revenue model of non-life insurers, but also helps them continue to fulfil their role in society by insuring and protecting society against the risks to which it is exposed. The remainder of this report delves deeper into the theme of insurability (or uninsurability) and the division of roles between insurers and the government in creating insurance markets. Specific attention is devoted to flood and cyber risks.

3 Insuring risks and uninsured losses

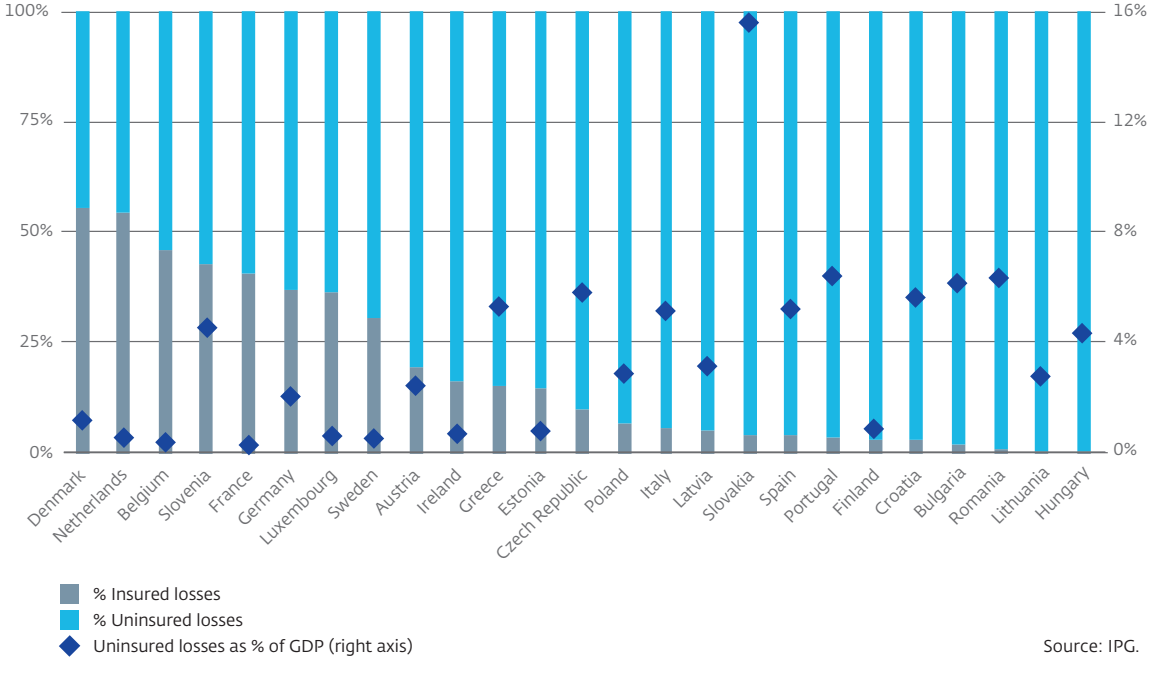
Supply and demand in insurance markets do not always match. Insurance is not available for all risks that households and businesses want to insure. This chapter examines the factors preventing the emergence of private insurance markets, the uninsured losses that occur when uninsured risks materialise and the government's role in creating insurance markets.

3.1 Uninsurability is associated with uninsured losses

Whether and to what extent insurers are willing and able to insure a risk depends on many factors. Much has been written in the literature about the factors determining the extent to which a risk is insurable in private markets (see for example Berliner, 1985 and Eling and Wirfs, 2016). Examples of factors impeding the development of insurance markets are the correlated nature of risks, the inability to accurately assess risks and the potential claims burden being too great for an insurer to bear. Information asymmetry also hampers the development of insurance markets, for example because the people who wish to take out insurance are mainly those with high risk profiles or because policyholders take more risk after taking out insurance and insurers find this difficult to monitor. Another potential impediment is that the premiums policyholders are willing to pay may be insufficient to cover expected claims, other costs and a capital surcharge.

When risks are uninsurable, the materialisation of those risks will lead to uninsured losses. Businesses and households will have to bear the consequences of the damage themselves if a risk is uninsured or only partly insured. Such uninsured losses are liable to increase rapidly in the case of new and/or growing risks, such as those arising from climate change. Damage due to natural disasters, for example, is increasing worldwide due to climate change. In 2021, 57% of damage from natural disasters was uninsured. This equates to USD 160 billion of uninsured losses (Munich Re, 2022). In Europe too, damage from natural disasters has been largely uninsured over the past 40 years, as can be seen in Figure 3.1. In the Netherlands, damage from natural disasters has so far been relatively minor compared to the size of the economy, although a substantial proportion of damage is uninsured here too.

Figure 3.1 Uninsured losses from natural disasters in Europe, 1980-2020



Source: IPG.

Limiting the scale of uninsured losses leads to higher prosperity. A higher level of insurance cover for post-event damage reduces uncertainty for households and businesses. It also limits the economic impact of disasters, partly because uninsured damage may also affect the financial sector. This is illustrated in Box 3.1. Reducing potential uninsured losses has beneficial economic effects. This is illustrated in a recent study by EIOPA (2021). A relatively major disaster with a claims burden of 1% of GDP will affect economic growth significantly, but with a higher level of insurance coverage of the resulting damage the impact decreases sharply. When more than 75% of damage is insured, there is no measurable impact on the economy.

Box 3.1 The impact of uninsured climate damage on the financial sector

Financial institutions can be hit by uninsured losses due to natural disasters. The materialisation of climate and natural disaster risks affects the value of assets, such as real estate financed by financial institutions. This is because financial markets have not yet fully priced in these risks. The ECB (2021) shows that two-thirds of bank loans to firms with high or increasing exposure to physical climate risks are collateralised. If the collateral is not fully insured, financial institutions bear greater credit risks. Recent DNB research, for example, shows that a large proportion of the domestic real estate exposures of Dutch banks, insurers and pension funds is in regions of the Netherlands that are vulnerable to flooding. The flooding of vulnerable areas causes damage to buildings, which in very exceptional cases could amount to almost EUR 200 billion (DNB, 2021). The most extreme scenario of a DNB stress test, in which heavy floods flood the western part of the Netherlands, shows that the capital position of Dutch banks could fall by 7 percentage points of CET1 within a year (Caloia and Jansen, 2021). Moreover, when uninsured damages have to be absorbed by debtors themselves, this can affect the income position of households and businesses and weaken their balance sheets. This increases the probability of default and may lead to further losses in the market value of investments.

Large-scale losses in the financial system could lead to a self-reinforcing feedback loop. The income and capital position of financial institutions may be impacted if they incur losses on credit risk. If the affected institutions respond by cutting back lending, a macroeconomic domino effect could ensue. It is unclear whether the financial system – globally or nationally – has already experienced a climate and disaster shock large enough to trigger such a feedback loop (FSB, 2020). Research by Schüwer et al. (2019) suggests that bank lending remained fairly resilient after natural disasters in the past. The main explanation for this is that banks' historical exposure was fairly well diversified across different geographic regions. Now, however, there is an increasing possibility of a larger shock (or a series of shocks) affecting a large number of financial institutions simultaneously. Such scenarios could therefore trigger the self-reinforcing feedback loop earlier.

3.2 Government's role in creating insurance markets

When private insurance markets fail to get off the ground but are desirable from a societal point of view, the government can encourage their creation. Reducing uninsurable risks does not always require the same approach. It is therefore important for the government to consider why a risk is not insurable in the market. Below is an illustration of some common obstacles showing why insurance markets fail to materialise and the role the government can play in making risks more insurable.

Potentially high claims burden

Depending on the potential size of the claims burden, an insurer, a reinsurer or the government will be the most appropriate bearer of the risk. Risks that affect many households and businesses simultaneously and lead to substantial damage, such as earthquakes, are difficult for an individual insurer to bear. Reinsurers enable insurers to reinsure all or part of such risks for a fee, but there are limits to the total claims burden a reinsurer can bear. Reinsurers and capital markets are by no means able to bear the total claims burden of pandemics, for example. The government acts as an implicit insurer of such risks. It can spread risks among the population through taxes and between generations through public debt. During the COVID-19 pandemic, for example, the Dutch government provided support for businesses and self-employed people, acting as an implicit insurer of the losses.

Upfront clarity on the role of the government in natural disasters is important for the development of private insurance markets. Uncertainty about whether the government is willing or unwilling to compensate households and businesses for damage in the event of calamities or natural disasters makes risks less predictable for insurers and consequently hinders the development of private insurance markets. This uncertainty also has repercussions on households and businesses. They will be less willing to take out insurance if they believe that, possibly as a result of increasing political pressure, the government will be prepared to compensate for losses after a calamity or natural disaster. Clearly stating in advance the cases in which the government will provide support and those in which it will not is therefore important for the development of private insurance markets.

Asymmetric information and lack of awareness

Information asymmetry between policyholders and insurers and a lack of risk awareness can limit the degree of risk sharing. Asymmetric information occurs when a policyholder has a better view of the risk than the insurer. This information asymmetry can lead to adverse selection, because – for a given insurance premium – the people wanting insurance are mainly those with a high risk profile.[7] For people with a low risk profile, insurance is unattractive because the premium is high relative to the risk they bear. The influx of people with predominantly high

7 Information asymmetry can also lead to moral hazard with policyholders behaving less prudently after taking out insurance (see also Chapter 1).

risk profiles forces the insurer to raise premiums. In theory, this self-selection mechanism could continue until there is virtually no one left who wants insurance. A lack of risk awareness can also lead to limited willingness to share risks. When households and businesses underestimate the risks they are exposed to, as in the case of cyber risks (see Chapter 4), they are less willing to take out insurance.

Government intervention can ensure that more policyholders share their risks, allowing the creation of an insurance market. In the case of adverse selection, the government itself can offer insurance for everyone at fair prices or make insurance mandatory. In many countries, health insurance is provided or mandated by the government, partly to ensure that insurance does not become unaffordable for those who need it most. The government can also raise risk awareness among households and businesses by educating them about the risks to which they are exposed. This will enable them to take any necessary precautions and make more informed decisions on whether or not to take out insurance.

Lack of data for estimating risks

A lack of data makes it harder for insurers to assess risk and leads to reluctance to offer insurance. Data on risk frequency and the associated claims burden are a prerequisite for insurers to estimate and price risks. When an insurer has hardly any data, it is difficult to gauge the appropriate insurance cover and set the corresponding premium. This applies particularly to new and/or changing risks.

By making data publicly available and promoting private data sharing, governments can encourage the emergence of private insurance markets.[8] In some cases, the government itself can act as a data sharer and in other cases it can encourage private operators to share data on incidents and damage. As well as promoting data sharing, the government can play a role in developing a shared taxonomy of incidents and damage. A shared taxonomy makes it easier to aggregate data from different sources and can improve data quality.

8 See DNB and AFM discussion paper (2022) for an account of the importance of data and data access for the financial sector.

3.3 Changing risks, changing insurance needs?

The risks to which society is exposed are changing. Climate change is accompanied by rising temperatures and sea levels and an increase in extreme weather events, such as drought, storms and precipitation. As a result, households and businesses are increasingly exposed to various climate-related risks. This increases the damage they suffer, partly because different climate risks, such as drought and extreme precipitation, are liable to occur in the same location in any given year (IPCC, 2022). The risks are also evolving due to the transition to a climate-neutral economy. Changes in energy infrastructure, for example, are leading to increased demand to insure solar panels, electric vehicle fleets and homes heated using hydrogen. Greatly increased digitisation of society also makes households and businesses more vulnerable to cyber risks, such as phishing and ransomware attacks. Since the COVID-19 crisis there has also been an increased focus on the risk of pandemics, which have once again shown their potential to disrupt society.

The following chapter deals specifically with flood risk and cyber risk. Following the floods in the Dutch provinces of Limburg and North Brabant in the summer of 2021, flood risk has been the subject of renewed interest among policymakers. These floods showed that flooding can also result from extremely heavy precipitation leading to peak river discharge. EIOPA also recently highlighted the Netherlands' relatively high vulnerability to uninsured losses due to floods (EIOPA, 2020). Risks of an increase in extreme localised precipitation and storms are already largely covered by contents and buildings insurance in the Netherlands. Risks resulting from increasing drought are actually sometimes too predictable for the emergence of private insurance markets. Insurers no longer offer cover for drought-related subsidence, for example, since it is reasonably easy to predict which homes will be affected (AFM, 2021). *Cyber risks* also result in high uninsured losses. The cyber insurance market is still small, while potential losses are growing rapidly. Some of the analyses below regarding cyber risk and flood risk are also applicable to *pandemic risk*. However, since it is not clear whether this is a growing risk and EIOPA (2020) has published a detailed study on this, Chapter 4 is confined to flood and cyber risks.

4 Insuring flood risks and cyber risks

Dutch households and businesses are vulnerable to floods and cyber incidents, but find it almost impossible to obtain the relevant insurance from private markets. This chapter examines the insurance markets for flood risk (sections 4.1 and 4.2) and cyber risk (sections 4.3 and 4.4) and the underlying factors that make them difficult to establish. Finally, it considers the role of the government and insurers in creating better functioning insurance markets for these risks (section 4.5).

4.1 Flood risk in the Netherlands is high but only insurable to a limited extent

The floods in the Dutch provinces of Limburg and North Brabant once again highlighted how vulnerable the Netherlands is to flooding. About 60% of the Netherlands' land area is below sea level or susceptible to flooding from rivers bursting their banks. Almost 70% of the population lives in this flood-prone area. How vulnerable the Netherlands is to flooding became clear again in 2021. Total direct damage from flooding in Limburg and North Brabant in July 2021 due to heavy rainfall in Germany's Eifel region and the Belgian Ardennes is estimated at EUR 0.5 billion (Government of the Netherlands, 2022). The damage was greater in the Netherlands' neighbouring countries. Munich RE (2021) estimates the total damage in Europe at EUR 46 billion, including EUR 33 billion in Germany.

Some flood damage is currently uninsurable for Dutch households and businesses. In their insurance products, insurers use the legal distinction between primary flood defences, such as the dykes of major rivers and sea walls, and secondary flood defences, such as those of smaller, regional water courses (see AFM, 2021). In recent years, insurance coverage for floods caused by breaches of secondary flood defences has gradually increased as insurers have included it in contents and buildings policies. Insurance for floods resulting from breaches of primary flood defences is almost impossible to obtain. It is only offered to multinationals, which carry this risk internationally, and a limited number of high net worth individuals (Dutch Association of Insurers, 2020).

The Dutch government now implicitly covers part of the flood risk through the Calamities Compensation Act (*Wet tegemoetkoming schade bij rampen – Wts*). This Act provides a structured scheme whereby the government can pay compensation for major disasters. It expressly does not grant a right to full compensation for damage and focuses on damage that is not reasonably insurable. The Minister of Justice and Security *may* decide to declare the Act applicable after a flood or other disaster has occurred. A ministerial regulation will then specify the scope of the scheme, the damage area and the maximum amount of compensation. When the Calamities Compensation Act was applied after the floods in 2021, the amount of compensation for damage to homes, for example, was capped at 90% of the loss, while for contents the cap was 90% subject to a maximum of EUR 32,400. The Act was previously triggered for the Wilnis dyke breach (2003) and the Maas floods in 2003 and 2011.

4.2 Causes of the limited insurance market for flood risk in the Netherlands

The potentially unmanageable claims burden in the event of a breach of primary flood defences makes it difficult to insure this risk. Despite substantial and necessary investments in flood protection and legally enshrined water safety standards, the Netherlands remains vulnerable to flooding.[9] The probability of large-scale flooding in any year may be low, but when it does occur, the potential damage is great. This is particularly true if it also causes prolonged outages of essential facilities, such as telecommunications and electricity. Thus, although insurance has added value from society's perspective, the limited scope for diversification makes it costly for an individual insurer to insure floods at primary flood defences. If the risk materialises, the damage may even lead to the failure of an insurer. While individual insurers can provide wider insurance coverage by reinsuring risks, their ability to insure potential damage in severe flood scenarios, such as those involving the flooding of densely populated regions with millions of inhabitants, is also constrained by the capacity limits of the international reinsurance market.

Uncertainty about the extent of government coverage of damage caused by floods from major rivers and the sea reduces the willingness to provide insurance cover. It is only *after* a major river flood that the government decides whether – and under what conditions – the Calamities Compensation Act will be declared applicable. This gives rise to uncertainty for households and businesses and makes it harder for insurers to predict risks (see section 3.2). Households' anticipation of government compensation may be a reason for them not to obtain insurance. It also reduces the incentive to take preventive measures.

A lack of awareness of the risk also plays a role, with the result that the market is smaller than would be justified based on the risk. A survey commissioned by the Dutch Association of Insurers (2017) shows that four out of 10 respondents thought their own insurer covered damage from large-scale flooding and three out of 10 thought the government did. In reality, however, they would have to bear this damage themselves. A survey commissioned by DNB in 2021 confirms this picture. Only 25% of respondents said they themselves bore principal responsibility for absorbing the losses caused by natural disasters. Some 20% thought the insurer would cover the damage and just under 10% thought it would be central government. This lack of awareness not only hinders the creation of a private insurance market, but can also lead to reputational damage for insurers. If policyholders think they are insured for flood damage and only find out after a flood that this is not the case, some will feel (rightly or wrongly) that they have been misled by the insurer.

9 Water safety standards for primary flood defences are enshrined in law in the Netherlands. These standards are set on the basis of flood probability, which means that a higher flood risk necessitates reinforcement of flood defences. However, meeting these standards is not a given in all circumstances. For example, a stronger than currently expected sea level rise could lead to higher costs for protection measures, or the (temporary) failure to meet the established standards (see also DNB, 2017).

In other countries, flood risks are insurable to a greater extent. Research by EIOPA (2020) shows that many other European countries have wider flood risk coverage than the Netherlands. Wider coverage is often associated with a more active role on the part of the government. Private flood insurance is mandatory in a number of countries , such as Belgium. Sometimes the government plays a role in the emergence of a reinsurance market, as in the United Kingdom, where Flood Re, a flood risk reinsurer established as a public-private partnership, ensures wider availability of relatively cheap flood insurance. In some countries such as Iceland, Denmark and Spain, the government itself acts as an insurer (OECD, 2021).

These examples from other countries should also be emulated in the Netherlands. Uninsured losses after large-scale floods fuel uncertainty, lead to potentially higher consequential damage and trigger political pressure for compensation. Although an earlier initiative to achieve wider flood coverage was unsuccessful – partly due to competition law issues and limited support (see ACM, 2013) – the floods in Limburg and North Brabant once again highlight the vulnerability caused by the deficient functioning of the insurance market for flood damage. Insurers and the government therefore have a key responsibility for making Dutch households and businesses more aware of and better insured against the risk of large-scale flooding. In view of the parallels with cyber risk insurance, relevant policy recommendations are discussed in section 4.5.

4.3 Cyber risks are increasing, but are still largely uninsurable

Cyber risks arise from the use of ICT and data transfers by businesses, households and governments. Cyber risks include both physical damage – caused for example by cyberattacks, data loss or damage and fraud – and the resulting liability, for example due to the impact on the availability, integrity and confidentiality of information (IAIS, 2016). Cyber incidents can have both criminal and non-criminal origins. Incidents with a criminal origin are referred to as cybercrime. Examples include hacking attacks and extortion with ransomware. Non-criminal cyber incidents occur, for example, due to technical hardware failures or human error leading to unintentional disclosures of confidential information.

Digitisation has made Dutch society more vulnerable to cyber risks. Almost 85% of people in the Netherlands bank online and over seven out of 10 buy goods and services online. A significantly higher proportion of working people in the Netherlands (72%) use the internet in their work than the EU average (56%) and almost a quarter of businesses sell products and services online (Statistics Netherlands, 2021). This high level of digitisation makes households and businesses vulnerable to cyber risks. Recent geopolitical tensions, including the war in Ukraine, have increased the cyber threat.

Cyber incidents are common among businesses. In 2020, over 15% of Dutch companies with more than 250 employees experienced data breaches due to internal incidents. Around 20% of large companies were affected

by external ICT security incidents. In almost half of the cases, the affected companies reported having to bear costs (Statistics Netherlands, 2022). Cyber incidents also affect financial institutions. According to DNB data (2021) over 15% of Dutch pension funds and insurers reported significant financial losses due to security incidents and data breaches. Around 5% of institutions experienced unauthorised access to data during that period. In addition, losses due to fraud in banks' payment services amounted to over EUR 60 million in 2021 (Dutch Payments Association, 2022).

Households are also regularly victims of cyber incidents. According to Statistics Netherlands data, 1.5 million people said they were victims of online scams and fraud in 2021. Two out of three Dutch people said they had received a phishing message at least once. Of the two per cent who reported having fallen for the phishing scam, almost half – equivalent to over 100,000 people in the Netherlands – were ultimately financially affected (Statistics Netherlands, 2022).

Cyber incidents may potentially develop into a systemic crisis. Not all cyber incidents are reported, for example because of reputation loss, and reports that are made are not always clear (Aldasora et al., 2022; OECD, 2017). There is no doubt, however, that the damage is significant. A study by the OECD (2021) shows that the data breach at the US credit agency Equifax involved losses amounting to USD 1 billion. The WannaCry and NotPetya cyberattacks in 2017 caused damage exceeding USD 10 billion. Damage is also increasing due to a rise in *ransomware* attacks. In 2021, a meat processing company in Brazil paid USD 11 million and the US oil pipeline company Colonial Pipeline paid over USD 4 million. Cyberattacks have the potential to develop into a systemic crisis, for example when vital digital processes in telecommunication and energy supplies, public administration or transportation are rendered inaccessible. The same applies to attacks targeting financial institutions or the financial infrastructure (see also DNB, 2022).

At the same time, the size of the cyber insurance market in Europe is still relatively modest, albeit growing rapidly. EIOPA (2019) estimated the size of the cyber insurance market, in terms of premium volume, to be around EUR 300 million in 2018. In 2017, it was around EUR 170 million. This is significantly smaller than in the United States, where premium volume grew from almost USD 1 billion in 2015 to nearly USD 5 billion in 2021 (Fitch, 2022). In the Netherlands, at least 15 insurers offered some form of cyber coverage in 2021 and their total gross premium turnover was around EUR 36 million, compared to EUR 10 million in 2015 (Dutch Association of Insurers, 2018; 2022). This is rapid growth, but it remains low relative to the potential losses and in terms of the total premium volume of the Dutch non-life market. The first entrants to the Dutch cyber insurance market were large, international insurers focusing mainly on the corporate segment. Several Dutch providers have since entered the market.

Cyber insurance is usually targeted at businesses; the cyber insurance market for households is still in its infancy. Cyber cover is offered as a standalone policy or as an extension to other non-life insurance policies.

In addition, cyber risks may not be explicitly excluded in traditional non-life insurance policies, so cyber incidents may still be covered. In addition to cover for such things as data recovery and liability costs, cyber insurance policies often include additional services for businesses, such as cyber risk mitigation and forensic and legal assistance. A report by Hiscox (2021) shows that 33% of businesses in the United States took out separate cyber insurance in 2021, compared to 26% in the United Kingdom, 28% in Germany and 21% in the Netherlands. There are various insurers offering private cyber insurance in the Netherlands. This mainly involves assistance combined with cover for identity fraud and payment data fraud (Consumentenbond, 2021). As far as we are aware, no data are available on the proportion of households insured against cyber risks.

4.4 Various factors are hampering the growth of the cyber risk insurance market

A primary factor holding back the cyber insurance market is a lack of historical data. Cyber risks are relatively new, so only limited data are available on incidents and the resulting damage. There is also a reluctance to share data on cyber incidents, partly because of privacy and security concerns. Disclosing data on cyber incidents could also make criminals aware of system vulnerabilities. Data sharing between insurers concerning cyber insurance claims and data sharing by other private operators also raises competition concerns, since it is uncertain whether the benefits of data sharing will outweigh the costs and data sharing may negatively impact competitiveness (OECD, 2020). Moreover, there is no harmonised taxonomy for cyber incidents, making it difficult to aggregate data from different sources, and cyber risks are evolving rapidly. Even when historical data are available, it remains a challenge for insurers to estimate their risk exposure accurately.

Second, losses from cyber risks, like those from flood risk, may be correlated, with extensive damage occurring in a short space of time. The WannaCry attack, which claimed 300,000 victims across 150 different countries within a short period, illustrates that cyber risks may be strongly correlated. Furthermore, in the event of an attack on critical IT infrastructure, for example by a state actor, or in situations where criminal software intentionally or unintentionally affects a large number of victims, the potential claims burden may rapidly exceed an insurer's risk-bearing capacity. Even cyberattacks targeting a single company can lead to substantial damage, for example when an attack completely shuts down a business for an extended period of time. The cyberattacks on VDL NedCar and the Colloseum Dental chain are cases in point. Insurers are therefore generally reluctant to provide cyber cover, which is reflected in the relatively low maximum loss covered and the large extent to which insurers reinsure cyber risks (OECD, 2021).

Third, the potential market is limited by the relatively low awareness of cyber risks. Although businesses and households are becoming more aware of cyber risks, they find it difficult to gauge the direct and indirect financial consequences (OECD, 2017). In addition, the complexity of cyber risks makes it difficult to understand what a cyber policy

does or does not cover and what insurance limits apply (Eling and Wirfs, 2016). For example, people often assume that cyber risks are covered by regular non-life and liability insurance policies, whereas in reality that is not the case.

A more developed cyber insurance market is no panacea for rising cyber risks, but it may contribute to stronger digital resilience in society. A well-functioning cyber insurance market can increase awareness among businesses and households of the potential consequences of cyber incidents and contribute to knowledge sharing. It may also encourage investment in cyber security, partly as a result of insurers making eligibility for cover contingent on the security of IT and data infrastructure. It is naturally important that this security is maintained throughout the life of the insurance and that businesses and households do not behave less prudently as a result of taking out insurance, since this would negate or diminish the positive effects on cyber security. At the same time, strengthening society's cyber resilience requires more than just a well-functioning cyber insurance market. In addition to the necessary preventive measures that households and businesses can take themselves, vital processes must be cyber resilient (see also Cyber Security Council, 2021). The government must also consider how to deal with systemic risks, for example due to state-sponsored cyberattacks. No cyber incidents with a disruptive impact on society have so far occurred in the Netherlands, but this does not mean such an incident will not occur in the future. If such attacks occur, society will look to the government, as is currently the case with large-scale natural disasters.

4.5 Policy recommendations for better functioning insurance markets for flood and cyber risks

Better coverage for society against damage from flooding and cyber incidents requires a broad approach, in which both the government and insurers have a role. Key ingredients of this approach are raising risk awareness in society and creating the necessary preconditions for private insurance markets to develop. One way to do this is by clarifying the role of the government upfront and promoting data sharing so that insurers are better able to assess risks. Where private markets lack the capacity to bear certain risks, but where insurance cover is desirable from a societal point of view, the government has a role to play in helping to make these risks insurable.

First of all, it is important that the government and insurers raise society's awareness of flood and cyber risks so that households and businesses can take the necessary preventive measures themselves. If households and businesses are made more aware of the flood and cyber risks to which they are exposed and the extent to which they must bear the financial consequences of damage themselves, they will be better able to assess the desirability of additional insurance. Greater awareness will thus also reduce the potential reputational risks for insurers. Finally, greater awareness will also encourage preventive measures, for example through the incorporation of climate-adaptive measures in housing projects and developments or redevelopments of business parks or investments in cyber security. This will limit the risk exposure of

households and businesses and thus also increase their resilience.

The development of private insurance markets for the currently uninsurable part of flood and cyber risks also requires greater clarity from the government about its role. In the case of damage caused by floods from major rivers and the sea, where the government only decides whether to provide compensation under the Calamities Compensation Act *after* a flood has occurred, there is uncertainty about the role of the government.[10] This uncertainty also applies in the case of cyber risks. Although the cyber threat is permanent and incidents can lead to socially disruptive damage, it is not clear what role the government sees for itself in compensating society for the damage suffered in such large-scale cyber incidents. Providing more clarity *upfront* about this role and the conditions under which, and the extent to which, it will compensate for damage will make risks more predictable for insurers and enable them to respond with appropriate insurance products. One way to provide this clarity is by setting a lower limit, for example in terms of the total claims burden, above which the government will compensate for damage. In that case, an insurance solution may emerge where the first layer of losses is borne by insurers and reinsurers and the government pays compensation when damage exceeds a predefined threshold. Another possibility is setting out more clearly which risks are and are not covered by the government, for example by distinguishing between different types of floods. If desired, the government could further increase the coverage capacity of private markets by acting as a reinsurer. Within the Dutch Terrorism Claims Reinsurance Company (NHT), for example, insurers, reinsurers and the government jointly provide EUR 1 billion of coverage capacity and the State has provided a guarantee for the last EUR 50 million of this coverage capacity – against payment of a premium.

Specifically for the further development of the cyber insurance market, it is important that data on cyber incidents are made more accessible and that government and the industry jointly produce a taxonomy of cyber incidents. Making data on cyber incidents more accessible, at least at European level, will enable insurers to assess cyber risks more accurately. The government can promote data sharing between market participants, but it can also share its own data on cyber incidents – while of course ensuring privacy and security. When data are shared between private operators, such as insurers or reinsurers concerning cyber insurance claims, competition aspects must also be considered, but this need not preclude such data sharing in advance. In the United States, for example, where the cyber insurance market is more developed, insurers exchange data among themselves, including through companies that aggregate incident data from different insurers (OECD, 2020). Besides data sharing, it is important to produce a harmonised taxonomy for cyber incidents, as standardisation makes it easier to aggregate data and can

10 The Calamities Compensation Act was introduced to cover damage caused by freshwater flooding and earthquakes. The law could also be declared applicable to other disasters of at least a similar order by Royal Decree (see here).

promote data quality. Both the industry and government have a role to play in establishing standards and norms for classifying cyber incidents. For example, government involvement can contribute to international coordination, thereby increasing data quantity, and increasing the probability of risk sharing between countries. EIOPA's previously announced cyber underwriting strategy (2020) is a welcome development in this regard. In this strategy EIOPA announced that it would explore and promote the development of a harmonised taxonomy for reporting cyber incidents with various stakeholders, including the European Commission and the European Union Agency for Cybersecurity (ENISA).

It is important that insurers properly manage the risk of cyber incidents and flooding, as well as other climate-related risks, especially when insurance coverage is being widened. Risk exposures increase as insurance coverage widens. From a prudential perspective, it is essential that insurers manage the resulting risks properly. Where coverage is material, this means flood or cyber coverage must be part of an insurer's risk strategy, the risk exposure must be identified and measured and the associated risk management must be satisfactory. A reinsurance strategy, or explicit limits on risk exposure, can help make such risks more manageable. By the same token, in the case of cyber risks, attention must also be paid to the phenomenon of "silent coverage", whereby cyber risks are not explicitly excluded in other policies, such as buildings and contents insurance (see also EIOPA, 2022). Silent coverage can lead to insurers facing claims for unforeseen cyber incidents that were not taken into account when premiums were set.

The supervisory authority has a role in overseeing this. Climate risks, including flood risks, have been further integrated into DNB's supervisory approach in recent years. Although insurers are increasingly aware of the climate-related risks to which they are exposed, there is room for improvement. In that light, DNB provided guidance on comprehensive climate and environmental risk management earlier this year (see DNB, 2022). In addition to existing efforts around cyber risks as an operational risk for insurers – such as the TIBER-NL programme that tests resilience to cyberattacks – growing cyber risks and cyber insurance markets require that DNB devotes increasing attention to the underwriting risks borne by insurers as a result of providing cyber coverage.

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