TABLE 7.7

Effects of full global merchandise trade liberalization on the number of extreme poor, using the Linkage model, by region

	Average unskilled wage change, real[a]	Baseline headcount		New levels, $1/day		New levels, $2/day		Change in number of poor from baseline levels		Change in number of poor from baseline levels	
		$1/day	$2/day	Headcount	Number of poor	Headcount	Number of poor	$1/day	$2/day	$1/day	$2/day
	(%)	(%)	(%)	(%)	million	(%)	million	million	million	%	%
East Asia	4.4	9	37	8	151	34	632	-17	-52	-10.3	-7.6
China	2.1	10	35	9	123	34	440	-5	-12	-4.0	-2.7
Other East Asia	8.1	9	50	6	29	42	192	-12	-40	-30.1	-17.1
South Asia	-1.9	31	77	32	454	78	1124	8	8	1.8	0.7
India	-3.8	34	80	36	386	82	883	15	15	4.2	1.7
Other South Asia	4.0	29	94	26	68	92	241	-8	-7	-9.9	-2.7
Sub Saharan Africa	5.3	41	72	39	287	70	508	-11	-14	-3.8	-2.7
Latin America	4.1	9	22	8	44	21	115	-3	-6	-6.8	-4.7
Middle East & North Africa	14.3	1	20	1	3	13	40	-2	-19	-36.4	-32.7
Above developing countries	5.9	18	48	18	944	46	2462	-26	-87	-2.7	-3.4
Developing, excluding China	6.5	21	52	20	820	50	2022	-21	-74	-2.5	-4.7
Eastern Europe & Central Asia	4.5	1	10	1	4	9	43	-0	-4	-6.8	-8.0

[a] Nominal unskilled wage deflated by the food and clothing CPI

Source: LINKAGE model simulations from Anderson, Valenzuela and van der Mensbrugghe (2010).

7.3   Prospects for further reductions in price distortions

The above review of estimates of policy indicators could lead one to view developments from the early 1960s to the mid-1980s as an aberrant period of welfare-reducing policy divergence (negative and declining RRAs in low-income countries, positive and rising RRAs in most high-income countries) that has given way to welfare-improving and poverty-reducing reforms during which the two country groups' RRAs are converging. But closer inspection of the NRAs for exporting and import-competing sub-sectors of agriculture (figure 7.1) makes clear that the convergence of NRAs to near zero is mainly with respect to the exporting sub-sector, while NRAs for import-competing farmers are positive and trending upwards over time at the same rate in both developing and high-income countries – notwithstanding the Uruguay Round Agreement on Agriculture which was aimed at tariffying and reducing import protection. True, applied tariffs have been lowered or suspended as a way of dealing with the international food price spike in 2008, but this, and the food export taxes or quantitative restrictions imposed that year by numerous food-exporting developing countries, may be only until international prices return to trend (as happened after the price hike of 1973-74 and the price dip of 1986-87).

The indications are very mixed as to why some countries appear to have reformed their price-distorting agricultural and trade policies more than others in recent decades, and why some have stubbornly resisted reform. Some reforming countries have acted unilaterally, apparently having become convinced that it is in their own national interest to do so. China is but the most dramatic and significant example of the past three decades among developing countries, while among the high-income countries only Australia and New Zealand are in that category. Others may have done so partly to secure bigger and better loans from international financial institutions and then, having taken that first step, they have continued the process, even if somewhat intermittently. India is one example, but there are numerous examples also in Africa and Latin America. Few have gone backwards in terms of increasing their anti-agricultural bias, but Zimbabwe and perhaps Argentina qualify during the present decade – and numerous others joined them in 2008, at least temporarily, in response to the sudden upward spike in international food prices. And some have reduced their agricultural subsidies and import barriers at least partly in response to the GATT's multilateral Uruguay Round Agreement on Agriculture, the European Union (EU) being the most important example (helped by its desire also for otherwise-costly preferential trade agreements, including its recent expansion eastwards).

The EU reforms suggest agricultural protection growth can be slowed and even reversed if accompanied by re-instrumentation away from price supports to decoupled measures or more direct forms of farm income support. The starker

examples of Australia and New Zealand show that one-off buyouts can bring faster and even complete reform[10]. But in the developing countries where levels of agricultural protection are generally below high-income levels, there are fewer signs of a slowdown of the upward trend in agricultural protection from import competition over the past helf-century.

Indeed, there are numerous signs that developing country governments want to keep open their options to raise agricultural NRAs in the future, particularly via import restrictions. One indicator is the high tariff bindings that developing countries committed themselves to following the Uruguay Round: as of 2001, actual applied tariffs on agricultural products averaged less than half the corresponding bound tariffs for developing countries of 48 percent, and less than one-sixth in the case of least-developed countries (Anderson and Martin 2006, Table 1.2).

Another indicator of agricultural trade reform reluctance is the unwillingness of many developing countries to agree to major cuts in bound agricultural tariffs in the WTO's on-going Doha round of multilateral trade negotiations. Indeed, many of them believe high-income countries should commit to reducing their remaining farm tariffs and subsidies before developing countries should offer further reform commitments of their own. Yet modeling results reported in Valenzuela, van der Mensbrugghe and Anderson (2009) suggest that if high-income countries alone were to liberalize their agricultural markets, such a sub-global reform would provide less than two-thirds of the potential gains to developing countries that could come from global agricultural policy reform.

More than that, the current negotiations have brought to prominence a new proposal for agricultural protectionism in developing countries. This is based on the notion that agricultural protection is helpful and needed for food security, livelihood security and rural development. This view has succeeded in bringing "Special Products" and a "Special Safeguard Mechanism" into the multilateral trading system's agricultural negotiations, despite the fact that such policies, which would raise domestic food prices in developing countries, may worsen poverty and the food security of the poor (Ivanic and Martin 2008).

To wait for high-income country reform before liberalizing the farm trade of developing countries is unwise as a poverty alleviating strategy, not least because the past history revealed in the NRAs summarized above suggests such reform will be at best slow in coming. In the US, for example, the most recent two five-year farm bills were steps backwards from the previous regime which at least sought to re-instrument protection towards less trade-distorting measures (Gardner 2009). Nor have the world's large number of new regional integration agreements of recent

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[10] For a detailed analysis of the buyout option versus the slower and less complete cashout option (moving to direct payments), as well as the uncompensated gradual squeeze-out or sudden cutout options, see Orden and Diaz-Bonilla (2006).

years been very successful in reducing farm protection. Furthermore, for developing countries to postpone their own reform would be to forego a major opportunity to boost theirs and (given the size and growth in South-South trade of late) their neighbors' economies. As Anderson and Winters (2009) argue, it would be doubly wasteful if, by being willing to commit to reform in that way, they would be able to convince high-income countries to reciprocate by signing on to a more-ambitious Doha agreement, the potential global benefits from which are very considerable.

Developing countries that continue to free up domestic markets and practice good macroeconomic governance will keep growing, and typically the growth will be more rapid in manufacturing and service activities than in agriculture, especially in the more densely populated countries where agricultural comparative advantage is likely to decline. Whether such economies become more dependent on imports of farm products depends, however, on what happens to their relative Rates of Assistance (RRA). The first wave of Asian industrializers (Japan, and then Korea and Taiwan) chose to slow the growth of food import dependence by raising their NRA for agriculture even as they were bringing down their NRA for non-farm tradables, such that their RRA became increasingly above the neutral zero level (Table 7.4). A key question is: will later industrializers follow suit, given the past close association of RRAs with rising per capita income and falling agricultural comparative advantage? Developing countries' RRA trends of the past three decades have been on the same upward trajectory as the high-income countries prior to the 1990s, so unless new forces affect their polities, the governments of later industrializing economies may well follow suit.

One potential new force is disciplines on farm subsidies and protection policies of WTO member countries following the Uruguay Round. Earlier industrializers were not bound under GATT to keep down their agricultural protection, and the legal constraints on developing countries have been even less constraining. For India, Pakistan and Bangladesh, for example, their estimated NRAs for agricultural importables in 2000-04 are 34, 4 and 6 percent, respectively, whereas the average bound tariffs on their agricultural imports are 114, 96 and 189 percent, respectively (WTO, ITC and UNCTAD 2007). Also, like other developing countries, they have high bindings on product-specific domestic supports of 10 percent and another 10 percent for non-product specific assistance, a total of 20 more percentage points of NRA (17 percent in China's case) that legally could come from domestic support measures – compared with currently 10 percent in India and less than 3 percent in the rest of South Asia.

Hopefully developing countries will choose not to make use of the legal wiggle room they have allowed themselves in their WTO bindings to follow Japan, Korea and Taiwan into high agricultural protection. A much more efficient and equitable strategy would be to instead treat agriculture in the same way they have been treating non-farm tradable sectors. That would involve opening the sector to

international competition, and relying on more-efficient domestic policy measures for raising government revenue (e.g., income and consumption or value-added taxes in lieu of trade taxes)[11] and to assist farm families (e.g., public investment in rural education and health, rural infrastructure, and agricultural research and development). Investments in public agricultural R&D in developing countries as a group are currently equivalent to just 0.3 percent of the gross value of farm production (about one-third the intensity of high-income countries). Given the extremely high rates of return at the margin to such investments (see, e.g., Fan 2008), expenditure on that would be far wiser than providing farm price supports as middle-income economies develop.

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[11]Developing countries are becoming less and less reliant on trade taxes as a source of government revenue, with even very poor countries realizing that a tax imposed at the border, if called a consumption tax rather than a tariff, does not induce protected domestic production and yet can raise the same revenue at the same collection cost as a tariff.

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Review of public support to agricultural insurance

Piero Conforti[1]

Introduction[2]

Farmers operate within a highly uncertain environment characterized by long production cycles. The amounts and quality of products that will become available several months ahead, the price that will materialize in output markets, the institutional framework that will prevail, and even technologies, are subject to wide changes during the production cycle. Such a high degree of uncertainty implies a number of risks[3].

Risks in agricultural production are among the justifications for extensive public support to the sector by certain countries, along with the importance attached to securing food supplies and access to adequate levels of consumption. As recently observed by the Organisation for Economic Co-operation and Development (OECD, 2009b), many domestic support measures have a significant impact on risk. Income support measures granted to farmers in some OECD countries have been widely analyzed in terms of their impact on risk, both theoretically and empirically (Sckokai

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[3] There are several classifications of the sources of uncertainty and risks in agriculture; reference is made here to the one proposed by Moschini and Hennessy (2001), which takes into account sources, and proposes four of them: production, prices, technology and policies. Other classifications divide idiosyncratic risks, affecting individuals, from co-variant risks, which affect groups; and systemic risks, which affect entire countries or regions. A wide discussion is in OECD (2009a). The two concepts of "risk" and "uncertainty" can be differentiated in several ways. Normally risk implies knowledge of a probability distribution, while uncertainty does not. We concur with OECD (2009a) that the distinction is not particularly useful, given that in most cases uncertainty implies some risk and *vice versa*.

and Moro, 2006; Koundouri et al, 2009).[4]

In many developing and least-developed countries, agriculture is less generously supported than in OECD countries. In these countries farmers mitigate risk and prevent excessive income and consumption fluctuations mainly by resorting to a plethora of more or less formal strategies and practices. Despite being effective in many instances, in developing countries such mitigation mechanisms can hinder investment, innovation and agricultural development (Alderman and Paxon, 1992), or even perpetuate poverty traps (Dercon, 2004, 2005; Barrett et al, 2008). Promoting the ability to manage risk can be an important element to foster agricultural development in poor countries. The World Bank (2008) has recently indicated that this requires a number of combined actions, among which the reduction of exposure to risks can play an important role.

Insurances are among the tools which can help managing risk in agriculture. They are private services, which can be exchanged in a market. In principle, this warrants more efficient use and better targeting, in managing farmers' risk, compared to price and income support policies. Among agricultural policy measures, schemes involving private insurance are considered less distortionary. In terms of the World Trade Organization (WTO) classification, support to insurance can be notified within the green box measures, implying no or minimal impact on trade; however, some support has been notified as an amber box, under the *de minimis* provisions. In developing countries, the insurance market tends to be incomplete, as for services in general.

Public intervention in agricultural insurance is frequent. Some insurance schemes are directly operated by the public sector or by paratsatals. In other cases, private insurance companies are supported by governments through different channels. Governments themselves seem to be looking with growing interest towards market-based tools to hedge their financial positions in case of extreme adverse events affecting both agriculture as well as the rest of the economy.

The record of a number of publicly backed agricultural insurance schemes is mixed, especially in terms of financial sustainability and farmers' participation. Many have been abandoned, and there are reported cases in which informal mechanisms as well as micro-insurance are deemed to be crowded out by public intervention (Skees and Hess, 2003). But there are also many examples in which governments have played a positive role in the development of the agricultural insurance market (Angelucci, 2008). There are also cases in which even informal mitigation strategies

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[4] Risk reduction is one of the channels through which subsidies which are classified as "decoupled" from production decisions – for instance those granted under the Common Agricultural Policy of the European Union – do in fact affect farmers' investment decisions.

may exclude the poorest, and hence call for some kind of public intervention (Santos and Barrett, 2006).

Based on a review of experiences with agricultural insurance, this chapter seeks to shed light on the role being played by the public sector in this market. Section 2 draws from the literature on risk management in agriculture to understand if and how governments need to intervene in agricultural insurance. Starting points in this area are the work of the World Bank (2005) on risk layering, and the holistic approach to risk management proposed by the OECD (2009a). Section 3 compares the indications which can be derived from such frameworks with the evidence provided by case-studies. A number of agricultural and non agricultural insurance described in the literature are reviewed, summarized and organized, with reference to public intervention. Concluding remarks are in section 4.

8.1 Risk layering, policies, and the role of governments

Insurance is a service which enjoys the properties of excludability and rivalry. Hence, the role of the public sector in the insurance market should be limited, in principle, to providing regulations and information. A legal framework needs to be in place to enforce contracts and ensure competition among insurance companies. Governments should also ensure that the information required for actuarial calculations and defining contracts is available to the involved parties. Data on risk exposure and, possibly, on expected damages are needed on the supply side. On the demand side, information can reduce so-called cognitive failure, which is the tendency to underestimate the probability of unlikely events. Since private agents would have no incentive to collect and disclose some of this information, government intervention is necessary. Especially in poor communities, agents may be unfamiliar with the concept and characteristics of insurance, especially those of the more innovative products. If so, training may play a useful role.

However, not all risks are insurable. Highly frequent and small-size risks are usually not insured because the associated losses are smaller than the transaction costs involved in insurance. At the other extreme of the spectrum, private companies cannot directly insure the so-called covariate or systemic risks, such as large-scale droughts or floods, which involve very large damages. Insurance companies would be unable to pay indemnities in case of adverse events affecting a large number of insured (Sawada, 2006).

Risk layering is one way of logically separating insurable from non-insurable risks, and defining the respective role of private companies and governments (World Bank, 2005; OECD, 2009a). Layering is the identification of areas in a probability distribution of potential losses associated with adverse events (Figure 8.1). Three

"layers" can be identified:

• a "retention layer", including losses associated with the normal or expected variability in uncertain outcomes, and which are normally retained by entrepreneurs;
• an "insurance market layer", which includes losses that are large enough to disrupt normal business practices, but can be pooled in an insurance product sold by a private company; and
• a "tail risks layer", comprising catastrophic events that insurers are unwilling to cover, and only public intervention can address.

FIGURE 8.1
Risk layers
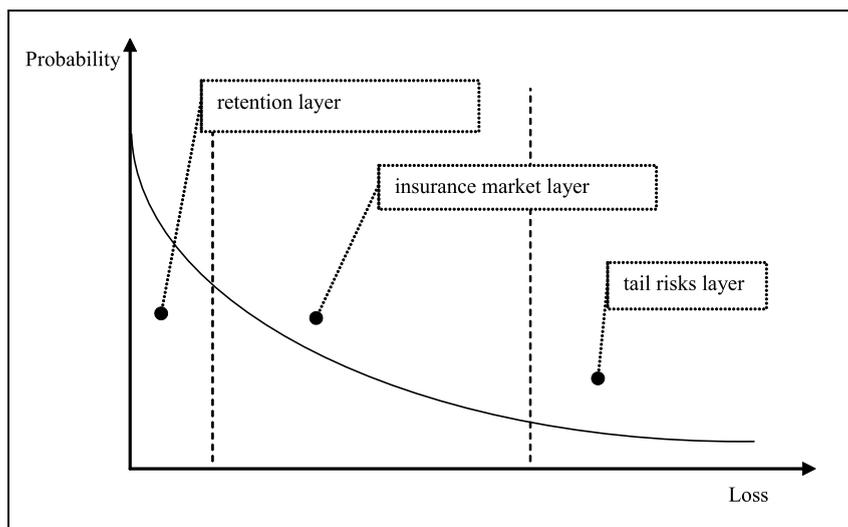
Source: adapted from World Bank (2005)

While layering is a useful concept, quantifying losses and probabilities associated with risky events is not easy in agriculture. This is one of the reasons why commercial insurance tends to have a more limited circulation compared to other sectors (FAO, 2005). It is interesting to consider what can affect the ability of agents to behave as expected in the above framework. The probability distribution of expected damages is primarily determined by the specific risks of each environment. But the ability of farmers to retain small risks, and the possibility for private insurances to operate, depend upon a number of other elements. Insights on these are described in the two sub-sections that follow.

8.1.1 What affects the ability of farmers to retain small and frequent risks?

As seen, losses in the retention layer are highly frequent and of limited size. In most rural contexts, they are normally addressed through income diversification and other consumption smoothing mechanisms, as well as through the use of a number of services. Credit and finance, the availability of storage and transport facilities, extension and technical assistance all contribute to counteract the negative impact of production variability. Farmers often require credit even to bridge the time lag between sowings and harvests, given that revenues are usually collected at the end of the production cycle while inputs need to be purchased from the beginning. Storage, and the purchase of financial assets, when accessible, can serve to manage the expected variability in price and yields. If the physical characteristics of production and the institutional context allow hedging, even unexpected price variability can be dealt with by farmers directly. The availability of updated and location-specific technical information is another element that helps farmers reduce their risk exposure. For instance, the application of agronomic techniques can reduce the impact of pest attacks, or other sources of yield variability. The extent to which markets for these services work effectively and meet farmers' demands affects their ability to retain small risks.

Where the service markets are incomplete or uncompetitive, the ability to retain risks is hindered. This is frequently true in developing countries and, in general, for households close to subsistence conditions. In these cases, farmers are forced to rely exclusively on mitigation strategies and other informal ways to smooth incomes and consumption. Examples range from crop and income diversification to informal networks of relatives and friends; from social safety nets to contracts, such as share tenancy or credit contracts, or business contracts along a production chain (Alderman and Paxon, 1992).

While some of these strategies are common to all agricultural environments – for instance crop and income diversification or the different types of vertical integration – there are contexts in which they result in the perpetuation of subsistence conditions and hinder specialization and productivity improvements. Farmers may easily reject technical change, such as improved seeds or new cultivation techniques, due to the need to increase income through diversification and reduce the exposure generated by costly inputs. Hence, risk may prevent the development of agricultural productivity, leaving potential resources idle (Carter, 2008). Income risk can be at the origin of the poverty traps and constitute a key constraint to agricultural development and the improvement of living standards of poor households (Dercon, 2004, 2005; Barrett et al, 2008).

Policies also play a part in shaping the ability of farmers to retain risks.[5] Price subsidization, border protection and direct income support are likely to increase farmers' ability and willingness to retain individual risks directly. In turn, this affects their ability to invest in and purchase technical and financial services that can smooth income variability. In developing countries, support to agriculture is usually limited, if not negative, and farmers can be directly exposed to world price variability, as well as to large swings in traded volumes. This reduces their ability to retain small risks and increases their reliance on informal mitigation and smoothing strategies. As mentioned above, such strategies may prevent investment and perpetuate low productivity and poverty traps.

8.1.2 What affects the emergence of a market for agricultural insurance?

Insurable risks, falling within their relative layer, are those which can be pooled within a market. Private companies will be able to determine the relative premiums on the basis of a probability distribution of insurable events. Traditional commercial insurance in agriculture includes those covering specific risks, such as hail. These normally imply differentiated damages across groups of farmers, which can be pooled. Multi-peril policies have also been developed in the past.

One significant product innovation in this field is the so-called index-based or parametric insurance (Skees et al, 1999; World Bank, 2005; Skees et al, 2006; Varangis and Lewin, 2006). Indexed insurance is based on the idea that a pre-determined indemnity can be triggered by changes in an objective indicator – the index or parameter – which is expected to affect individual policy subscribers to a pre-determined extent. Damages, and the related indemnities, are computed on the basis of their statistical association with the index[6]. After an initial investment in design and data gathering and processing, indexed contracts allow costly *ex-post* damage assessments, which are required in traditional insurance, to be avoided. This can reduce the asymmetry of information, and the related potential for moral hazard. Due to these potential advantages, indexed insurance has also been proposed as a means to provide and manage safety nets for poor farmers in developing countries (Chantarat et al, 2007; Barnett and Mahul, 2007; Skees et al, 2007). Against these advantages, indexed insurance requires that the insured assumes the so-called basis risk. Since indemnities are pre-determined, no compensation is paid for damages which exceed – or fall short of – what is predicted by the correlation between the

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[5] The OECD (2009a) has recently emphasized the need to analyse risk management in agriculture by considering simultaneously all the elements that shape the risk profile of farmers, including policies and farmers' mitigation strategies.

[6] Indemnities are computed on the basis of the correlation between the parameter or index, say millimeters of rain at one gauge, and the damage suffered by farmers of the area around the gauge. When the millimeters of rain reach the established trigger point, indemnities are paid to the subscribers of the insurance, based on the statistically computed expected damage and without individual damage assessment.

index and the expected damage (Berg and Schmitz, 2006).

Weather parameters are the most widely applied indexes, consistent with the notion that yield failures arising from climatic variability are the most important reason for vulnerability, especially in the agriculture of developing countries (Barnett and Mahul, 2007; OECD, 2008). Yields are also employed as indexes, as well as expected revenues (in the USA, for example). Other indicators can be used to design insurance and safety nets, including food security indicators in developing countries (Chantarat et al, 2007).

Similar to what happens with respect to the ability of farmers to retain small losses, the possibility to develop a market for private insurance in agriculture is affected by the agricultural policy frameworks. Where agriculture is extensively supported, farmers' incentives to purchase an insurance policy may be reduced, given their enhanced ability to retain risks individually (OECD, 2009b; Roth et al, 2007). Support to agriculture, in other words, can crowd out private insurance, unless premiums are subsidized as well. Subsidized premiums imply considerable distortions in production decisions, especially when they are granted for specific crops. This will change the distribution of expected revenues and encourage production on land that might not otherwise be used, as well as non-optimal investment in risky production (Young and Westcott, 2000). Moreover, subsidies may translate directly into rents for insurance companies, especially if the market is not competitive (Capitanio and Cafiero, 2006).

In addition, in poor developing countries, where agriculture receives less support, there seems to be limited space for the operation of private insurance. On the demand side, premiums may be expensive for poor and subsistence farmers, who may value them more then the worst possible insurable outcome. Poverty may result in a high rate of discount on the future,[7] and make more unlikely the decision to spend money to counteract future uncertain events. This may contribute to scarce knowledge and understanding of insurance contracts and to cognitive failures on risky events, thus reducing interest in purchasing insurance. From this perspective, poverty and subsistence conditions seem to reduce both the ability to retain small losses and the willingness to purchase insurance. A reduced ability to retain small losses seems unlikely to translate into more opportunities for commercial insurance.

On the supply side, high transaction and delivery costs in remote rural areas may result in high premiums, and the potential for moral hazard may undermine incentives for insurance companies to operate. Controlling contractual conditions

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[7] Evidence on this point is not straightforward: empirical studies have shown that subsistence farmers, even under extreme conditions, make considerable efforts to preserve productive assets, showing reduced rates of time preferences; see, for instance, Moseley (2001). Also, risk perceptions can be extremely variable, depending upon contingent events (Doss et al, 2008).

may be difficult: companies may ignore the degree of exposure of farmers to different sources of risks, as data are seldom available for remote communities. Actuarial calculations may thus become difficult. For this reason, indexed insurance is seen as a promising alternative: it can tackle two major constraints to the operation of private insurances: transaction costs and the need to assess damages ex-post.

8.1.3 Tail risks

The so-called "tail risks" or "market failure" layer includes highly infrequent and damaging events which are usually not insured by private companies. The magnitude of the associated losses, on the one hand, and the cognitive failure, on the other, can reduce the willingness of farmers to insure against unlikely events, and prevents private insurance companies from operating. Farmers often develop expectations of receiving support from the governments in case of extreme events and large covariate damages, such as droughts, floods or earthquakes. This may reinforce cognitive failures and contribute to depress market demand.

Tail risks call for the establishment of public-private partnerships, allowing risks to be transferred to a higher level. The World Bank (2005) provides indications on the means that governments can use to transfer risk. This can be done either through direct transfer to the re-insurance market, or through the re-insurance of pooled risk. The second option will leave some basis risk at the lower level. Examples of such types of extended partnerships are: the Turkish Catastrophe Insurance Pool; the Andhra Pradesh micro insurance programme; index-based weather derivative for farmers facing drought in Malawi; and the Caribbean Catastrophic Risk Insurance Facility (CCRIF), co-financed by the World Bank.

To sum up, risk layering helps identifying the different levels of risk facing farmers, and distinguishing risks in which private insurance could play a role as well as potential market failures that prevent private or market-based insurance from developing and operating. It consequently points the why to where the public sector can intervene to correct for these market failures, promote risk-reducing insurance markets and foster more stable production and incomes.
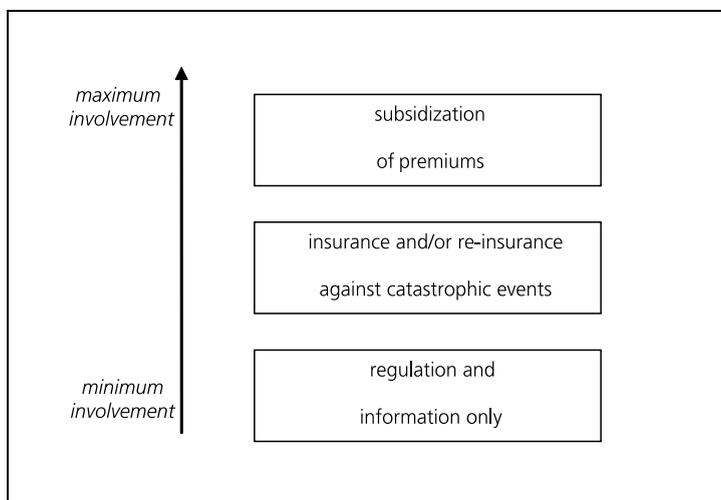
But how and where the governments can intervene is not a straightforward question. Equity considerations in the agricultural risk management of governments may warrant different choices, and these seem to be at least as important as those based on efficiency (OECD, 2009a). Typically, a government may want to provide support to more vulnerable farmers' groups, or the production of goods that are considered strategic. In these cases a careful assessment would be in order, to understand whether supporting insurance is the best option to pursue this goal (Wright, 2006). The next section reviews several countries experiences with agricultural insurances, and the extent to which governments succeeded

in addressing identifiable market failures and promote market-based insurance schemes to smooth production and incomes.

8.2 Experiences with government interventions in agricultural insurance

Public intervention in insurance markets takes different forms. The case studies reviewed here, which are far from being exhaustive, indicate that there are three broad types of public intervention (Figure 8.2). Firstly, public resources play a minimal role, comprised of regulation and the provision of information that is necessary to set up and enforce contracts. Secondly, public resources can be employed to re-insurance for covariate risks and extreme events. Thirdly, public resources can be employed to directly subsidize premiums, through State or private companies.

FIGURE 8.2

Types of government involvement in the agricultural insurance market

maximum involvement

subsidization

of premiums

insurance and/or re-insurance

against catastrophic events

minimum involvement

regulation and

information only

Source: Author

Examples of these three types of approaches are found in different countries, quite independently from the country's aggregate income level. Different organizations are also found within these three types, which are not mutually exclusive. Rather, they are incremental: premium subsidization is often implemented on top of the provision of a regulatory framework, and of financial support to public or private companies. It should be also noted that the distinction between the three types can

be blurred, since the presence of a market failure justifying government intervention can often be questionable.

The literature reviewed in the remainder of this section classifies some cases as more "successful" than others. These judgments tend to reflect two main elements: firstly, the extent to which targeted farmers decided to purchase the insurance offered; and secondly, the financial sustainability of the insurance operations. It is worth noting that these are very crude indicators of the effectiveness of insurance in managing farmers' risks. A proper assessment has seldom been undertaken (Wright, 2006) and involves resolving a set of theoretical problems, starting from the identification of a relevant indicator (Cafiero, 2008). Detailed information on risks exposure and potential damages also needs to be collected. Such a sophisticated analysis is beyond the scope of this paper, and can only be applied to a few cases of agricultural insurance. Moreover, the distinction between more and less successful insurance becomes quite evident from the descriptions offered by the literature, especially in developing countries.

8.2.1. Support to agricultural insurance in the OECD

In the OECD, several countries provide public support to agricultural insurance. In terms of the three types described in Figure 8.2, many governments seem to be highly involved in the market, by providing re-insurance and subsidizing premiums.

In the European Union (EU), for instance, 17 member countries provide direct support to premiums for a variety of agricultural insurance, in the framework of farmers' income stabilization programmes. Available insurance includes traditional products, such as policies covering specific risks, as well as combined products based on yields, and index-based policies. However, index-based insurance is far less widespread than others: it is available only in Spain, the United Kingdom and Austria (European Commission, 2008). The share of the premiums that is subsidized is estimated to vary between 2 percent and 67 percent. In five EU member countries, governments provide re-insurance for covariate risks through public insurance companies, which in some cases is mandatory (Bielza et al, 2007).

In the USA, several types of agricultural insurance benefit from subsidized premiums and support to re-insurance against catstrophic events. Insurance can be stipulated on yields, for multiple perils; on revenues for specific products; and on the revenue of the whole farming activity, under the Adjusted Gross Revenue scheme. Index-base insurance has been introduced. It is mostly sold by private companies, but the US Department of Agriculture Risk Management Agency subsidizes premiums and administrative costs. A recent comparison of the incidence of subsidies to agricultural insurance in the EU and the USA indicates that public intervention in the agricultural insurance markets accounts for about 32 percent in the EU and

58 percent in the USA (European Commission, 2008). However, estimates of the aggregate market impact of the US subsidies on agricultural insurance have shown that this may be limited, especially in terms of distortion in production choices and trade flows (Young and Westcott, 2000).

Agricultural insurance is also subsidized in other OECD countries, such as Japan, Mexico and Turkey. In Mexico, until 2001 agricultural insurance was supplied exclusively by the National Agricultural and Livestock Insurance Company, a State entity. Following the liquidation of this company, insurance has been managed though Agroasemex, another public entity which operates mostly as a re-insurer of private companies (Barnett and Mahul, 2007; Angelucci, 2008.) Since 2002, Agroasemex has also started piloting, and subsequently operating, parametric insurance, tied to drought, excessive rainfall, temperature and wind speed parameters, and later on to a vegetation index. Apparently, the switch to private companies has led to a considerable increase in farmers' demand and has also smoothed financial requirements in case of extreme events. Further expansions of the system are deemed to be constrained only by the availability of weather stations (Agroasemex, 2006).

8.2.2 Support to agricultural insurance in developing countries

A number of agricultural insurance schemes are being promoted also in developing countries. We summarize their main features here, with reference to the three types of intervention described in Figure 8.2.

Minimum involvement

Examples of this first type of intervention – involving the provision of regulations and information – are found mostly among traditional agricultural insurance schemes, such as those covering damages from hail, or multi-peril. They tend to concern insurance that is limited in scope and size.

For instance, in Argentina about 25 companies operate on a purely private basis, offering insurance against single and multi-risks (FAO, 2005). However, their market is quite limited: less than 1 percent of the total land of the country (IICA, 2008). Ukraine is another case in which traditional insurance, operating on a private basis, has never developed significantly due to lack of farmers' interest. Several companies are actively competing in the sector, offering a variety of products, including weather index-based policies (Angelucci, 2008). The reasons given for such low interest range from lack of transparency in the design of contracts, to expectations of protection from the government in case of extreme events (Barnett and Mahul, 2007). Private agricultural insurance also operates in India, on high value-added products. However, it covers only a small share of production and land (FAO, 2005; Skees and Hess, 2003).

<u>Coverage of tail risks</u>

This second type of public intervention is common among the more innovative agricultural insurance schemes. Several examples are found among indexed insurance. The idea is that governments mostly operate by addressing market failures in the area of "tail risks".

One reported case of effective design is that of the livestock insurance in Mongolia. Risk for herders is layered. Index-based privately operated insurance is sold in the market. However, the government covers part of the losses incurred by this operation, and provides coverage for extreme covariate risks. The World Bank, in turn, assists the government with a loan. In this case, the goal is to preserve market incentives, allowing private companies to operate within the "market layer", while calling upon the government to play its subsidiary role in the "tail risks" layer (Angelucci, 2008).

Another example is found in Ethiopia. The scheme covers the highly covariate drought risk through the World Food Programme, which purchases an indexed insurance from a foreign private company. In other words, the insurance covers the ability of the World Food Programme to intervene in case of drought, and provides a timely availability of financial means to support interventions. While innovative, the scheme is deemed to be financially unsustainable (Barnett and Mahul, 2007).

Macro-level support is also offered by the World Bank in India, for the operation of an agricultural index-based insurance. This scheme was started in 2003 to cover insufficient water availability, mainly in the State of Maharastra, on basic products such as rice and groundnuts. At the micro level, insurance is offered by the private company ICICI Lombard, through a microfinance institution called BASIX. However, policies remained unsold. This outcome was attributed to the crowding-out effect of another public yield insurance, the National Agricultural Insurance Scheme (NAIS), which is subsidized (Skees and Hess, 2003). Allegedly, farmers would have no incentive to purchase policies from BASIX, due to competition from those of NAIS.

Another example of this type of intervention is found in Malawi (Hess and Syroka, 2005). Since 2005, coverage has been offered by private companies operating in conjunction with a farmers' association, and with assistance from the World Bank and other international institutions. The scheme is deemed to have sold several thousand contracts in its first three years of operation. A macro-level scheme has also been designed, to cater for emergency relief in case of drought (Angelucci, 2008).

A similar type of index-based insurance could not take off in Morocco. A scheme was developed in 2004, with assistance from the World Bank, to insure farmers

against inadequate rainfall. The scheme was based on an index showing a high degree of correlation with yields. Implementation was unsuccessful, as it started during a period of unfavourable rainfall, which generated losses in the first year and quickly made the programme financially unsustainable (FAO, 2005; Angelucci, 2008).

Subsidization of premiums

This third type of intervention is relatively common in many countries. One example, already mentioned, is offered by NAIS in India, which is a vast government programme whose objectives are primarily social. NAIS is estimated to cover some 10 million farmers, corresponding to about 15.7 million hectares of land, providing insurance against credit default risk for most crops at premium rates of 1.5 to 3.5 percent of the amount of the loan. Premiums and indemnities are deemed to be inequitably distributed across crops and States; and the programme is considered to suffer from inefficiencies, such as long delays in payments of indemnities, as well as fraud and lack of financial sustainability (Skees and Hess, 2003).

The experience of Morocco with subsidized premiums is similar, to some extent. The government's *Programme Sécheresse*, started in 1995, has been supplying yield insurance through a mutual company called MAMDA. The main goal of the programme was to secure loans on the asset portfolio of the *Caisse Nationale de Credit Agricole*, a public lending entity. Critiques pointed mainly to excessive administrative costs and lack of fiscal sustainability (Stoppa and Hess, 2003; FAO, 2005; Angelucci, 2008).

A more traditional approach has been adopted by the Mauritius Sugar Insurance Fund (MSIF), which is entirely managed by the public sector (FAO, 2005). The MSIF was launched in the 1960s to cover risks arising from cyclones. Later on it started covering other less catastrophic damages, such as fire and excessive rainfall. Subscribers are classified on the basis of the claims they submit, on a dynamic scale which praises reliability. Apparently, this system has ensured a sound and incentive-compatible use of public resources. The scheme is reported to be working effectively for farmers, and to be financially sustainable.

In the Philippines there is another example of traditional agricultural insurance, granted within a wider agricultural support programme, and directly operated by a parastatal, named the Philippine Crop Insurance Corp (PCIC). This is a subsidiary of the Land Bank of the Philippines, and supplies insurance policies in connection with credit. Subscription of policies covering potential damages from cyclones is mandatory in high-potential areas. Policies include traditional multi-peril, and can cover also risks of drought and pest attacks. They are deemed to be sold at heavily subsidized premiums, and high administrative costs (FAO, 2005).

Pilots and studies

Innovative insurance schemes are mostly founded on weather index-based insurances. This is the case of drought and flood indexes in Bangladesh; of a drought pilot index for vegetables in the Chinese province of Shangai; and of indexes in Thailand for drought and in Viet Nam for flood risks (Barnett and Mahul, 2007). Feasibility studies have been promoted to assess the viability of insurance in Syria, South Africa, and in Nicaragua in the past. Renewed efforts are underway in this last country, where a project piloting indexed insurance encountered resistance. Pilots are also being set up in Honduras and Guatemala (FAO, 2005). Studies have simulated insurance schemes in Ghana (Molini et al, 2006). Livestock insurance schemes have been assessed and proposed for Kenya, Cameroon (Otieno et al, 2006; Barrett et al, 2008) and Sub-Saharan Africa in general (Gautam, 2006). A pilot is underway in Peru, based on the ocean surface temperature, which can be used to insure against floods in the northern areas of the country (Skees et al, 2007). For many of these, the main limiting factor is the availability of information to reliably compute the relation between the index and the extent of damages.

8.2.3. Lessons from non-agricultural insurance

Useful indications on the conditions for the development of the insurance market and the role of governments can also be derived from non-agricultural insurance. A number of case studies on grassroots-level insurance have been promoted by the International Labour Organization (ILO). These operate within environments characterized by limited ability to pay premiums, high transaction costs and incomplete service markets, often in rural areas. In such contexts, the development of the insurance market encounters problems that are similar to those faced by agricultural insurance. Lessons learned are available on some 24 micro insurance schemes in developing countries. Table 8.1 below provides a summary of the major characteristics of the ILO case studies.

Insurance studied by the ILO offers policies covering health, death and disability risks, as well as funeral expenses. Government intervention is limited, and direct subsidization only occurs in two Indian insurance schemes – the Kuruna Trust and the Yeshavini Cooperative – while donor support is present in the VimoSewa and Kuruna Trust, also in India, in the AseF group in Benin, and in the Bangladeshi health insurances provided by the Brac, Grameen, Kalyan, and SSS groups. In some of these cases, the subsidization of premiums is associated with reports of inefficiencies, poor targeting and even fraud.

Other case studies concern organizations that are entirely private, and/or subsidiaries of large-scale national and international companies: for instance Tata-AIG in India or AIG-Uganda. Interestingly, most of these companies started operating on behalf of, or in relation to, microfinance institutions. This is the case