

## **Income insurance as a risk management tool after 2013 CAP reforms?**

MIRANDA P.M. MEUWISSEN<sup>a</sup>, MARCEL VAN ASSELDONK<sup>b</sup>  
KYÖSTI PIETOLA<sup>c</sup>, BRIAN HARDAKER<sup>d</sup>, RUUD HUIRNE<sup>b</sup>

<sup>a</sup>Business Economics, Wageningen University, Wageningen, the Netherlands,  
[miranda.meuwissen@wur.nl](mailto:miranda.meuwissen@wur.nl), tel: +31 317 483857

<sup>b</sup>Agricultural Economics Research Institute (LEI), WUR, Wageningen, The Netherlands,  
[marcel.vanasseldonk@wur.nl](mailto:marcel.vanasseldonk@wur.nl)

<sup>c</sup>MTT-Economics, Jokioinen, Finland, [kyosti.pietola@mtt.fi](mailto:kyosti.pietola@mtt.fi)

<sup>d</sup>Univeristy of new England, Armidale, Australia



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## **Income insurance as a risk management tool after 2013 CAP reforms?**

### **Abstract**

Concerns on increasing farm income volatility after 2013 CAP reforms, has led the European Commission to propose an income stabilization tool to be implemented throughout the whole of the European Union. The proposed tool is designed as an insurance scheme compensating farmers if income drops below a certain level. As insuring a farmer's income is not trivial, among others from a measurement and incentive point of view, the aim of this paper is to review insurance designs for income and price, and to elicit experts' opinions on the total "risk management arena" in the European Union. Results show that the proposed EU wide income stabilization tool is likely to face problems of asymmetric information reducing its effectiveness and attractiveness. In addition, we perceive that it may yet be too early to introduce such a scheme as other private and public-private risk financing solutions covering (parts of) a farmer's income have not yet been fully explored, especially not in eastern EU countries. Even innovative schemes such as "business continuation insurance" may prove to be a more feasible alternative.

Keywords: Income volatility; Income insurance; Expert elicitation; Price insurance

### **1. Introduction**

Income from farming is rather volatile due to stochastic factors that affect production and prices. Throughout the years, various risk management tools have been used to reduce, or to assist farmers to absorb, some of these risks. Also the Common Agricultural Policy (CAP) of the European Union has taken away some of the risks through a variety of mechanisms that support prices of many agricultural products, such as direct payments, refunds for milk and eggs, intervention storage of butter and pigmeat and disturbance clauses in case of severe market disruptions. Farm-level risk profiles throughout the European Union are however likely to change (Majewski et al., 2008; Meuwissen et al., 2008a; High Level Group on Milk, 2010). International trade agreements can be expected to lead to price liberalization and to a greater exposure of European farmers to competitive market forces. Production risks may change, among others, due to a more regulated use of herbicides, medicines and vaccines. Changes are also occurring in relation to risks of catastrophic events such as floods, droughts and pests. Knemeijer et al. (2009) expect such catastrophic events to happen more frequently and potentially with more severe consequences. Even more, the predictability of the impact of crises seems to worsen due to unknown consumer responses and public pressure to apply new control strategies (Longworth et al., 2008; Meuwissen et al., 2009).

For policy makers and farmers designing an income insurance scheme seems an interesting option to cope with future volatility and uncertainty. The interesting fact being among others that income insurance is a "basket product" in which you don't need to worry about underlying triggering events and overcompensation of low yields while market prices have already covered for the losses. In line with this, several countries already offer some form of-subsidised-income insurance or income stabilization scheme. In the USA, private companies deliver and service revenue insurance schemes. Subsidies are provided for the farmer-paid premiums, for delivery and administration, and for the private sector reinsurance. Farmers pay about 25 per cent of the total cost of risk management programs. Also Canada has a rich history of income stabilization

tools, starting with the Net Income Stabilisation Account (NISA) from 1991 up to 2004, followed by the Canadian Agricultural Income Stabilisation (CAIS) program (2004-2007). This program integrated stabilisation and disaster protection into a single program, helping producers protect their farming operations from both small and large drops in income. From 2007 onwards, Canadian farmers can participate in the Growing Forward program consisting of various tranches of coverage, i.e. AgriInvest, AgriStability, AgriInsurance, and AgriRecovery, varying in coverage and government participation.

Since 1998, also the European Community has been intensively investigating the potential role of agricultural insurance programs in stabilising agricultural incomes (Meuwissen et al., 1999; OECD, 2000; European Commission, 2001; Cafiero et al., 2005; European Commission, 2005; European Commission, 2006). World Trade Organisation (WTO) agreements and the EU enlargement mean that agricultural policy in Europe is also evolving. As the insurance schemes and income stabilising tools developed in the USA and Canada seem legitimate in the WTO-framework, i.e. they fit into the “green box” representing allowed forms of support, the European Community might also consider alternative risk financing tools. Moreover, in 2008, following the latest “CAP health check”, the European Parliament recommended, among others, to replace intervention systems for market crops by a safety net for crises, as well as to develop private sector or mixed insurance schemes, and to consider a Community-wide reinsurance system for climate-related or environmental disasters (European Parliament, 2008).

In line with the above, ideas for an EU-wide income stabilization tool for farmers were launched in the summer of 2010. The scheme proposes to compensate farmers when their income drops below a certain level (compared to the average income). This implies that the government would assume the role of insurer. Literature generally agrees that insuring income is problematic, among others for reasons of measurability, incentives and the need to cope with increasing or declining trends of income. Problems would even be worsened due to the subsidies involved in the scheme. A recently finished EU-project on income stabilisation (FP6 Income Stabilisation) therefore argued for a “basket” of risk management solutions other than income insurance and specifically excluding premium subsidies (Meuwissen et al., 2008b). Suggested options included further developing derivatives, the use of futures markets, further exploration of mutual insurance schemes and education of farmers and extension personnel in risk management issues. Government roles were suggested to be limited to direct damage compensation after a crisis event, preventive actions and lender of last resort solutions for some type of risks. In this context the current prominence of an income stabilisation tool as risk management program after 2013 CAP reforms is surprising. This paper aims to elicit expert opinions on various income stabilisation issues to see whether project conclusions potentially need to be finetuned. The paper first introduces the reader to the complexity of insuring components of income and price. Section 3 presents materials and methods. Section 4 shows the results of the expert elicitation and section 5 “makes up the balance”.

## **2. Designing insurance for income and price**

### **2.1 The basic concept of insurance**

With insurance, an insured typically pays a premium to the insurer and receives an indemnity payment from the insurer once an insured loss occurs. The insurer is the party that pools the

risks, but risks are shared among the insureds. This sharing of risks among insureds manifests itself by additional premium assessments or dividend payments at the end of the policy period, and/or by premium adjustments at the beginning of the next policy period, all depending on the actual loss experience of the insurance pool. Insurance is widely available for personal risks (e.g. life insurance) and for a number of production risks such as hail.

Two main factors that can limit the insurability of risks are asymmetric information and the correlation of risks among those insured. Asymmetric information exists when the would-be insured knows more about the risk being insured than does the insurer; this is the rule rather than the exception. Such asymmetry of information can lead to the dual problems of moral hazard and adverse selection. Moral hazard occurs when an individual purchases an insurance policy and as a result of having purchased that policy alters his/her behaviour (production or management practices) so as to increase the potential magnitude of a loss and/or the probability of a loss. Adverse selection occurs when those purchasing insurance face a higher risk than those who do not, so that the rates developed on aggregate data underestimate the cost of indemnities to the insurer. To minimise the problems arising from asymmetric information, an insurance scheme should ideally cover only: (a) accidental and unintentional losses, as if losses are influenced by the management of the insured, problems of moral hazard are likely to arise; (b) measures for which proper risk classification and rate making are possible, thus requiring the availability of sufficient and reliable data; and (c) losses that are determinable and measurable, i.e. for a proper loss assessment the amount of loss and the extent to which the loss was caused by an insured event need to be unambiguous. In practice, all these conditions may not be fully satisfied, yet it may still be possible to develop a feasible insurance scheme using tools such as deductibles and co-payments.

The second factor that can limit the insurability of risk is where risk is correlated among those insured, i.e. where many policyholders can face losses at the same time. Examples of correlated risks (also called “systemic risks”) include price fluctuations, floods, droughts and livestock epidemics such as Foot and Mouth Disease. Insurance companies have problems dealing with such risks themselves and adequate reinsurance capacity is not usually available when the scale of the systemic risk is large. As a consequence, governments are often financially involved in providing insurance for these types of risk. Developments on capital markets, such as the increasing “securitisation” of reinsurance, may reduce the need for government involvement in the future.

## 2.2 Insuring whole-farm income

Stabilizing whole farm income appeals to policy makers because whole-farm (or farm household) income is the best measure of the welfare of farm families. In discussing an income insurance scheme, first the income measure to be used as a basis for insurance has to be defined. In choosing an appropriate income basis for the insurance, problems of moral hazard, adverse selection and the related problem of data availability play very important roles. In general, the income measure should not include: (i) non-farm income and compensation of employees, because of moral hazard and fraud problems; (ii) fixed costs (rent and interest) and variable costs (for example feeding costs), because there is too much management of the farmer involved; and (iii) aspects that are more or less independent of current performance of the farm business, such as depreciation. Economic accounts would be too manipulative in revealing precisely the true

producer income loss and the threshold for triggering the indemnity payments. The reason is that the timing of input purchases and the amount of inventories could be used to show accounting results in the interest of the insured producer. An alternative could be to use a farmer's tax returns. The merit of this approach is that farmers seldom overstate their incomes on tax returns, implying that the insurance coverage will never be too high. Besides the measurability and incentive issues, there will also be the problem of systemic risks as many farmers will face low prices at the same time.

### 2.3 Gross revenue insurance

Insuring gross revenue (price times yield) takes account of the possibility that low yields can be offset by high prices and vice versa. Furthermore, gross revenue is better correlated with farm income than is yield or commodity price, implying that insuring gross revenue is more satisfactory from the point of view of farmers who are seeking to reduce the riskiness of their incomes. Gross revenue insurance schemes can be set up per commodity or as a portfolio. Advantages of commodity-wise schemes are that farmers are free to choose which commodities they want to insure and at what levels, given for example the degree of specialisation of the farm and the relative importance of off-farm income. Farmers thus create their own efficient portfolio of risk management strategies. In addition, providers of insurance can focus on activities for which relevant data are available. Providing portfolio revenue insurance, however, has also some advantages:

- Farm revenue correlates better with farm income than the gross revenue from one or two commodities, implying that insuring farm revenue contributes more to a producer's welfare (which is a function of the net income distribution) than insuring the revenue on a commodity by commodity basis.
- Farm revenue insurance will be cheaper since low revenues from one enterprise are likely to be partly offset by high revenues of another enterprise, as long as they are not perfectly positively correlated. This relates to the basic principle of diversification: aggregating similar independent risks into a single insurance pool reduces the variance of loss.

Comparing portfolio revenue insurance with farm income insurance differences can be observed in rating and loss assessment methods. In the first scheme (adding gross revenues of different commodities) the rating of the price part can be based on observed futures market prices (not on, for example, a ten-year moving average). In the second scheme, however, there is no separate price component and rates can only be based on the distribution of revenues and on average values in previous years. Differences also exist in loss assessment. With portfolio revenue insurance moral hazard can be reduced, at least on the price part, by the use of observed futures market prices as a measure for price. In the second scheme, serious moral hazard problems can exist as farmers can report very low incomes. This is a problem even though farmers have to prove their losses and even if a farmer's premium rate is (partly) based on his/her own income history.

### 2.3 Price insurance

In Europe, currently, price variability depends to a large extent on the level of price support. With further liberalisation of agricultural markets in the EU, price variability of products currently supported will tend to rise, though the effect will be less for products in large, highly integrated markets as can exist for grains. Large, well integrated markets are less volatile because of less than perfect correlation in yields in different, widely dispersed, places. Also most

livestock product markets can be expected to become highly integrated because of the high value to bulk of these commodities. Potato markets are poorly integrated because potatoes are mostly water and are very perishable, making them very expensive to transport relative to their value. Note that some of the observable volatility in world commodity markets is caused by the price support measures in place in the EU and in North America. Farmers in those places do not get the appropriate signals to cut back on production when prices are low, and vice versa, so magnifying price swings. Similarly, for some products, consumers face the same price under price support, regardless of the (world) supply situation. With the eventual removal of these distortions, supply will adjust more quickly to demand shifts, and vice versa, so dampening price swings.

Price risks can be covered to some degree on futures and options markets (the basis risk cannot be covered). These are efficient markets for systemic price risks (Purcell, 1991). However, in Europe, the use of these markets is not yet widespread, mainly because of the existence of the Common Agricultural Policy (and other support programs related to the CAP). The attention being given to agricultural futures markets in Europe is however increasing due to declining agricultural subsidisation, the specialisation of farms, the introduction of environmental and production rights, and the increasing use of automated trade systems. The use of futures and options markets can be stimulated by (i) abolishing price support (futures markets can only evolve in a competitive market; futures markets thrive on price uncertainties); (ii) education of farmers in the field of futures and options markets; and (iii) development of trading requirements (for example quality grading and standard definitions of commodities). Even when futures and options markets are more developed, experience shows that farmers are in general reluctant to use futures markets. Learning to use derivative markets requires a substantial investment of time. This overhead appears to be too high for most farmers. On the other hand, an agency such as an insurance company can spread the costs over many clients, making a product based on these markets potentially attractive to farmer clients.

An insurance that includes price should establish prices yearly and futures market prices would be a good measure of price (though the farmer faces basis risk). For those commodities for which no European futures markets exist, Chicago Board of Trade futures prices or some other transparent prices, such as the Rotterdam harbour prices for grain, might be useful. Commodities for which an objective price measure is available can be included in a price insurance. Attention should be paid in rating the prices from livestock commodities because of the existence of price cycles. However, this aspect is less of a problem when prices are established yearly, because the stage of the cycle may be reasonably apparent when the insurance contract is written. Attention should furthermore be paid to speciality products, and smaller volume crops in general, because a small increase in production can have a significant impact on world and domestic prices. Furthermore, speciality commodities have a large number of different varieties which can have very different prices.

### **3. Materials and methods**

A total of 30 statements on risk management and income stabilisation issues were evaluated by a panel of 26 experts. Experts were from governments, farmers' organization, research institutes and risk financing companies. They originated from Eastern EU countries as well as from other

EU countries. Statements were categorized into statements about the risk exposure (past and future), risk management (availability and performance, perception, economics) and policy options for risk management. Statements were mostly based on FP6 Income Stabilisation project findings. Data were gathered in a one-day workshop, organized as a satellite meeting to an EEAE seminar on risk management (Warsaw, August 2008). Before experts were asked to evaluate the statements, definitions and terminology were clearly explained. Statements were then evaluated on a four-point scale, ranging from 1 (fully disagree) to 4 (fully agree). In presenting the results we differentiate between respondents from Eastern EU and non-Eastern EU countries as we expect to find differences between both groups. Eastern EU countries have for instance less access to insurance schemes, and risks of livestock epidemics are likely to be higher due to the proximity of regions in which epidemic diseases are still endemic.

#### **4. Results**

Results show that with regard to farmers' risk exposure, experts believe that it is not only yield risks that are important but also market risks (statement 1 and statement 14). They furthermore perceive that farmers are generally used to large income fluctuations (statement 2) and that risks are not necessarily higher for weather exposed crop farms (statement 8). With regard to risk management, experts mostly agree that farmers do not perceive decoupled direct payments as a risk management tool (statement 17) but that such payments are crucial in stabilizing farm incomes (statement 6). Experts also believe that insurance schemes' performance is improving (statement 10), but that many fields are largely unexplored and not well known by farmers (statements 26 and 16 respectively). With respect to on-farm risk management measures to cope with future risks, some experts see a role for diversification and changing farm plans, others not.

#### **TABLE 1**

As ways to go forward with income stabilization, results show a number of interesting findings. It is recognized that the current FADN system is not suitable for triggering crisis payments as the system is not keeping track of crises events (statement 4). The only possibility would be to use aggregate farm income data as discussed above under whole-farm income insurance, together with its complexity and problems of asymmetric information. Results also show that experts agree that education and risk management services might be useful strategies to support risk management practices at farm level (statements 27 and 30). Little agreement however is shown with regard to the premium subsidies: about 45% perceives subsidies to be relevant for developing derivatives and insurance schemes (statement 28) and believes even that insurance is only attractive in case of subsidies (statement 22).

With regard to differences between Eastern and non-eastern EU experts, outcomes reveal that not many differences exist, although the ones that come out as significant are interesting. Statement 5 shows that experts from non-Eastern EU regions expect changing WTO agreements to lead to more risks than the experts from the Eastern EU regions, probably because the latter are less used to various kinds of price support. Statements 12 and 21 support our expectation that Eastern EU countries are less well acquainted with the opportunities of insurance schemes as they do not greatly value innovative solutions in such schemes (statement 12) and mainly regard insurance to be relevant for catastrophic risks only (statement 21).

## **5. Outlook: making up the balance**

Having reviewed the theoretical issues of designing income insurance and the practical considerations among risk financing experts in the European Union, we conclude that current intentions to launch the proposed EU wide income stabilization tool (i) is likely to face problems of asymmetric information reducing its effectiveness and increasing transaction costs; and (ii) may yet be too early as other public-private risk financing solutions covering (components of) income, especially in eastern EU countries have not yet been fully explored. (In other words: we believe that FP6 Income Stabilisation project conclusions as mentioned in the introduction are still viable.)

It is understandable that policy makers are urged to look for alternatives to cover price risks after 2013 CAP reforms, but results from our analyses show that private market opportunities such as futures markets (possibly offered as a price insurance scheme) are promising, needing no or only little amounts of subsidy (e.g. through farmer education programs). The advantage being that such markets are privately run, immune to policy pressure. Income stabilization tools as proposed by the European Commission however may continuously be in the center of policy debate because of the need to establish income trigger levels per year, per farm type, per country, corrected for trends, etc.

We would therefore recommend to further explore the basket of risk management tools before introducing a scheme throughout the whole of the European Union. For instance, a “competitive” proposal might be to design a ‘business continuation insurance’ or ‘anti-bankruptcy insurance’. Such insurance scheme could make use of the debt-to-asset ratio of a farm and make payments if this ratio is at the bankruptcy (i.e. catastrophically low) level. Farmers (together with their banks) could establish a farm-specific ‘bankruptcy level’ and pay a premium according to this level. To prevent moral hazard and adverse selection, accurate data and objectively established asset measures are necessary, trigger levels should always be set very low, and, if, after payments, the debt-to-asset ratio stays very low for a long period, banks will eventually stop providing loans.

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**Table 1:** Level of agreement on risk management issues in the European Union (1=fully disagree, 2=disagree, 3=agree, 4=fully agree), n=26<sup>1</sup>.

|   | 1<br>(%) | 2<br>(%) | 3<br>(%) | 4<br>(%) | Mean scores <sup>2</sup> |                       |
|---|----------|----------|----------|----------|--------------------------|-----------------------|
|   |          |          |          |          | Eastern<br>EU<br>(n=12)  | Other<br>EU<br>(n=12) |
| <i>Past risk exposure</i>   |          |          |          |          |                          |                       |
| 1. Income fluctuations are mainly determined by yield risks   | 4        | 54       | 42       | -        | 2.58                     | 2.25                  |
| 2. Farmers are used to large income fluctuations  | 4        | 3        | 58       | 8        | 2.75                     | 2.67                  |
| 3. Catastrophic events hardly cause farmers to go broke   | 8        | 31       | 50       | 11       | 2.83                     | 2.58                  |
| 4. FADN data can not be used to trigger (crisis) risk payments  | -        | 23       | 46       | 31       | 2.92                     | 3.17                  |
| <i>Future risk exposure</i>   |          |          |          |          |                          |                       |
| 5. Overall, new WTO agreements have no significant impact on farm income levels and risk of low incomes                     | 19       | 54       | 23       | 4        | 2.42**                   | 1.83**                |
| 6. In a less protective CAP, decoupled direct payments play a key role in stabilising farm incomes                          | -        | 12       | 65       | 23       | 2.91                     | 3.25                  |
| 7. Some member states are more exposed to income falls than others  | -        | 4        | 65       | 31       | 3.17                     | 3.33                  |
| 8. Crop farms face higher probability of negative income than livestock farms   | 4        | 46       | 46       | 4        | 2.67                     | 2.25                  |
| 9. Small (< 16 esu) and large farms (> 100 esu) are more threatened by the risk of low incomes than mid-sized farms         | 4        | 54       | 38       | 4        | 2.55                     | 2.27                  |
| <i>Review of the risk management arena</i>  |          |          |          |          |                          |                       |
| 10. The performance of publicly provided crop insurance is improved due to e.g. surveillance and better risk evaluations    | -        | 25       | 67       | 8        | 2.82                     | 2.91                  |
| 11. Governments increasingly require farmers to contract insurance for being eligible for ad hoc disaster payments          | -        | 16       | 60       | 24       | 3.00                     | 3.08                  |
| 12. Many innovations, such as derivatives and public-private risk sharing, enlarge the opportunities for transferring risks | -        | 12       | 56       | 32       | 3.00**                   | 3.5**                 |
| 13. Public(-private) compensation schemes for contagious animal diseases face problems of moral hazard                      | -        | 29       | 63       | 8        | 2.80                     | 2.83                  |
| <i>Risk and risk management perception</i>  |          |          |          |          |                          |                       |
| 14. Crises are mainly caused by weather and market risks  | -        | 19       | 46       | 35       | 3.25                     | 3.17                  |
| 15. Property insurance is the most important risk management tool   | -        | 42       | 50       | 8        | 2.75                     | 2.58                  |
| 16. Farmers are fully aware of all risk management tools available  | 27       | 62       | 11       | -        | 1.83                     | 1.92                  |
| 17. Decoupled payments are not perceived as a risk management tool  | 12       | 19       | 61       | 8        | 2.50                     | 2.75                  |

<sup>1</sup>12 experts are from Eastern EU member states, 12 from other EU member states and 2 responded anonymously.

<sup>2</sup>Asterisks (\* and \*\*) indicate significant differences, i.e. at  $P \leq 0.005$  and  $P \leq 0.10$  respectively.

**Table 1** (continued): Level of agreement on risk management issues in the European Union (1=fully disagree, 2=disagree, 3=agree, 4=fully agree), n=26<sup>1</sup>.

|  | 1   | 2   | 3   | 4   | Mean scores <sup>2</sup> |                    |
|--|-----|-----|-----|-----|--------------------------|--------------------|
|  | (%) | (%) | (%) | (%) | Eastern EU<br>(n=12)     | Other EU<br>(n=12) |
| <i>The economics of risk management instruments</i>  |     |     |     |     |                          |                    |
| 18. More liberal policies do not induce arable farmers to change their farm plan                                 | 4   | 67  | 25  | 4   | 2.20                     | 2.42               |
| 19. Diversification is not likely to become a key risk management tool   | 8   | 42  | 42  | 8   | 2.58                     | 2.33               |
| 20. Risk premiums per hectare differ substantially across member states  | -   | 4   | 71  | 25  | 3.08                     | 3.40               |
| 21. Insurance schemes are only attractive for catastrophic events  | 15  | 66  | 19  | -   | 2.42*                    | 1.67*              |
| 22. Insurance schemes are only attractive in case of premium subsidies   | 4   | 52  | 44  | -   | 2.33                     | 2.36               |
| <i>Policy options for risk management</i>  |     |     |     |     |                          |                    |
| 23. Crisis risks are unforeseen, happen infrequently and related losses exceed the individual capacity to cope   | -   | 12  | 61  | 27  | 3.08                     | 3.25               |
| 24. The only short-term way for public policy to deal with crisis risk, is to provide direct damage compensation | 8   | 39  | 38  | 15  | 2.58                     | 2.58               |
| 25. Conditions for providing disaster relief need to be set at EU level  | 4   | 35  | 42  | 19  | 2.75                     | 2.83               |
| 26. Insurance schemes for production risks are underdeveloped  | -   | 19  | 73  | 8   | 2.75                     | 3.00               |
| Public policy needs to facilitate private markets by:  |     |     |     |     |                          |                    |
| 27. educating farmers and extension workers in risk management issues and the use of derivate markets            | -   | -   | 62  | 38  | 3.33                     | 3.42               |
| 28. supporting the development of insurance and derivative markets, but without premium subsidies                | 8   | 38  | 35  | 19  | 2.58                     | 2.75               |
| 29. developing and operating mutual funds for specialty crops and animal diseases                                | 8   | 15  | 54  | 23  | 3.08                     | 2.75               |
| 30. developing risk management services that take over farmers' complex risk management tasks                    | 4   | 19  | 65  | 11  | 3.00                     | 2.75               |

<sup>1</sup>12 experts are from Eastern EU member states, 12 from other EU member states and 2 responded anonymously.

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