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IMPACT ASSESSMENT

Accompanying the document

Proposal for a

DIRECTIVE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL

on the approximation of the laws, regulations and administrative provisions of the Member States concerning the manufacture, presentation and sale of tobacco and related products

(Text with EEA relevance)

{COM(2012) 788 final}
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A.5 SOCIO-ECONOMIC IMPACT OF THE OPTIONS

A.5.1. INTRODUCTION

This Annex outlines the expected **socio-economic impacts** of the policy options on economic stakeholders active in the tobacco supply chain as well as on Governments and society at large. It analyses how a **reduction of tobacco consumption** will impact on the stakeholders (e.g. loss of revenues). This is referred to as the *indirect* impact of the envisaged measures. The main part of this Annex consists of four sections.

Section 1 outlines the methodological approach taken for the analysis. **Section 2** describes the expected impact on the revenues and profits of the economic stakeholders. The analysis focuses on the tobacco industry, its upstream suppliers and its downstream distributors. The section also describes how a negative impact on these stakeholders will be compensated by a positive impact on other sectors, taking into account that money not spent on tobacco is spent on other economic activities.

Section 3 deals with the impact on Governments and society at large. It explains the positive impacts of reduced tobacco consumption on public health, on costs for medical treatment and smoking related absenteeism. These positive impacts are also contrasted with the anticipated negative impact on tax revenues associated with a decline of tobacco consumption, even though the tax reductions are not really a cost to society, but rather a transfer of resources within the society.

Section 4 analyses the impact of reduced tobacco consumption on employment in the tobacco industry, its upstream suppliers and downstream distributors, as well as in other economic sectors (redistribution effect). A particular focus will be placed on the input/output model which outlines how money not spent on tobacco would be spent on other economic activities. This section also addresses regional issues.

A.5.2. SOCIO-ECONOMIC IMPACT ASSOCIATED WITH A REDUCTION OF TOBACCO CONSUMPTION

A.5.2.1. Methodological approach

The main objective of the analysis in this annex is to quantify socio-economic impacts linked to a drop in cigarette/RYO prevalence and consumption, as a result of the implementation of the proposed preferred policy options. For this, our analysis was based on the assumption that the **combination of the envisaged policy options would lead to a drop of tobacco consumption of 2% for cigarettes and RYO**[1] beyond the baseline in 5 years. In absolute figures, such a drop in tobacco consumption corresponds to **2.4 million Europeans** that would either not start smoking or successfully manage to quit smoking.

The expected impacts are analysed for the **fifth year after transposition** of the envisaged directive, i.e. at a time when the measures are expected to develop their major impact in terms of decreased consumption. This should not be understood to mean that there are no **impacts on consumption** before or after "year five". On the contrary, the drop in tobacco consumption is expected to develop gradually, starting already in year one and continuing

[1] The focus on cigarettes and RYO is due to the fact that the preferred policy options focus on these segments and concrete measures are proposed for them whilst for other tobacco products (pipe and cigars) the preferred options foresee delegated powers. For smokeless tobacco and herbal products intended for smoking, the reference is made to the analysis on policy area 1 (scope).

beyond year five. This is for example due to the fact that some provisions (e.g. new mandatory picture warnings) are expected to initially affect actual and potential smokers awareness before leading to a change in smoking behaviour, while other provisions (e.g. the ban of characterizing flavours) may have a more direct/immediate effect on smoking behaviour. Overall, the measures are expected in particular to affect the uptake of smoking in young people leading to a continuous reduction in smoking consumption in the long run. This effect develops and reinforces itself over time[2].

Some **benefits of reduced tobacco consumption on public health** will also only develop over time. While improvement for certain tobacco related acute diseases (e.g. respiratory illnesses) are expected to be seen within short time period, the effect on some other diseases (e.g. cancer) may take several decades to fully materialise. A scientific study from 1997 suggests that maximum health benefits from tobacco control policies are observed five years after a tobacco control measure is introduced[3]. In this light, "year five after transposition" was selected as a good proxy for the analysis of the effects. The long term benefits (e.g. reduced cancer rates) are anticipated to allow for a fair comparison. Social discounting is used where appropriate.

As indicated the preferred policy measures are – in combination - expected to lead to a **decrease of consumption of 2% compared to the baseline**[4]. This assumption is in line with expectation and experiences of other tobacco control agencies which have observed similar drops for comparable policy measures. According to these, the main contributions are expected from the policy areas on packaging and labelling and ingredients. Whilst the details how each policy area contributes to the decrease of consumption are set out in the introductory part of section 5.7 of the IA report, the following table contains an overview:

Table 2.1: Contributions of individual policy areas to the projected decrease of cigarette/RYO consumption

Policy area		Foreseen contribution to the decrease in %
Scope	(STP)	0.2-0.3
	NCP	
	(Herbal)	
Packaging & Labelling		1-1.5
Ingredients		0.5-0.8
TOTAL		**1.7-2.6%**
Cross-border distance sales + Illicit trade		Additional decrease of consumption, however not in the legal supply chain. (Decreases in illicit consumption is expected to partially mitigate the decrease in the legal chain).

[2] In this respect it is considered that more than 80% of smokers start smoking when they are under age (teenagers) and that nicotine contained in tobacco has addictive properties, which makes smoking cessation a challenge. It is also considered that people, who do not start smoking under age, are less likely to start smoking at a later stage and that children of smokers are significantly more likely to start smoking
- Anne Charlton, Youth and Cigarette Smoking, http://www.globalink.org/en/youth.shtml, accessed on 11 March 2012
- Meg Riordan, Campaign for Tobacco-Free Kids; www.tobaccofreekids.org/research/factsheets/pdf/0127.pdf, accessed on 11 March 2012
- U.S. Department of Health and Human Services, Preventing tobacco use among young people; http://profiles.nlm.nih.gov/ps/access/NNBCLQ.ocr, accessed on 11 March 2012

[3] Jan J. Barendregt, M.A., Luc Bonneux, M.D., and Paul J. van der Maas, Ph.D. N Engl J Med 1997; 337:1052-1057

[4] For description of the base line see section 2.3 of the main report.

The figures in the above table should be interpreted with caution. Firstly, the proposed measures are mutually reinforcing. For example, improved health warnings and an improved ingredients policy both have the public health objective of making it less attractive for young people to start smoking[5]. The combination of these measures is expected to have a better effect than the sum of each individual measure. Secondly, from an *ex post* perspective it is sometimes not straight forward to fully disentangle the impact of the different measures. Typically **tobacco regulators introduce a variety of measures at the same time**. This is due to the fact that there is not one single policy measure that could make the introduction of all other tobacco control measures redundant. Tobacco control policy measures include among others price/tax policies, smokefree environments, information campaigns, advertising bans/limitations, health warnings. The task to say with precision which measure contributed to the success and to which degree is further complicated by the fact that certain measures require time to take full effect (see above). Lastly, the success of many of the policy measures implemented in other jurisdictions needs to be judged against the backdrop of existing measures, national/cultural differences and the economic situation of the country concerned. The same applies to the situation in the different Member States.

In the light of the arguments above, it seems preferable to work on the basis of the assumption that the **combination of the envisaged measures will lead to a drop of consumption of 2% in 5 years' time**.

For the sake of clarity and transparency, annex 5 provides not only the calculations for a 2% reduction, but also **calculations based on higher and lower impact scenarios**. This is done to show that more stringent measures could have even bigger impact (e.g. plain packaging, full ban of additives, full ban of displays, which could lead to a reduction of consumption of up to 5%), but also to show - if the current expectations prove not to be correct - that even smaller decreases in tobacco consumption are beneficial and therefore make sense from an impact assessment point of view. This simplified sensitivity analysis did **not suggest any significant variation of qualitative outcomes within the broad range of the assumed consumption drop**.

In order to bring our range into perspective, a comparison can be made with various global targets. For example, the WHO envisages a 40% relative reduction in prevalence of current tobacco smoking by the year 2025, taking 2010 as a base year. In comparison to these figures, the projected consumption drop is not overly ambitious, even if tobacco product regulation is just one tool of many and other tobacco control measures may also contribute to decreasing smoking prevalence.

One last **important caveat** should be remembered, **collecting data and presenting it in a coherent form was a challenge** when preparing the IA report. Whilst all possible efforts were made to gather the most comprehensive data, some challenges remain. For example, some stakeholders either did not provide the requested information or did not provide the information in a usable format. Furthermore, information received from economic stakeholders could not always be reconciled with publicly available data (e.g. Eurostat). The data sets received from industry were also not always fully consistent when comparing data of different market participants (here every effort was made to reconcile the data to the extent possible). In order to ensure overall quality, some key data was verified with associated

[5] Although the main objective of the revised directive is the improvement of the internal market, when it comes to the assessment of the effects of the proposed options, the drop of consumption needs to be assessed in line with the objective of a high level of public health.

services (e.g. tax revenues) and/or industry (e.g. turnover generated with tobacco products and the allocation of shares across stakeholders along the value chain). Finally, information on the illicit part of the market was difficult to establish in a robust form taking into account the nature of these activities.

As explained above, this annex addresses the expectation of how reduced tobacco consumption impacts on various stakeholders. It does not address other (for example direct) impacts associated with a change of regulation (e.g. costs/benefits associated with implementing the new regulatory requirements on labelling). These are described in the respective sections of section 5.5 of the IA report.

A.5.2.2. Impact on the revenues and profits of the economic stakeholders

This section describes the impact that a decrease in tobacco consumption is expected to have on the **revenues and profits of the tobacco industry, its upstream suppliers and its downstream distributors**. It concentrates on **factory manufactured cigarettes (FMC) and roll your own tobacco (RYO)**, as the different policy options focus on these categories of tobacco products[6].

The analysis focuses on the **legal part of the supply chain**. This is not to mean that policy options cannot have an impact on the illicit supply sector. However for the purpose of this impact assessment, the impact of the illicit part of the sector is only relevant to the extent that the illicit market takes away additional revenues from the legal supply chain or that revenues previously attributed to the illicit trade return to the legal supply chain. Moreover, the illicit sector does not deserve any protection in its own right. To the contrary, law enforcement needs to ensure that the illicit part of the market is reduced to the extent possible.

With respect to **illicit trade,** it is also worth noting that none of the preferred options are expected to lead to a (noteworthy) increase in illicit trade beyond the baseline and will therefore not shift additional revenues from the legal to the illicit supply chain. On the other hand, the preferred options in policy areas 4 (cross border (including distributors) 5 (tracking & tracing, security features) are expected to lead to a decrease in illicit trade, which will subsequently lead to part of these revenues returning to the legal supply chain. These effects have, however, not been analyzed in this section in order to ensure full transparency of the impact of the preferred policy options on consumption and to provide a conservative estimate of these impacts[7]. In this respect the analysis below thus amounts to a "**worst case/conservative scenario**" for economic stakeholders.

The analysis is also a "conservative scenario" for economic stakeholders for another reason, when applying the **input/output model** presented in detail in section 5.2.4 for the impact on employment, it appears that money not spent on tobacco will be spent on other goods and services. This will not necessarily benefit the tobacco industry, but will benefit certain parts of the distribution chain (retailers in particular) or upstream suppliers. Accordingly, the effects presented below are maximum negative impacts for the tobacco industry, but not for the economy as a whole (including distributors).

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[6] For pipe tobacco and cigars/cigarillos only delegated powers are foreseen, in particular if they develop into a smoking initiation products.

[7] See however section 5.6 of the main report.

The **main factors taken into account** in the analysis were (1) revenues generated by the economic stakeholders as well as the added values of the individual sectors in the overall supply chain, (2) the profit margins of the individual sectors and (3) the dependence of different sectors/stakeholders on the revenues generated with tobacco products.

Shares of the stakeholders in the value chain

As explained in Annex 2, in 2010 the **EU-27 market for FMC and RYO was worth 130.6 bEUR at retail level including VAT and excise duties**[8]. Thus, a 1% reduction in tobacco consumption would mean that a 1.3 bEUR decrease in spending on tobacco. However, in order to establish the impact on economic stakeholders the part of turnover associated with taxes (VAT and excise duties) must be removed[9]. Accordingly the total market at retail level accounted for 31.36 bEUR. Of this, 90.4% (i.e. 28.34 billion EUR) are generated from the sales of FMCs, and 9.6% (or 3.02 billion EUR) from RYO. The value generated from other tobacco products[10] are not further considered in this assessment, in particular because the envisaged policy measures are proposed to be currently suspended for these products.

If one assumes a 1% reduction in tobacco consumption, the company revenues from FMC and RYO at retail level would lead to a reduction of 313.6 mEUR, this would double with a 2% reduction and so on. The breakdown for the two product categories considered is 283 mEUR for FMCs and 30 mEUR for RYO if a 1% reduction is observed. Table 2.2 below summarises the revenue loss that all the companies within the tobacco supply chain face when overall tobacco consumption decreases by 1, 2, 3, 4 or 5%.

Table 2.2: Reduction of sales (mEUR)

	Reduction of consumption translated into reduction of tobacco sales at retail level				
	1%	**2%**	**3%**	**4%**	**5%**
Reduced spending on tobacco	1306	2612	3918	5224	6530
- Tax revenue lost	992.4	1984.8	2977.2	3969.6	4962
- Company revenue loss[11]	313.6	627.2	940.8	1254.4	1568

Source: own calculations

The concept of value added

In figure 2.1 below we present the **production/supply chain for cigarettes** in a simplified form. It sets out the main categories of suppliers, the activities of the tobacco companies and the distribution chain.

[8] Matrix report 2012, Euromonitor figure - consist of overall EU market value of FMC (121,3 bEUR) and RYO (9.3 bEUR); see also Annex 2

[9] Euromonitor, DG TAXUD, Matrix report 2012; see also Table 2 in Annex 2

[10] Cigars and cigarillos, pipe tobacco; for EU market shares of these products see Table 1 in Annex 2

[11] Overall tobacco suply chain losses

Figure 2.1: Supply and value chain of tobacco products

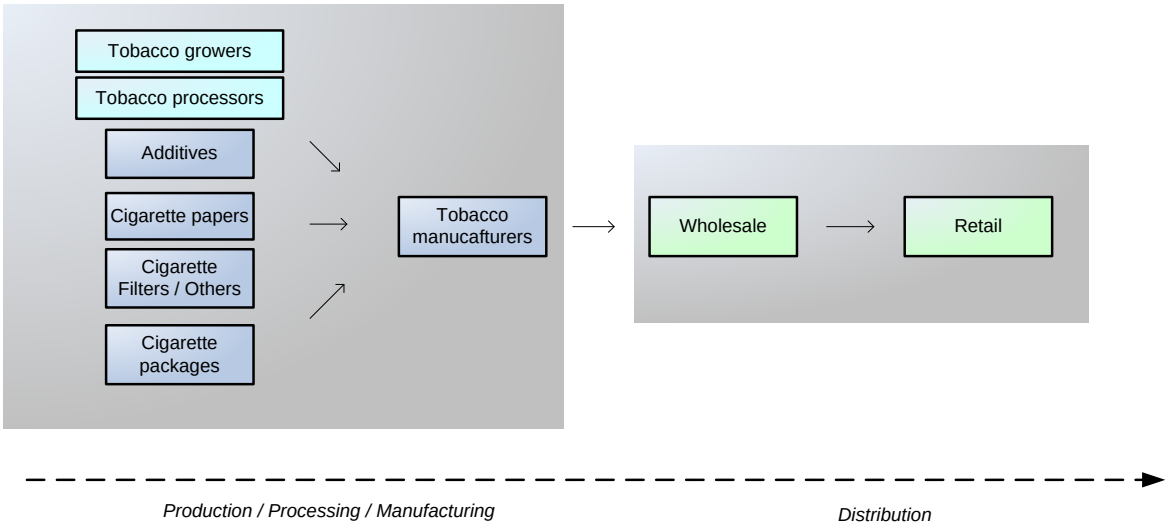

Table 2.4: Revenues (sales to tobacco industry or of tobacco products) and profits (in billion EUR)

	Upstream suppliers						Tobacco industry	Downstream Distribution	
	Leaf production		*Additives*	*Fine Paper*	*Filters/ Others*	*Carton*		*Wholesale*	*Retail*
	Farmers	*Processors*							
Revenue (bEUR)	0.68	2.56	0.61	0.61	1.38	0.91	18.82	23.25	31.36
Profit margin	8.0%	8.0%	6.8%	6.8%	6.8%	6.8%	14.4%	1.5%	1.5%
Profit (bEUR)	0.04	0.22	0.04	0.04	0.09	0.06	2.71	0.35	0.47

Source: own calculation for turnover, S&P Index 500 Stocks margins by sectors

The subsequent sections explain what a drop of consumption in the region of 2% would mean for the different stakeholders along the tobacco supply chain. The analysis starts with the tobacco industry, then turns to upstream suppliers and concludes with downstream distributors.

A.5.2.2.1. Impact on tobacco manufacturing industry

From Table 2.4 we can derive that the **tobacco manufacturing industry generated a turnover of 18.8 billion EUR** in year 2010 with the sale of FMCs and RYO at an ex-factory level excluding taxes[12].

Table 2.5 shows the impact on **revenues and profits** as a result of a declining consumption of FMCs and RYO. The projected decrease of 2% in consumption is expected to lead to total revenue losses for tobacco manufacturers of approximately 376 mEUR, which represents a reduction of profits in the region of 54 mEUR. The profit margins are based on industry averages[13].

[12] Excise duty and VAT
[13] S&P Index 500 Stocks margins by sectors; 3Q/2011; http://mobile.bloomberg.com/news/2011-10-28/summary-of-third-quarter-margins-for-s-p-500-stocks-by-sectors (accessed on 14/3/2012) – subsequently compared with the reported margins of the industry in their publicly available P/L accounts

Table 2.5 Reduction in revenues and profits for tobacco industry

Tobacco manufacture	Reduction in tobacco consumption				
	1%	2%	3%	4%	5%
Revenue loss in sector (mEUR)	188	376	564	753	941
Profit loss in sector (mEUR)	27.1	54.2	81.3	108.4	135.5

Source: own calculation

As indicated previously, the presented reduction in revenues and profits is a "**conservative estimate**" for the industry. For example, that certain sales of the illicit supply chain are expected to return to the legal supply chain as a result of the measures proposed under policy areas 4 (cross border internet sales) and 5 (dealing with measures against illicit trade) has not been considered.[14]

When comparing the expected reduction in revenues and profits with the **actual turnover and profits of the industry for the year 2010** (Table 2.5) as reported by the big four tobacco companies in their P/L accounts (accounting for 80-90% of the EU market), it can be concluded that the impact in relative terms would not be major and the measures are therefore not disproportionate.

Table 2.6: Revenues and profits reported by the industry in 2010[15]

	Data for the "big four" representing almost 90% of the total EU market			
	PMI*	**BAT**	**JTI***	**IT***
Revenues in the EU (in mEUR)	-	4,460	-	-
Profits reported for EU (in mEUR)	-	1,331	-	-
Revenues worldwide (in mEUR)	13,476	17,964	7,857	6,578
Profits worldwide (in mEUR)	5,586	5,212	2,463	2,192

Source: Company financial reports 2010; Companies internet websites[16]

Furthermore, it is important to underline that the relationship between FMC/RYO sales and profits of the tobacco companies is not perfectly correlated[17]. A decrease in cigarette does not necessarily lead to a reduction in relative, or even absolute, profits. It seems that companies, on the basis of their substantial market power, have been able to maintain profits at high levels in recent years despite a decline in sales.

[14] Further details in section 5.5 of the main report.

[15] Financial reports of "big four" tobacco companies; companies internet websites; data converted in EUR with ECB exchange rate as of 16/02/2012; data for EU

[16] Data on revenues and profits derived from sales within the EU were not available (neither made public nor provided by companies on request)

[17] Over last 10 years, Germany and France had a larger sales volume reduction than average, whilst Italy and the UK saw a smaller sales volume reduction than average. The French rise in tobacco profits coincided with a (larger than the EU average) -34% fall in the volume of cigarettes sold in France, and could be explained by both a resistance to the squeezing of profit margins despite rising taxes *and* strong growth in the volume of RYO tobacco (+36%) and cigarillos (+10%) sales; Matrix report 2012

A.5.2.2.2. Impact on tobacco growers and other upstream suppliers

A reduction of tobacco consumption is also likely to impact the **upstream suppliers** to the tobacco industry, as the tobacco industry will reduce its purchases from upstream suppliers in the light of declining sales. For the purpose of this impact assessment, these effects were estimated and are presented below. It is assumed that a 2% reduction in consumption will lead to a linear reduction in purchases of the tobacco industry (FMC/RYO) from upstream suppliers.

Tobacco growers and processors

In 2010, EU based tobacco **growers produced 294,000 tonnes of raw tobacco and generated revenues of 682 mEUR**[18] in sales to the tobacco industry. This includes sales for products other than FMCs and RYO, without adjusting for product exemptions (leading to an overestimation of the overall reduction considering all tobacco products).

Table 2.7 shows the revenue and profit losses in the tobacco growing and processing sector as a result of a declining consumption of FMCs and RYO. The projected decrease of 2% consumption would lead to **total revenue losses for tobacco farmers in the EU** of approximately **13.6 mEUR,** representing an overall sector net profit loss of approximately 1.1 mEUR. This assumes, conservatively, that all sales of raw tobacco were made to EU tobacco manufacturers, which cannot be compensated through other sales.

Table 2.7: Reduction in revenues and profits for tobacco growers and processors

	Reduction in tobacco consumption				
	1%	2%	3%	4%	5%
Tobacco growers					
Revenue loss in sector (mEUR)	6.8	13.6	20.4	27.2	34
Profit loss in sector (mEUR)	0.54	1.09	1.63	2.18	2.72
Tobaco processors					
Revenue loss in sector (mEUR)	25.6	51.2	76.8	102.4	128
Profit loss in sector (mEUR)	2.05	4.10	6.14	8.19	10.24

Source: own calculation

Whilst it is reasonable to assume that a significant number of growers are able to, and actually do, generate at least some **additional revenues with other products**, it was not deemed appropriate to consider these revenues in this impact assessment. In order to maintain a "conservative scenario", it was assumed that no additional revenues were generated by growers. If the overall reduction in profits is distributed over all 86,133 farmers[19] in the EU, the **annual reduction in an individual farmers' turnover amounts to 158 EUR per year**.[20] This appears to be an acceptable burden. In particular, it does not appear that certain types of farmers (Burley or Oriental growers) would be affected in particular manner. Obviously it is unlikely that each farmer will produce 2% less tobacco. Taking into account past experience,

[18] DG AGRI data

[19] Sources: Member States' communications (Commission Regulation (EC) No 2095/2005) ; DGAGRI.

[20] As the EU tobacco consumption is composed by 1/3 of EU production and 2/3 of EU imports, we have also performed a sensitivity analysis assuming that the reduction of 2 - 3%, will affect only the EU production or will affect only the imports into EU. Taking in account these extreme scenarios, the theoretical loss of income for the EU tobacco growers should lie between 0 - 711 EUR/grower.

it is more likely that certain farmers will discontinue their activities whilst other will continue at previous levels.

In this respect it should also be noted that in the past in the EU, the market for growers has decreased faster than the market for FMCs (with sales of RYO even growing).[21] There is thus **no linear correlation between the reduction in smoking consumption and EU farming output**. If this negative trend for growers continues, it is important to distinguish between the baseline scenario (which would predict a negative trend for farmers irrespective of the measures foreseen) and the relatively moderate effects that can be associated with the reduced consumption of FMCs and RYO following the revised TPD.

Finally, table 2.8 below shows that the European market for growers and processors has developed differently from the **world market**. The EU market has seen a decline of 31% from 2000 to 2009 in volume terms, whilst the world market has grown by 7%. It is therefore fair to assume that the underlying cause for the negative trend for European growers is at least partly of a structural nature, including decoupling of subsidies from production in 2004.[22]

Table 2.8: EU production and trade of unmanufactured tobacco (000, tonnes)

	2000	**2009**	**change**	Trade in unmanucatured tobacco (2010)			
				import		Export	
				(000 t)	(mEUR)	(000 t)	(mEUR)
EU 27	439	304	-31%	597	2170	167	686
World Total	6676	7122	7%				

Source: Matrix / Euromonitor; Faostat, Eurostat

In 2010, there were 88 **first processors**[23] of tobacco in the EU. These were located close to tobacco growing regions, with the majority located in Bulgaria and Italy. Two U.S. based leaf tobacco merchants[24] with similar market shares control the major part of the EU market of **second processors.**[25] In 2011, Alliance One delivered 54% of its tobacco sales to customers in Europe (approx. **800 mEUR**).[26]

Table 2.6 above shows the revenue and profit losses in the tobacco processing sector as a result of a declining consumption of FMCs and RYO. The projected decrease of 2% consumption would lead to **total revenue losses for tobacco processors in the EU** of approximately **51 mEUR** which represent overall sector net profit loss of 4mEUR.

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[21] Between 2000 and 2009, the total production of unmanufactured tobacco in the EU decreased by 31%, from 438.7 thousand tonnes annually to 303.8 thousand tonnes annually. The volume of the EU cigarettes market in 2010 (608.8 billion sticks) declined by 23.3% in comparison to 2000. The market size of RYO tobacco in 2010 (75.500 tonnes) increased in comparison to 2000 by 42.2 %. Thus, overall FMC+RYO market decreased by 19.2 % (assuming that 1g of RYO tobacco corresponds to one cigarette).

[22] Negative effect of the reform was the growth of raw tobacco's prices which brings significant competitive disadvantage of EU tobacco growers in the global market.

[23] The first processors collect the raw tobacco cured by farmers and undertake the first process before selling it to the second processors (see also Annex 2), cf. DG AGRI.

[24] Alliance One Int.; Universal Corporation

[25] The second processors subsequently purchase, process, blend, pack, store and ship tobacco to meet each specifications of manufacturers of cigarettes and other tobacco products (see Annex 2).

[26] AOI 2011 Annual Report, http://phx.corporate-ir.net//phoenix.zhtml?c=96341&p=irol-reportsannual, accessed on 29 February 2012. Recently, the Commission fined the company's subsidiaries in Spain, Italy and Greece for operating cartels, but the outcome of the appeal is not yet known.

Other upstream suppliers

Table 2.9 below shows the reduction in revenues and profits of other industries/sectors supplying the tobacco manufacturers as a result of decline in the consumption of tobacco products.

Table 2.9: Reduction in revenues and profits of suppliers to FMC/RYO producers

	Reduction in tobacco consumption				
	1%	2%	3%	4%	5%
Tobacco additives					
Revenue loss in sector (mEUR)	6.1	12.1	18.2	24.3	30.3
Profit loss in sector (mEUR)	0.41	0.83	1.24	1.65	2.06
Cigarette papers					
Revenue loss in sector (mEUR)	6.1	12.1	18.2	24.3	30.3
Profit loss in sector (mEUR)	0.41	0.83	1.24	1.65	2.06
Cigarette packages					
Revenue loss in sector (mEUR)	9.1	18.2	27.3	36.4	45.5
Profit loss in sector (mEUR)	0.62	1.24	1.86	2.48	3.09
Cigarette filters / Others					
Revenue loss in sector (mEUR)	13.8	27.6	41.5	55.3	69.1
Profit loss in sector (mEUR)	0.94	1.88	2.82	3.76	4.70

Source: own calculation; based on data received from industry

The EU based suppliers of **tobacco additives** generated an estimated 610 mEUR of revenue [27] from sales to producers of FMC/RYO in the EU in 2010. The projected decrease of 2% in consumption would lead to total revenue losses for the sector of approximately 12.1 mEUR which represents an overall sector net profit loss of 0.83 mEUR. Given that the **dependence of additives/flavours production sector on tobacco industry is rather limited** (possibly with the exception of some specialised SMEs), the impact of decreasing tobacco consumption on revenues and profit losses within the sector would be marginal.

The EU based suppliers of **cigarette fine papers** generated revenues of 610 mEUR[28] from sales to the tobacco industry in the EU in 2010. Sales to tobacco industry often represents close to 100% of these suppliers total revenue, but only approximately 50% of the sector production is reported as sales within the EU. The projected decrease of 2% in tobacco consumption would lead to total revenue losses for the sector of approximately 12.1mEUR which represents an overall sector net profit loss of 0.83 mEUR. Similarly to suppliers of additives, the 2% decrease in cigarette consumption would have a relatively small impact on overall revenues and profits of the cigarette paper industry representing 1% of the profits taking into account exports.

The EU based suppliers of **cigarette packages** generated revenue of 910 mEUR[29] from sales to the tobacco industry in EU in 2010. The sales to the tobacco industry represent approximately 10% of the sector total revenue. The projected decrease of 2% in cigarettes consumption would lead to total revenue reduction for the sector of approximately 18.2 mEUR which represents an overall sector net profit loss of 1.24 mEUR. Since the dependence

[27] Reconciled from the data obtained from additive and cigarette manufacturers
[28] Reconciled from the data obtained from industry - fine paper producers and cigarette manufacturers
[29] Reconciled from the data obtained from industry – ECMA industry association and cigarette manufacturers

of cigarette package producers on the tobacco industry is low, the overall impact of a decrease in tobacco consumption by 2% on **reduction in revenues in the sector will be an insignificant 0.2%** of total sector turnover.

It is estimated that **other EU based suppliers** to tobacco industries including acetate tow / cigarette filter producers generated revenues of 1.38 billion EUR[30] from sales to the tobacco industry in the EU in 2010. The projected decrease of 2% in cigarette consumption would lead to total revenue losses for the sector of approximately 27.6 mEUR which represents an overall sector net profit loss of 1.88 mEUR. There is insufficient information available on how much the industries concerned rely on sales to the tobacco industry located in the EU[31], but in line with the explanations above it is assumed that the impact on these industries is significantly less than the respective decrease in consumption.

A.5.2.2.3. Impact on wholesalers and retailers

The reduction in consumption will also affect the **downstream distributors** of the tobacco industry, i.e. wholesalers and retailers (which range from specialist retailers to hypermarkets). This section aims at summarizing the expected impacts of reduced consumption on these stakeholders.

Wholesale

The EU based **wholesalers of tobacco products** generated revenues of 23.25 billion EUR[32] from sales of FMC and RYO in the EU in 2010. As shown in the table 2.10, the projected decrease of 2% in consumption would lead to total revenue losses for the sector of approximately 465 mEUR which represents an overall sector net profit loss of 7 mEUR.

Table 2.10: Reduction in revenues and profits of wholesalers

Wholesale	Reduction in tobacco consumption				
	1%	2%	3%	4%	5%
Revenue loss in sector (mEUR)	232.5	465	697.5	930	1162.5
Profit loss in sector (mEUR)	3.49	6.98	10.46	13.95	17.44

Source: Euromonitor; own calculation

In a number of Member States wholesale activities, formerly part of national tobacco monopolies, are operated by large tobacco manufacturers.[33] In other MS the wholesalers are often involved in the distribution of various product categories, and therefore only part of their revenue would be impacted[34].

[30] Reconciled from the data obtained from industry – GAMA industry association
[31] The acetate tow producers are part of big multinational cooperations which generate only a very small fraction of their revenues with acetate tows
[32] Reconciled from the data obtained from industry. Obviously, the wholesalers would have proportionally reduced purchasing costs of 18.82 bEUR. In this regard the sector added value is estimated at 4.4 bEUR.
[33] Case No COMP/ M.4424 JT / Gallaher; Case No COMP/ M.4581 Imperial Tobacco / Altadis. Article 6(2) non-opposition
[34] e.g. Cash and carry warehouses, European Tobacco Wholesalers Association

Retail

The **turnover generated at retail level from tobacco products** (FMCs and RYO) amounted to 31.36 bEUR in 2010.[35] The table below shows the revenue and profit reductions of the retail distributors of tobacco products as a result of declining consumption. The projected decrease of 2% in consumption would lead to total revenue loss for the sector of approximately 627 mEUR (cooresponding to the sector added value of 162 mEUR) which represents an overall sector net profit loss of 9.4 m EUR.

Table 2.11: Reduction in revenues and profits of wholesalers

Retail	Reduction in tobacco consumption				
	1%	2%	3%	4%	5%
Revenue loss in sector (mEUR)	313.6	627.2	940.8	1254.4	1568
Profit loss in sector (mEUR)	4.70	9.41	14.11	18.82	23.52

Source: Euromonitor; own calculation

It is evident that the dependence of retailers on turnover generated with tobacco varies quite significantly. On the one hand, there are specialist tobacco retailers, which generate a significant part of their turnover from tobacco. On the other hand big super markets sell a great variety of products and tobacco products only account for a minor share of their revenues. Table 2.12 below shows the proportion of sales of tobacco products in the EU across the different retail channels and allocates the total revenues at retail level to them. The subsequent column shows the impact of declining consumption for each type, if consumption decreases by 2%. Similarly to previous sections the net profit margin was applied for each of the sectors[36].

Table 2.12 : Shares of retail sale of tobacco products in EU and impact on revenue/profit

Place of sale	Share of retail sales in EU (2010)	Impact of 2% decline in consumption (mEUR)	
		Revenues	Profits
Tobacco specialists	23.8%	149.27	2.24
Newsagent-tobacconists/kiosks	24.7%	154.93	2.33
Supermarkets/discounters	14.6%	91.60	1.37
Hotels/restaurants/bars	1.3%	8.13	0.12
Vending machines	8.6%	53.93	0.81
Small grocery retailers	10.8%	67.73	1.01
Convenience stores	4.9%	30.73	0.46
Forecourt retail / gas stations	8.9%	55.80	0.84
Others	2.4%	15.07	0.23
	100.0%	627.20	9.41

Source: Matrix report 2012; Euromonitor, own calculation

[35] Obviously, the wholesalers would have proportionally reduced their purchasing costs in the range of 23.25 bEUR. In this regard the sector added value is estimated at 8.1 bEUR.
[36] S&P Index 500 Stocks margins by sectors; 3Q/2011

The **retailers most dependent on selling tobacco products**[37] generate an aggregated revenue from selling tobacco products of 15.2 bEUR, which is almost 50% of the total retail revenues from the sales of tobacco products. Assuming that their revenues from tobacco products account for between 45-60% of their total revenues[38], the projected decrease of 2% in cigarettes consumption would lead to revenue losses of 304.2 mEUR, representing 0.9-1.2% of their total revenues. Overall the profit reduction for the retailers most dependent on tobacco would account for 4.57 mEUR.

As discussed in more detail in Section 4, **money not spent on tobacco products will be spent on other products and services**. This will also partially benefit retailers specializing in tobacco (e.g. bars, newsagents, snacks).

All other retailers, which are less dependent on tobacco products, generated revenues from tobacco products in the region of 16 bEUR. Since these revenues form only a fraction of their total revenues, the projected decrease of 2% in cigarettes consumption would influence these retailers only in an insignificant manner.

Whilst the **general trend** in tobacco sales has been downward, the distribution channels through which tobacco is sold changed only slightly between 2000-2010. Declining sales in cigarettes have affected all retail channels, but to different degrees.[39] Furthermore, in recent years, the number of very small mixed businesses in the EU have in general been on the decline. This has resulted mainly from overall consumer behavior changing (e.g. longer working hours and extended shopping hours for supermarkets and major shopping centers). Thus, regardless of public policies on tobacco, the continuing decline in profitability of small corner stores in EU is likely to lead to **concentration of cigarette and tobacco sales by larger retailers**.

A.5.2.2.4. Input output model

As explained, money not spent on tobacco is spent on other goods and services (e.g. food, cloths, holidays, cinemas among others). This additional expenditure is expected to benefit the economic operators concerned (**re-distribution effect**). In order to fully capture the macroeconomic effects, a so-called **input/output model** was used. Whilst this model is explained in more detail in section 4 below (employment), the attached table shows which sectors are expected to benefit from a reduction in tobacco consumption and which sectors are expected to lose revenues (for more detailed explanations see A5.2.4.1 below).

[37] Tobacco specialists, Newsagents-tobacconists/kiosks
[38] Data provided by European Federation of Tobacco Retailers
[39] Over last 10 years, sales have dropped more in specialised stores than in larger supermarkets/hypermarkets or discounters (Matrix report 2012).

Table 2.13: The impact on output of different sectors associated with a reduction in consumption of tobacco by 1% (in billion EUR)

Industry	Monetary impact of reduction in tobacco consumption	Monetary impact of increase in expenditure for other goods	Net effect on output
TOTAL	**-0.574**	**0.634**	**0.059**
Agriculture	-0.025	0.017	-0.008
Mining and petroleum	-0.002	0.006	0.005
Food industries	-0.012	0.067	0.054
Tobacco	-0.197	0	-0.196
Textile	-0.002	0.022	0.019
Wood and wood products	-0.003	0.018	0.015
Paper products and printing	-0.018	0.007	-0.011
Chemical products	-0.011	0.014	0.003
Rubber products	-0.003	0.005	0.002
Metal and non metal products	-0.004	0.009	0.005
Basic metal products	-0.004	0.008	0.004
Machinery	-0.005	0.009	0.004
Transport devices	-0.025	0.057	0.033
Housing and Electricity	-0.011	0.07	0.059
Finance and trade and insurance	-0.018	0.018	0
Wholesale and retail	-0.033	0.044	0.011
Services	-0.095	0.136	0.041
Compensation of employees	-0.093	0.108	0.014

Source: Matrix report 2012

A.5.2.3. Impact on society and Government budgets

For the society as a whole, a reduction in tobacco consumption has mostly **positive implications** (improved public health, reduced health care costs and less absenteeism). However, it might also have some adverse impacts on budgets (reduction in **tax revenues**), even if in the past a reduction in tobacco consumption has not lead to a decrease of revenues and from a macro-economic perspective represents only redistribution of the resources to other stakeholders with the society.

This section describes the effects outlined above in more details. It starts with the positive effects associated with a reduction in tobacco consumption and then turns to the budgetary implications of this reduction. The subsequent section balances both effects and comes to the conclusion that the positive effects outweigh the negative effects. In order to cater for the benefits and costs that occur in different time periods, social discounting is applied in the last part of this Section.

A.5.2.3.1. Positive impacts of reduced consumption

The main positive impact of reduced tobacco consumption is that **public health is significantly improved**. People, who do not smoke/stop smoking in time, live significantly longer with better health. It is evident that across society and individuals, as well as for their families and those close to them, a gained (healthy) life year is a very significant and precious value in its own right. This effect will be outlined in the first subsection, which also monetises

the value in line with the Commission's Impact Assessment guidelines to allow for comparisons to be made.

Apart from improved public health (i.e. decreased mortality and longer healthy life years), reduced tobacco consumption will also lead to **lower health care costs** and to **improved productivity** due to fewer cases of absenteeism and premature retirements. These impacts will be described in the second and third subsections.

A.5.2.3.1.1. Morbidity and mortality caused by tobacco

The risks associated with smoking

From a scientific/medical perspective, it is by now generally acknowledged that smoking harms nearly every organ of the human body, causing a broad range of diseases.[40] At least 24 of these smoking induced diseases are fatal, whereas others lead to chronic illnesses. The long-term risks of smoking have been extensively quantified in a cohort study of British doctors that compared the overall survival of smokers and non-smokers over time. This **study showed that at least 50% of smokers die prematurely.**[41]

Another study based on Danish data compared the **average lifetime in good health** of smokers and non-smokers and found that, in addition to the years lost from dying earlier, smokers suffer from poor health conditions for a greater number of years compared to non-smokers. Men who smoked heavily (defined here as at least 15g of tobacco per day) had 8 years more of poor health than people who never smoked. Women who smoked heavily had an average of 12 years more of poor health, in addition to their earlier loss of life.[42] A number of studies have also found similar results.[43,44,45]

Peto et al[46] have estimated that in the EU27 smokers who die in middle age as a result of their tobacco consumption lose an average of 22 years of life. Even those who die at age 70 or older as a result of their smoking at lose on average 8 years of life. Peto et al estimates that, on average, **smokers who die as a result of their tobacco consumption die 14 years earlier than people who never-smoked**. Other studies come to similar conclusions.[47]

These findings also allow for a comparison between different risk factors that lead to premature mortality, for every 1000 individuals who smoked regularly across all EU countries (reference year 2000), 500 will die from smoking related illness, whilst only seven will be

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40 US Department of Health and Human Services. The health consequences of smoking: a report of the Surgeon General.Washington, Government Printing Office, 2004.
41 Doll R, Peto R, Boreham J, Sutherland I. (2004). "Mortality in relation to smoking: 50 years' observation on male British doctors". BMJ 328 (7455): 1519.
42 Bronnum-Hansen H, Juel K. Abstention from smoking extends life and compresses morbidity: a population based study of health expectancy among smokers and never-smokers in Denmark. Tobacco Control 2001; 10: 273-278.
43 Nusselder WJ, Looman CW, Marang-van de Mheen PJ, van de Mheen H, Mackenbach JP. Smoking and the compression of morbidity. J Epid Comm Health 2000; 54: 566-574.
44 Klijs B et al. Obesity, smoking, alcohol consumption and years lived with disability: a Sullivan life table approach. BMC Public Health. 2011; 11: 378.
45 Bronnum-Hansen H, Juel K, Davidsen M, Sorensen J. Impact of selected risk factors on expected lifetime without long-standing, limiting illness in Denmark. Prev Med. 2007;45(1):49–53.
46 Peto R, Lopez AD, Boreham J,Thun M. Mortality from Smoking in Developed Countries 1950-2010. 2nd Edn. Imperial Cancer Research Fund, World Health. Data updated November 2011. Organization. Oxford, Oxford University Press,
47 http://www.cpinternet.com/~mdmagree/smokers_2006-01-19.html

killed in road accidents and only one will be murdered.[48] Smoking is generally seen as the largest avoidable health threat in Europe and the rest of the world.

Healthy life years as a value to society

Every civilised society **strives to avoid premature death of its citizens and to maintain a high level of public health**. For example, EU Member States build hospitals and medical research centres, finance the education of doctors and nurses, and provide public health insurance that reimburses medical treatments, pharmaceuticals and medical devices. Even outside the healthcare sector, many measures are introduced to improve public health and/or ensure a high level of public health. Some examples of Member State actions, across different sectors, that demonstrate these societal efforts towards a high level of public health forcefully are the obligation to wear seat belts in cars, the prohibition of dangerous pesticides that could potentially enter the food chain and the introduction of legislation that requires the removal of asbestos in public buildings.

The underlying reason for all these policies is that Member States governments and societies in general attribute a high value to the avoidance of premature death and a high level of public health. **Life in general and healthy life years in particular are a value in their own right** and in most constitutions of Western societies the right to live and the right to have access to medical treatment is recognised as human right of highest importance. With the same token societies do not allow companies to put their profits above public health as repeated scandals in health care sector show (e.g. Mediator case in France[49]).

Traditionally, the **question whether a public measure improving public health makes sense from an economic perspective is of secondary nature**. Nobody seriously raises the question whether society should stop medical treatment of people who are no longer part of the active workforce or whether citizens should be obliged to wear seat belts. However in times of economic crisis it is important to ensure that measures are not only beneficial to society but also cost effective. A good example, is the approach of the UK public body NICE, which evaluates whether a new medicine should reimbursed based on both its cost and the number of healthy life years gained from the treatment.

The attempt to monetise

In light of the above, economists have repeatedly attempted to **monetise the value of life** in order to provide regulators with a tool to decide whether certain policy measures are beneficial for society (e.g. because the measures are cost-effective). Concretely at least two approaches are discussed: (1) the loss of productive capacity (a tangible cost) and (2) the psychological effects borne by the deceased and others (an intangible cost).

The first method focuses on the loss of productive capacity. The approach is known as the **human capital approach**. It involves estimating and monetising the loss of the expected productive capacity. The second method also looks at the psychological costs of premature death/avoidable illness. This approach is also known as the **willingness-to-pay approach**, in which researchers identify how much people would be willing to pay to reduce the risk of

[48] ASPECT 2004 study

[49] http://www.afssaps.fr/Dossiers-thematiques/Mediator-R/Mediator-R-et-accompagnement-des-personnes/(offset)/0

death in a particular period of time. Generally, intangible costs (willingness-to-pay) are more difficult to establish than tangible costs, for which conventional markets (market prices) exist.

If regulators merely take into account the human capital approach, the **premature deaths of people above workforce age** could be considered to have no cost/limited costs to society since no productive capacity is lost. Indeed, when such an approach is taken, it can be argued that some "benefits" accrue to society as a whole from the premature death of old people, since certain resources (such as pension payments), which would have be needed to meet the needs of the deceased, are now saved. **It can thus be concluded that looking only at the human capital approach would not be in line with the Europe's values**.

As indicated above, European societies and Member States actions (including the allocation of substantial health care resources to the aged) demonstrate that **lives of people/healthy life years are valuable in their own right, irrespective of whether the persons concerned are part of the work force.** Thus, while it is important to evaluate the loss of productive capacity, it is not appropriate to ignore the social costs of premature deaths.

The analysis method used by the European Union considers the **value that is attributed to each life year gained**, not the value of a lost life itself (which can involve the loss of many years of living or just a few months). The values used in the Commission's impact assessment guidelines are based on surveys or observations of the research project ExternE, which established a 'typical' range of €50,000 to €100,000 for the **value of one life year (VOLY)**. The median of estimates of intangible value of the loss of one year's living (as included in the Commission's Impact Assessment guidelines), is **€52,000** irrespective of the age or country of residence of the victim.

Table 3.1 shows that premature deaths in the population due to smoking is a very significant burden associated with tobacco consumption. In total, **almost 700,000 premature deaths** (i.e. 15% of all deaths in the EU for those over 35) can be attributed to smoking, out of almost 5 million total deaths annually observed in the EU (year 2005).

Table 3.1: Overall estimated mortality attributable to smoking in the EU27 in 2005

Gender	Total mortality	Attributable to smoking	As % of total mortality
Males	2,404,508	522,267	21.7
Females	2,408,625	176,557	7.3
Total	4,813,133	698,824	14.5

Source: R. Peto, 2011

Expressed in life years, it is calculated that in 2010, **about 9.94 million years are lost prematurely**. Applying the estimate from the ExternE project, the **loss to society caused by premature deaths associated with smoking thus amounts to a monetised value of 517 bEUR for the EU**, which corresponds to about 4.7% of the GDP (Table 3.2).

Table 3.2: Estimated monetary value of years of life lost (YLL) due to smoking

	Total YLL due to smoking	Monetary value of loss (mEUR)	As % of EU	GDP (mil.EUR at PPS[50])	Loss as % of GDP (at PPS)
Austria	132,411	6,885	1.3	244,796	2.8
Belgium	226,637	11,785	2.3	298,464	3.9
Bulgaria	179,103	9,313	1.8	78,424	11.9
Czech Republic	219,861	11,433	2.2	202,557	5.6
Denmark	157,613	8,196	1.6	159,410	5.1
Estonia	25,989	1,351	0.3	19,993	6.8
Finland	65,266	3,394	0.7	144,259	2.4
France	1,116,577	58,062	11.2	1,639,459	3.5
Germany	1,563,453	81,300	15.7	2,224,648	3.7
Greece	206,717	10,749	2.1	249,870	4.3
Hungary	434,458	22,592	4.4	152,259	14.8
Ireland	67,451	3,507	0.7	133,871	2.6
Italy	992,332	51,601	10.0	1,469,877	3.5
Latvia	48,974	2,547	0.5	27,152	9.4
Lithuania	66,660	3,466	0.7	42,754	8.1
Luxembourg	5,582	290	0.1	31,102	0.9
Malta	4,900	255	0.0	7,978	3.2
Netherlands	365,121	18,986	3.7	511,825	3.7
Poland	1,080,437	56,183	10.9	543,816	10.3
Portugal	130,191	6,770	1.3	199,839	3.4
Romania	511,757	26,611	5.2	237,224	11.2
Slovakia	98,134	5,103	1.0	92,359	5.5
Slovenia	37,966	1,974	0.4	41,781	4.7
Spain	721,281	37,507	7.3	1,112,893	3.4
Sweden	122,421	6,366	1.2	260,683	2.4
Unit. Kingdom	1,355,499	70,486	13.6	1,606,081	4.4
Total	**9,936,789**	**516,713**			**4.7**

Source: GHK; 2012 data[51], Cyprus excl.

Application of the methodology to the expected reduction of tobacco consumption

The above methodology can be applied to the expected drop in tobacco consumption. Table 3.3 shows how the estimated losses to society caused by premature deaths would decrease, if tobacco consumption is reduced by 1, 2, 3, 4, or 5%. For example, a 2% decline in consumption would result in a **net benefit to society of 10.3 bEUR per year**.

Table 3.3: Estimated monetary benefit of decreased mortality

	Premature mortality decrease with different percentage reduction in tobacco consumption				
	1%	**2%**	**3%**	**4%**	**5%**
Premature mortality cost due to smoking (mEUR)	511,546	506,379	501,212	496,044	490,877
Net benefit (mEUR)	5,167	10,334	15,501	20,669	25,836

Source: GHK 2012, own calculation

[50] Gross domestic product adjusted for the size of an economy in terms of population and also for differences in price levels across countries

[51] A Study on Liability and The Health Costs of Smoking. GHK, revised report published in June 2012.

It is important to underline again that the above approach is merely an **attempt by economists to express in monetary terms how much society values life in general and (healthy) life years in particular**. It is a proxy for the fact that people do not wish to die prematurely. It is also important to underline again that a good part of the benefits associated with reduced tobacco consumption will accrue only in a few years time (e.g. when a drop in cancer treatments are observed).

Implications for social security system

As indicated above, **certain studies,** including one study from the tobacco industry which was later withdrawn, have argued that smokers subsidise non-smokers' pensions, at least in some countries.[52] Society would thus benefit from premature deaths caused by smoking.

In this respect, it is first important to underline that **other studies**[53] have argued that smokers' greater disabilities (fewer healthy life years) lead to net pension payments to them. It has also been argued in more general terms that the net lifetime costs of smokers are superior for the State than the costs for non-smokers, in particular if one includes indirect costs. Evidence from Sweden shows that smokers use the social welfare systems more than non-smokers, and that smoking leads to net lifetime external costs for men and women currently smoking, and even for former male smokers.

Furthermore it should be noted that **people above the official workforce age actively participate in the economy**, be it as consumer, as investor or as provider of often unpaid services, e.g. taking care of children. The pension age in most Member States is also currently being increased. It can therefore be expected that the current work force will work much longer than in the past, increasing potential productivity losses in the future, in particular considering the demographic development of Europe.

In any event, it is important to underline that the arguments developed in the studies mentioned above are contrary to the approach foreseen by the Commission's impact assessment guidelines, which **attributes a value to each (healthy) life year** irrespective of the fact whether the person is still an active member of the active work force or not. This is due to the fact, as previously mentioned, that life has a value in its own right.

A.5.2.3.1.2. Health care budget

Another major benefit for society and Governments is that a reduction in tobacco consumption is expected to lead to reduced health care costs.

The health care costs associated with treating smoking related diseases

Governments/societies incur very significant costs associated with **smoking-related diseases**. The size of these costs depends on the extent to which healthcare, prevention and public health services are covered by public funds. Indirectly, the burden on Governments also appears in the form of smoking related disabilities and social benefits payments, lost income

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[52] Arthur D. Little International Inc. Public finance balance of smoking in the Czech Republic, 1999. http://www.mindfully.org/Industry/Philip-Morris-Czech-Study.htm (accessed 15 February 2012).

[53] - Atkinson AB, Skegg JL*(1973) Anti-smoking publicity and the demand for tobacco in the UK. The Manchester School of Economic and Social Studies* ***41****:265–282.*

- Anneli Taala, Raul Kiivet,b and Teh-Wei Huc (2004); The Economics of Tobacco in Estonia

tax and lost contributions to social benefits funds. This section focuses on health care costs, whereas the issue of absenteeism is addressed in the next subsection.

With respect to **health care costs,** it has been well documented through clinical evidence that smoking increases the risks of individuals contracting certain diseases requiring health treatment. For the purposes of the analysis, the **direct costs** to European public healthcare systems were considered in terms of the estimated amount of healthcare expenditure attributable to the treatment of diseases caused by smoking in a given year. Direct costs represent the costs of in-patient and out-patient treatment and the cost of medication.

There are **six main disease categories** that are associated with smoking. This includes respiratory and cardiovascular diseases or cancers. In order to estimate the expenditure on health attributable to smoking, a standard smoking attributable factor (SAF) for each six disease categories was used[54]. Table 3.4 presents these diseases and the total treatment costs per disease that is attributable to smoking.

The calculation on the expenditure is based on the annual EU public healthcare expenditure for diseases, which might be caused by smoking and the subsequent attribution of this total expenditure to different causes (including smoking) on the basis of available statistical data. In conclusion, **healthcare expenditure on treating smoking attributable diseases is estimated to be around 25 bEUR** which corresponds to 2.89% of total healthcare spending in the EU27 and 0.22% of GDP.

Table 3.4 EU-wide health care expenditures on treatment of smoking attributable diseases

Disease category	Costs (bEUR)
Cardiovascular diseases	9.113
COPD	5.081
Lung cancer	3.641
Other cancers	3.063
Other respiratory diseases	2.662
Upper aerodigestive cancers	1.740
Total	**25.300**

Source: GHK, 2012

Benefits from a decline in smoking consumption

Declines in smoking consumption will lead to a **reduction in health care costs**. The extent of the reduction will depend on the success of the envisaged measures.

For certain diseases there will be a **time lag** before the reduced heath care costs are observed (e.g. cancer treatments), whereas for other diseases (e.g. respiratory and cardiovascular) the savings will be more immediate. Regarding respiratory diseases many ex-smokers feel immediate positive effects when they stop smoking, with smokers frequently suffering from coughing, headache, eye irritation, sore throat, sneezing and runny nose, nausea, breathing

[54] The estimates of the costs to public healthcare systems of treating smoking attributable diseases are based on incidence data and average of per case expenditure based on data from the UK, Germany and the Netherlands (data 2008-2010).

problems, and irregular heartbeat.[55] Lightwood and Glantz estimated that **each new non-smoker** as a result of the Californian anti-smoking campaign **reduced anticipated medical costs** associated with acute myocardial infarction and stroke by $47 in the first year and by **$853 during the next 7 years**.

In order to present the figures for one single year (year 5 after transposition), the costs for the long term treatments were anticipated. In this light it is expected that the annual net benefit of a reduction in tobacco consumption by 2% amounts to **506 million EUR** per year. The current value of this benefit should be the same or even higher considering the inflation of the health care costs above the average.

Table 3.5: Estimated savings in health care expenditures

	Health care expenditures with different percentage reduction in tobacco consumption				
	1%	**2%**	**3%**	**4%**	**5%**
Projected Total EU health care expenditures (mEUR)	19,628	19,430	19,232	19,034	18,836
Net benefit (mEUR)	198	396	594	792	990

Source: GHK, 2012, own calculation

Lifetime costs of smokers and non-smokers

Smoking is a major health hazard, and since non-smokers are healthier than smokers, it is only natural that health care systems spend less money on non-smokers compared to smokers, which is confirmed by a number of studies.[56,57,58] Not smoking saves money spent on health care.[59] In each age group, the annual per capita health care costs for smokers are higher than for non-smokers and they rise sharply with age. The difference varies according to age group, but according to some sources the costs for smokers among 65-to-74-year-olds are as much as 40 percent higher for men and as much as 25 percent higher for women.

[55] Lightwood JM, Glantz SA. Short-term economic and health benefits of smoking cessation: myocardial infarction and stroke. Institute for Health Policy Studies, Department of Medicine, University of California, San Francisco 94143-0124, USA. Circulation. 1997;96:1089-1096

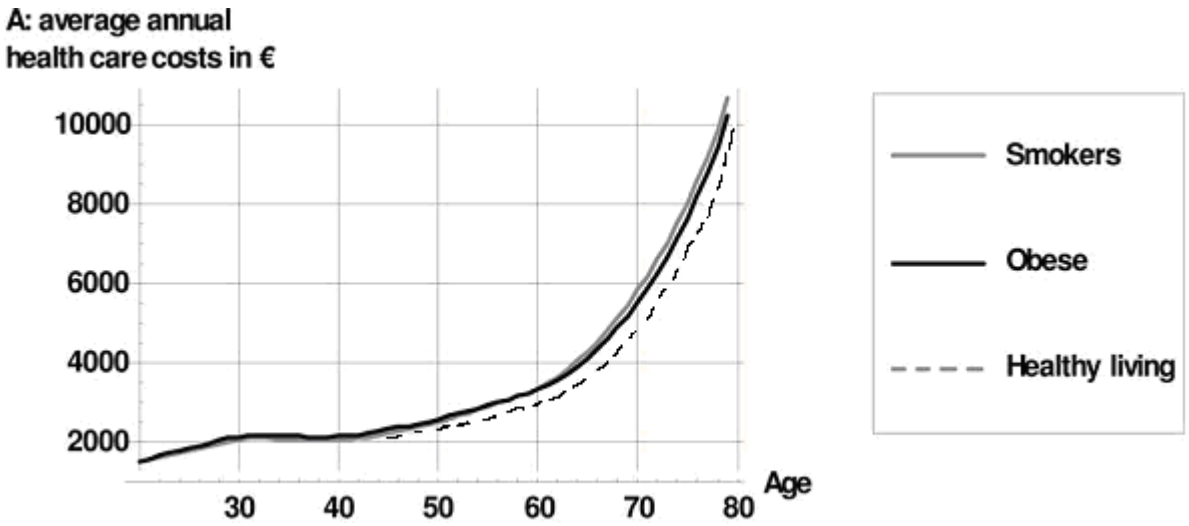
[56] Paul A Fishman, Zeba M Khan, Ella E Thompson, and Susan J Curry:Health Care Costs among Smokers, Former Smokers, and Never Smokers in an HMO

[57] Manning, W. G., *et al*. (1989). The taxes of sin: Do smokers and drinkers pay their way? *Journal of the American Medical Association, 261*, 1604-1609.

[58] Milbank Q. 1992;70(1):81-125. Cigarette smoking and lifetime medical expenditures.

[59] Despite the fact that the link between the consumption of tobacco products and health cost savings is not necessarily linear as smoking and other risky health behaviours, such as drinking alcohol or food disorders, could be to some extent substitutable. However there is no evidence that the population of non-smokers is more prone to any kind of behaviour linked to increased health risks than smoker's population.

Figure 3.1: Average annual health care cost in Netherlands



Source: Van Baal et al, 2008[60]

However some recent studies[61,62] in this field have argued that the non-smoking population as a whole is more expensive than the smoking population because the annual cost per capita ignores the differences in longevity between smokers and non-smokers. Non-smokers live longer and therefore incur more costs over their lifetime due to diseases not related to smoking, particularly in old age, when these costs are the highest. As the differences in life expectancy are substantial, more non-smokers live to old age than smokers. In the age group of 70 and above, the lower per capita cost of non-smokers is outweighed by the greater number of non-smokers requiring treatments of age related, mostly chronic, diseases.

In this context, it is noteworthy that, within a longer evaluation period, the reduction of health care costs attributable to reduced smoking gradually decreases. According to this study the break-even year, when the initial benefit is balanced by the eventual cost at the society level, has been estimated to occur after 26 years of follow-up[63].

Ageing is one of the greatest social and economic challenges of the 21st century for European societies. The EU strives to help citizens age in good health, and live active and independent lives[64]. Our society is clearly willing to spend money on not only on additional life years but also on healthier life years. Therefore, the evaluation of interventions within tobacco control policy should not be restricted to a comparison of "total costs", but it should rather, or at least also, look at cost-effectiveness. The analysis reveals the costs per gained life year. In this respect it is important to note that in the area of smoking cessation, favourable **cost-**

[60] Van Baal et al. Lifetime Medical Costs of Obesity: Prevention No Cure for Increasing Health Expenditure PLoS Med. 2008 February; 5(2): e29.
[61] The Health Care Costs of Smoking, Jan J. Barendregt, M.A., Luc Bonneux, M.D., and Paul J. van der Maas, Ph.D.N Engl J Med 1997; 337:1052-105
[62] van Baal PHM, Polder JJ, de Wit GA, Hoogenveen RT, Feenstra TL, et al. (2008) Lifetime medical costs of obesity: Prevention no cure for increasing health expenditure. PLoS Med 5(2): journal.pmed.0050029
[63] Discounting of the projected costs and benefits has a greater impact as the costs become more distant in time and brings the "break-even" further into the future.
[64] http://ec.europa.eu/health/ageing/policy/index_en.htm

effectiveness results have been shown even if increased medical costs in life-years gained are taken into account[65].

Thus, even if recent studies are correct when arguing that over their lifetime the total health care costs of non-smokers are higher than those of smokers, any intervention leading to reduced smoking would beneficial, as it would yield a **very high return in health for the money invested**. An effective antismoking policy is thus cost-effective.[66]

In conclusion, it is fair to say that a reduction of consumption by 2% would result in savings to EU Governments of 506 mEUR per year. Whilst over a longer time period and presupposing a very successful tobacco control policy the benefits of smoking cessation are expected to reduce/diminish, it is important to underline that tobacco control policy is certainly a very cost-effective measure to improve public health.

A.5.2.3.1.3. Increased productivity

Smoking also has an important impact on the productivity of the paid workforce. Smoking reduces the size of the available workforce as a result of smoking-attributable deaths and illnesses causing premature retirement. It also increases the absenteeism resulting from smoking-attributable sickness or injury. **A reduction in smoking consumption is expected to reduce these productivity losses**.

Premature retirements and deaths

Table 3.6 presents estimates of the **loss of productivity from premature retirements and deaths** in the EU which are caused by smoking. The total annual costs for the economy in the EU caused by absenteeism due to smoking are 6.1 bEUR. These losses are estimated for the paid workforce. The calculations are based on estimates of years lived with disability (YLD),[67] estimated inactivity due to smoking related diseases (number of people in retirement due to smoking) and average labour costs in business economy.[68] As with the preceding cost estimates for health care, these are net estimates, and show the amount of resources which would have been available if there had been no tobacco-attributable productivity losses.

65 David Hoeflmayr, Reiner Hanewinkel. (2008) Do school-based tobacco prevention programmes pay off? The cost-effectiveness of the 'Smoke-free Class Competition'. Public Health 122:1, 34-41.
66 Jacobs-van der Bruggen MA, Bos G, Bemelmans WJ, Hoogenveen RT, Vijgen SM, et al. (2007) Lifestyle interventions are cost-effective in people with different levels of diabetes risk: results from a modeling study. Diabetes Care 30: 128–134.
van Baal PH, Hoogenveen RT, de Wit GA, Boshuizen HC (2006) Estimating health-adjusted life expectancy conditional on risk factors: results for smoking and obesity. Popul Health Metr 4: 14.
van Baal PH, Feenstra TL, Hoogenveen RT, Ardine de Wit G, Brouwer WB (2007) Unrelated medical care in life years gained and the cost utility of primary prevention: in search of a ''perfect'' cost-utility ratio. Health Econ 16: 421–433.
67 WHO estimates, 2004
68 Eurostat data, 2009

Table 3.6: Estimated number of retirements due to smoking

Disease category	Total inactive persons due to long-term sickness or disability	Inactive due to smoking-related diseases	Of which: attributable to smoking	Economic loss due to smoking-related incapacity (million EUR)
Lung cancer	n.a.	11,482	9,664	359
Upper aerodigest. cancers	n.a.	5,694	3,027	109
Other cancers	n.a.	153,392	10,617	390
Cardiovascular diseases	n.a.	214,922	141,131	3,929
COPD	n.a.	235,804	22,560	780
Other respirat. diseases	n.a.	156,868	15,127	514
Total	**8,017,872**	**778,162**	**202,127**	**6,081**

Source: GHK, 2012

Table 3.7 shows how the estimated losses caused by premature retirement and deaths would decrease with the different percentage reductions in tobacco consumption. The net annual benefits resulting from a 2% decline in consumption are expected to amount to **122 million EUR (productivity gains)**.

Table 3.7: Estimated productivity losses caused by early retirements due to smoking

	Economic losses (caused by early retirement, deaths) with different percentage reduction in tobacco consumption				
	1%	**2%**	**3%**	**4%**	**5%**
Economic loss form early retirement and deaths due to smoking (mEUR)	6,020	5,959	5,898	5,837	5,776
Net benefit (mEUR)	61	122	183	244	305

Source: own calculation

Absenteeism during active work life

Decreased on-the-job productivity and employee absence because of smoking related diseases result in an additional cost factor to employers.

It has been well documented[69] that smokers have a higher rate of workplace absenteeism than non-smokers. Based on GHK calculations[70], an estimated **93 million days were reported as being missed** by adults in the EU due to smoking-related diseases in 2009. The smoking attributable fraction was calculated based on estimates of the number of days lost to disease (DLD) suffered by smokers that could be directly attributed to their smoking.

Absenteeism costs were calculated using the "**lost wages method**" (based on the average daily earnings rate for employed persons), the most frequently used method to measure

[69] The health consequences of involuntary exposure to tobacco smoke: a report of the Surgeon General", 2006 for a summary of clinical evidence (U.S. Department of Health and Human Services 2006) Bush and Wooden (1994)

[70] Eurostat data; calculation based on absenteeism data from 3 countries (AT, NL, DE) during 2007-2010

productivity loss[71], suggesting productivity loss of € 2.2 billion in the EU from absenteeism due to smoking. Table 7 provides a detailed breakdown of smoking attributable absenteeism per MS and diagnosis.

Table 3.8: Estimated loss from smoking-induced absenteeism in 2009 (mEUR)

Country	Neoplasms	Respiratory diseases	Cardiovascular diseases	Total
Austria	3.3	18.3	6.3	28
Belgium	14	60.4	36.5	111
Bulgaria	0.4	2.7	1.2	4
Cyprus	0.2	0.8	0.4	1
Czech Republic	3	18.2	9	30
Denmark	9.5	56.9	35.4	102
Estonia	0.2	1.8	0.6	3
Finland	5	23.1	12.6	41
France	43.5	194.4	105.7	344
Germany	38.6	157.4	132.8	329
Greece	2.9	12.8	6.9	23
Hungary	2.7	18.8	8.2	30
Ireland	2.5	16.4	8.9	28
Italy	25.7	112.7	53.6	192
Latvia	0.3	2.7	0.9	4
Lithuania	0.4	3.4	1.2	5
Luxembourg	0.3	1.3	1	3
Malta	0.1	0.2	0.2	0
Netherlands	30.4	160.4	95.1	286
Poland	9.2	55	29.9	94
Portugal	3.6	13.8	7.5	25
Romania	0.9	7.3	2.5	11
Slovakia	1.2	7.1	3.2	11
Slovenia	1.4	6	3.7	11
Spain	16.7	54.8	29.8	101
Sweden	6.5	37.3	23.6	67
United Kingdom	26.4	158.8	94.2	279
EU 27 total	**249**	**1203**	**711**	**2162**

Source: GHK, 2011

Table 3.9: Reduction of loss from smoking-induced absenteeism (mEUR)

	Economic losses due to absenteeism with different percentage reduction in tobacco consumption				
	1%	2%	3%	4%	5%
Economic loss from absenteeism due to smoking (mEUR)	2140.4	2118.8	2097.1	2075.5	2053.9
Net benefit (mEUR)	21.6	43.2	64.9	86.5	108.1

Source: own calculation

Table 3.9 shows how the estimated **losses caused by absenteeism** would decrease, if tobacco consumption decreased. More specifically, the net annual benefits of 2% decline in consumption would result in savings of **43 million EUR**.

[71] Mattke S. Balakrishnan A. Bergamo G. Newberry SJ. A review of methods to measure health-related productivity loss. *Am J Managed Care*. 2007;13:211–217.

Production losses in the household sector

Smoking-attributable sickness or death causes production losses not only in the paid workforce but also in the unpaid household sector. The total economy of a nation consists of both market and non-market sectors. The non-market sector uses through an unpaid capacity considerable human resources for the production of goods and services which are directly consumed by households without going through the market. These activities, though productive, are in almost all cases not included in conventional national accounts statistics and thus not considered for this analysis. For the purpose of this impact assessment they are just mentioned, but not monetised.

Conclusion

Smoking causes a loss of national productive capacity in the paid workforce as a result of smoking-attributable death and sickness. As a result of a 2% decline in tobacco consumption, **smoking related productivity losses to the EU economy would decrease by € 165 million annually**. Taking into account that the retirement age is expected to increase in the years to come, this figure is expected to increase significantly, but to maintain a conservative approach, the figures have not been amended.

A.5.2.3.1.4. Conclusion on the advantages

The overall benefits for Governments and society resulting from a reduction of tobacco consumption are summarised in the table below:

Table 3.10: Overall benefits for Governments and society (in million EUR)

	Different percentage reduction in tobacco consumption				
	1%	2%	3%	4%	5%
Decrease in health care expenditures	253	506	759	1,012	1,265
Increased productivity	83	165	248	331	413
- due to less early retirement / deaths	61	122	183	244	305
- due to less absenteeism	22	43	65	87	108
Decrease in premature mortality costs	5,167	10,334	15,501	20,669	25,836

Source: own calculation based on the above described analysis

A.5.2.3.2. Budgetary impact

Sales of tobacco products allow Member States to generate significant tax revenues. Governments collect **excise duties, VAT** and upon importation customs duties on tobacco products.[72] For the purpose of this Section, it was considered appropriate to concentrate on the excise duties collected. Custom duties are negligible considering minimal market share of manufactured tobacco products imported from third countries. Disregarding VAT appears justified as money not spent on tobacco products is expected to be spent on other goods and/or services, which in turn generate VAT. From this perspective, a reduction in tobacco consumption should be "VAT neutral".

Conventional wisdom would suggest that a decline in tobacco consumption will lead to a decline in Governments' revenues. Accordingly, tax revenues of Member States would

[72] EU legislation allows Member States to exclude customs duties from the basis for calculating the ad valorem excise duty on cigarettes.

decline when tobacco consumption decreases. However, in reality, Member States' tax revenues increased over recent years despite decreasing tobacco consumption. This is due to the fact that Member States have introduced higher tax levels over recent years. This will be further explained in this section.

Table 3.11: EU-27 revenues from excise duty (cigarettes + RYO) in 2010

Member State	Pack of 20 cigarettes				2010 Excise duty collected incl. RYO (mEUR)
	Weighted average retail price incl. taxes	Excise duty	All duties (excise + VAT)	Net retail price excl. Taxes	
IE	8.47 €	5.23 €	6.65 €	1.82 €	1,160
UK	6.27 €	4.61 €	5.65 €	0.62 €	10,153
FR	5.40 €	3.47 €	4.35 €	1.05 €	10,359
SE	4.97 €	2.81 €	3.80 €	1.17 €	852
NL	4.73 €	3.12 €	3.88 €	0.86 €	2,407
DK	4.65 €	2.82 €	3.75 €	0.90 €	1,105
DE	4.60 €	2.82 €	3.63 €	0.96 €	13,478
BE	4.53 €	2.69 €	3.48 €	1.05 €	1,987
FI	4.32 €	2.60 €	3.41 €	0.92 €	691
IT	4.10 €	2.39 €	3.07 €	1.03 €	10,622
AT	3.79 €	2.27 €	2.90 €	0.89 €	1,502
MT	3.76 €	2.33 €	2.90 €	0.86 €	70
LU	3.60 €	2.06 €	2.53 €	1.07 €	2,099
PT	3.45 €	2.28 €	2.66 €	0.79 €	1,429
ES	3.33 €	2.15 €	2.66 €	0.67 €	8,023
CY	3.27 €	2.11 €	2.54 €	0.73 €	199
EL	3.13 €	2.04 €	2.62 €	0.51 €	2,913
CZ	2.78 €	1.65 €	2.12 €	0.66 €	1,616
SK	2.66 €	1.72 €	2.17 €	0.49 €	614
SI	2.64 €	1.60 €	2.04 €	0.60 €	391
RO	2.39 €	1.60 €	1.88 €	0.51 €	1,345
PL	2.32 €	1.53 €	1.97 €	0.35 €	4,250
BG	2.25 €	1.55 €	1.93 €	0.32 €	777
LV	2.21 €	1.46 €	1.86 €	0.36 €	130
HU	2.21 €	1.34 €	1.78 €	0.43 €	925
EE	2.21 €	1.49 €	1.86 €	0.34 €	115
LT	2.16 €	1.30 €	1.68 €	0.48 €	160
EU 27					**79,369**

Source: EC, DG Taxud, 2010

The expected reduction of excise duties applying conventional wisdom

Revenue from excise duty on the sale of tobacco products in EU was about € 79 billion in 2010, contributing almost 3% to total Government revenues. Most of these revenues were generated by cigarettes (€72 billion).

Table 3.12: Loss revenues from excise duties

	Excise tax revenues with different percentage reduction in tobacco consumption				
	1%	**2%**	**3%**	**4%**	**5%**
Projected excise tax revenues (mEUR)	78,575	77,781	76,987	76,193	75,399
Decrease in excise tax revenues (mEUR)	794	1,588	2,382	3,176	3,970

Source: DG TAXUD, own calculations

As consumption of FMC and RYO is expected to decline, fewer tobacco products will be purchased and excise duty will decline (Table 3.12). Applying a linear approach, the **projected decrease in consumption of 2% would lead to lower excise tax revenues of 1.6 billion EUR**.

It should be underlined that this is a conservative/**worst case scenario** as the calculations do not take into account that – as a result of measures proposed in PA4b (cross border internet sales) and PA5 (measures addressing illicit trade) - certain sales currently occurring in the illicit part of the market are expected to return to the licit part of the market.

Possible tax increases

The calculations are also a "worst case scenario" for another reason. They do not take into account that Member States can react to decreased tax revenues with tax increases. In fact, **Member States are expected to take action to mitigate the negative impact on public budgets caused by lower tobacco consumption**, as they have done in the past.

Table 3.13: Excise duty from tobacco products collected by MS's

Member State	2002	2003	2004	2005	2007	2008	2009	2010
AT	1296.9	1328.7	1317.9	1339.7	1446.2	1424.5	1457.6	1502.0
BE	1255.0	1395.7	1409.4	1425.2	1559.5	1532.0	1529.5	1686.6
BG					687.4	875.3	901.9	762.9
CY			142.6	131.1	180.4	191.4	185.1	186.5
CZ			658.6	827.0	1666.9	1410.6	1375.1	1576.3
DE	13205.5	13353.0	12544.9	12386.9	12861.9	12260.6	11950.8	11991.6
DK	923.5	937.2	856.7	894.8	913.9	912.1	935.9	1042.8
EE			58.7	70.1	96.3	95.9	131.1	110.9
EL	2126.8	2248.1	2241.5	2257.1	2581.3	2516.2	2566.2	2913.0
ES	5144.9	5537.1	5836.3	6150.8	7169.7	7371.3	7452.8	7689.6
FI	535.1	528.1	538.0	544.2	563.7	570.1	614.0	628.6
FR	8628.6	8828.0	9244.0	9851.0	9380.0	9550.4	9894.5	9393.2
HU			681.1	675.7	956.8	1000.7	1055.4	787.7
IE	1121.0	1137.1	1042.9	1067.1	1177.5	1156.6	1201.9	1145.5
IT	7790.0	7993.0	8636.0	8912.0	9938.3	10256.9	10341.0	10426.4
LT			62.4	74.4	117.5	197.6	199.0	159.0
LU	352.0	381.5	458.8	372.4	415.0	439.1	413.2	406.7
LV			40.5	62.0	105.7	204.8	160.0	126.6
MT			57.3	60.2	56.7	60.4	62.9	68.2
NL	1380.3	1439.1	1597.6	1409.4	1717.0	1767.0	1809.0	1869.0
PL				2408.3	3521.6	3737.6	3856.5	4249.7
PT	1153.0	1215.2	1016.6	1309.8	1209.2	1276.1	1115.4	1395.6
RO					918.7	1081.2	1261.5	1345.3
SE	751.6	740.6	717.6	731.0	823.8	799.3	739.4	798.7
SI			226.0	247.0	299.6	341.8	362.0	389.1
SK			188.8	289.6	685.8	388.5	507.3	610.1
UK	12237.4	11608.9	10813.0	10741.6	11147.7	10232.0	8374.6	9257.4
EU-25				**64238.2**	**72198.0**	**71649.8**	**70453.7**	**72518.8**
EU-xx total	57901.7	58671.3	60387.1	64238.2	72198.0	71649.8	70453.7	72518.8

Source: EC, annual reports published by DG Taxud

The relatively low price elasticity of cigarette demand implies that a tax increase will in most cases secure higher revenues, and which is supported by research in a variety of contexts. In developed countries, demand for tobacco products decreases at around half the rate of price

increases.[73] Therefore, **price and/or tax increases normally result in the generation of additional revenues**.

The fact that tax revenues of Member States from tobacco have been stable in the past or even increasing can also be seen from the table 3.13. **While the number of FMC released for consumption in the EU 27 (ex RO) declined by 24% between 2002 and 2010, the revenues increased by more than 28% in the same period** (EU 27, ex RO and BG).[74] Reducing tobacco consumption does therefore not necessarily lead to a negative impact on public budgets in form of reduced excise duties (for VAT see above).

A.5.2.3.3. Summary

Taking into account the four main socio-economic factors (public health, health care expenditures, productivity loss and tax revenues), the **annual net benefits to the EU would amount to 9.4 billion EUR**, based on the assumption that smoking consumption will decrease by 2% (Table 3.14). The table includes estimates of both true economic benefits (i.e. reductions in health care expenditures, productivity losses, and premature mortality) as well as changes in excise tax revenues collected by Governments. Reductions in excise tax revenues do not, however, represent an actual benefit to society as a whole but rather a transfer of resources from one sector of society to another (i.e. from consumers to the state, or vice versa). A reduction in excise tax revenues (which is moreover very unlikely, see explanation above) does not thus constitute a true cost to society. However, it still represents a significant economic effect for the government and therefore it is included in the summary table below.

Table 3.14: Overview of costs and benefits from the societal and Governmental perspective (mEUR)

	Different percentage reduction in tobacco consumption				
	1%	**2%**	3%	4%	5%
Decrease in excise tax revenues[75]	-794	**-1,588**	-2,382	-3,176	-3,970
Decrease in health care expenditures	253	**506**	759	1,012	1,265
Decrease of productivity loss	83	**165**	248	331	413
- due to early retirement / deaths	61	**122**	183	244	305
- due to absenteeism	22	**43**	65	87	108
Decrease in premature mortality costs	5,167	**10,334**	15,501	20,669	25,836
Overall net benefit	4,709	**9,417**	14,126	18,836	23,544

Source: own calculations

A.5.2.3.4. Social discounting

Discounting is used to allow comparisons between benefits and costs that occur in different time periods by expressing their values in present terms. In the analysis above, it is assumed that the costs and benefits of the policies occur simultaneously and their relative values do not change over time. All amounts are expressed in the present value, e.g. changes of the health care costs are calculated from the actual present values and are thus in principle expressed in

[73] Curbing the Epidemic: Governments and the Economics of Tobacco Control, World Bank Development in Practice series. 1999. Washington DC.
[74] Calculation, based on unpublished data, provided by DG TAXUD
[75] Disregarding measures taken against illicit trade and possibility to increase tax levels.

current prices.[76] Therefore, in order to calculate the future value of current health care costs in year 5 after the implementation of the revised TPD (using the appropriate discount rate), the current cost would need to be increased to accommodate for inflation in the health care sector. This figure would then subsequently need to be discounted back to the present value, using a general inflation rate. For these reasons, the basic calculations are non-discounted. However, in order to account for individual or social rates of time preference, present values of the future benefits and costs can be calculated by employing the appropriate social discount rates.

The discount rate is not likely to affect the present value of the benefits and costs for those cases in which costs and benefits of a policy occur simultaneously and their relative values do not change over time. On the other hand, social discounting is applied in order to compare benefits and costs that occur at different times based on the rate at which society is willing to make such trade-offs. Discounting may substantially affect the present values of costs and benefits when there is a significant difference in the timing of realisation of costs and benefits. As this might be the case in tobacco control policies, which usually deliver some of their expected benefits with a certain time delay, three scenarios have been developed. The table below gives an overview of the scenarios in terms of time delays for two major benefits (i.e. decrease in morbidity induced costs and mortality).

Table 3.15 Alternative scenarios of time delays for morbidity and mortality benefits

Scenario 1	All the costs and benefits realised in year 5 are plainly discounted to the net present value.
Scenario 2	All the costs and benefits are discounted for the period of 5 years except the benefits from reduced premature mortality which are discounted for the period of 25 years[77]
Scenario 3	The costs from decrease in excise tax revenues are discounted for 5 years, the benefits from decrease in health care costs and productivity loss are discounted for 10 years and the benefits from reduced premature mortality are discounted for the period of 40 years[78]

Discount rate

Considering that costs and benefits can be represented as changes in consumption profiles over time, discounting should be based on the rate at which society is willing to postpone consumption today for consumption in the future. Thus, the rate at which society is willing to trade current for future consumption, or the social rate of time preference, is the appropriate discounting concept[79]. One common approach to estimating the social rate of time preference is to approximate it from the interest rates for **long-term, risk-free assets such as**

[76] Assuming their nominal increasse in line with general inflation rate.
[77] While the evidence suggest that the health consequences of smoking occur in relatively short period, the change in mortality rates is usually observed two decades later.
Lopez AD, Collishaw NE, Piha T.A descriptive model of the cigarette epidemic in developed countries. Tobacco Control 1994; 3: 242-247.www.who.int/tobacco/statistics/country_profiles/en/Introduction.pdf
[78] As incidence of some smoking related diseases increases with age, it can be argued that the social benefits of smoking cessation could be observed with additional delay if only the youngest population would be responsive to the proposed measures.
[79] EPA, Guidelines for Preparing Economic Analyses, December 2010.
http://yosemite.epa.gov/ee/epa/eerm.nsf/vwAN/EE-0568-06.pdf/$file/EE-0568-06.pdf

government bonds. The rationale behind this approach is that this market rate reflects how individuals discount future consumption and Government should value policy-related consumption changes as individuals do. In other words, the social rate of discount should equal the consumption rate of interest.

The overall net benefit of reduction in tobacco consumption by 1% for different scenarios and for various discount rates is calculated in table 3.16. The interests of the long term government bonds of Germany, UK and France fluctuate in the range of 2-3%.[80] We approximate the social rate of time preference at the level of 3%, which is for the purposes of our analysis a rather conservative assumption.

Considering the social discount rate corresponding with market interest rates of long term risk-free governmental bonds issued by major Member States, the annual net overall discounted benefit arising from a reduction in tobacco consumption by 2% would amount to 4.0 bEUR under the most likely scenario, i.e when decrease in tax revenues and health care/absenteeism savings are observed during the 5 years after implementation, while on average the benefits from reduced premature mortality accrue only in 25 years.

Table 3.16: Net present values of future benefits and costs (corresponding with 1% decrease in consumption) for different scenarios and discount rates

Overall benefits	Discount rate				
	1%	2%	3%	4%	5%
Non-discounted	4,709	4,709	4,709	4,709	4,709
Scenario 1	4,471	4,250	4,038	3,834	3,638
Scenario 2	3,578	2,700	2,016	1,486	1,077
Scenario 3	3,000	1,857	1,092	584	245

Source: own calculation

The conservative scenario 3 can cater for sensitivity analysis and even with the highest considered discount rate the **cost/benefit ratio remains positive**, with a corresponding net present benefit of 0.49 bEUR.

A.5.2.4. Impact of the reduction in consumption on employment

A.5.2.4.1. Input-output model

In order to evaluate how the reduction in consumption impacts on employment, the so called input-output model[81] was used. Input-output analysis is a means **of examining relationships within an economy**, both between businesses and between businesses and final consumers. The analysis captures all monetary market transactions for consumption in a given time period. The resulting mathematical formula allows the examination of the effect of a change in one or several economic activities on the entire economy. The core of the analysis is the

[80] Rates as of May 2012; www.bloomberg.com/markets/rates-bonds/government-bonds;

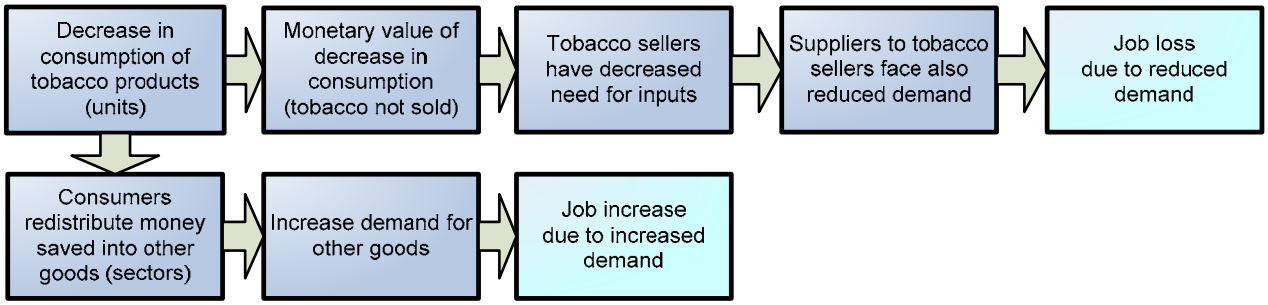
[81] I-O analysis is a well-established method for estimating economy-wide effects from a change in demand from one particular industry (Beyer et al, 2000). Conceptually, the I-O model estimates the direct and indirect effects associated with a change in demand for a particular industry. Economics of Tobacco Control Toolkit, Worlbank 1999. http://web.worldbank.org/wbsite/external/topics/exthealthnutritionandpopulation/extetc/0,,contentmdk:20365047~menuPK:478898~pagePK:148956~piPK:216618~theSitePK:376601,00.html

creation of input-output tables. These tables describe the flow of goods and services in the economy in a matrix form.

The **World Bank recommends** the input/output model as one of the preferred methodologies for estimating economy-wide effects from a change in demand from one particular industry while acknowledging its limitations, including the static nature of the model. For example, it does not account for technological development leading to increased production in a certain industry sector without increased the employment. Cigarette manufacturing is highly automatized, and numerous examples have shown that jobs in cigarette manufacturing have fallen dramatically as a result of upgrading to new more capital-intensive technology, even with increases in production levels.[82] Conversely, service oriented industries are more work intensive and employment levels follow to a larger sector output.

Three different matrices are used for a standard input-output model. The inter-industry transaction matrix describes the flow of goods and services between all individual sectors of an economy in a given year. The direct requirement matrix indicates the requirements for a particular industry to produce an average unit output. The total requirement matrix indicates the total requirements of all industries necessary for that industry to deliver a unit of output to final demand.

Figure 4.1: Conceptual I/O model



Source: Matrix 2012

The model assumes that **money not spent on tobacco is spent on other goods and services** according to consumers' existing (average) expenditure patterns. To simulate the change in employment from a reduction of tobacco consumption, the amount of expenditure released from tobacco spending is distributed according to an assumed expenditure pattern and then applied to the static input/output (I/O) model. The model contains interdependencies or relationships between industry sectors in the economy and is used to simulate the impact of an external policy change (i.e. change of which the consequence is a reduction of tobacco consumption) on outputs and employment of each sector of the economy (Figure 4.1).

Calculations

If consumers forgo tobacco products they will spend the money they would have spent on tobacco products on other goods and services (for example on food, beverages, clothing, cinemas, and hotels). These sectors will therefore see an increase in demand for their products/services and thus increase their expenditure on inputs. This has a knock-on effect in all associated industries. The **overall impact on the economy** of a reduction in tobacco

[82] http://ec.europa.eu/health/archive/ph_determinants/life_style/tobacco/documents/world_bank_en.pdf

consumption is therefore the net effect on employment due to both reduced demand/consumption of tobacco products and increased demand/consumption of non-tobacco products.

Table 4.1: Increased spending on other products as a result of a reduction in tobacco consumption (mEUR, 2010)

Expenditure categories	Spending pattern of a recent ex-smoker	Increase in consumption of non-tobacco products with different reductions in tobacco consumption				
		1%	2%	3%	4%	5%
Food products and beverages	22.90%	43.1	86.2	129.3	172.4	215.5
Clothing; furs	7.80%	14.7	29.4	44.1	58.8	73.5
Housing, electrical energy, gas, steam and hot water	24.40%	46	92	138	184	230
Furniture; other manufactured goods n.e.c.	6.50%	12.2	24.4	36.6	48.8	61
Health and social services	5.60%	10.5	21	31.5	42	52.5
Motor vehicles, trailers and semi-trailers	6.10%	11.6	23.2	34.8	46.4	58
Other transport equipment	6.10%	11.6	23.2	34.8	46.4	58
Post and telecommunication services	2.50%	4.7	9.4	14.1	18.8	23.5
Recreational, cultural and sporting services	6.10%	11.5	23	34.5	46	57.5
Education services	0.70%	1.4	2.8	4.2	5.6	7
Hotel and restaurant services	5.70%	10.7	21.4	32.1	42.8	53.5
Other services	5.60%	10.5	21	31.5	42	52.5
Total	**100%**	**188.5**	**377.0**	**565.5**	**754.0**	**942.6**

Source: Matrix report 2011; data on spending pattern by York (1995)

As stated in Section 2, the **EU-27 tobacco market at retail level including taxes is worth 130.6 bEUR.**[83] Thus, a 1% reduction in tobacco consumption would mean 1.3 bEUR less spent on tobacco. However in order to establish the impact on the economic stakeholders it is essential to remove the part of the turnover associated with taxes not least as it is assumed that Member States might use the possibility to increase the tax rates to maintain the revenues (VAT and excise duties).[84] Additionally, the distribution margin of wholesalers and retailers cannot be attributed to the tobacco manufacturers (in total 40%). In this light, the calculations are based on the assumption that the tobacco industry experiences reduced revenues of about 188 mEUR for each per cent of reduced consumption.

[83] The value of the domestic tobacco market is based on the value of consumed cigarettes and roll your own tobacco. A large proportion of this comprises tax payments.

[84] It is true that once consumers forgo tobacco products, they will save and consequently spend total amount of money including taxes. However, similarly the governments would use/spend/redistribute the taxes which ultimately will end up in the economy.
For the purpose of this impact assessment it was considered that - on a weighted average basis - taxes (excise + VAT) account for 77.4% of the final retail price across the EU-27; DG Taxud data + VAT rates in MS

Table 4.1 shows how **consumers are expected to spend the money they save on tobacco**. Like in previous sections, the presentation is based on different scenarios from a drop in consumption of 1 to 5%, i.e. between 188 to 942 mEUR. The table outlines corresponding increases in expenditure by sector due to a reduction in tobacco consumption.

The York study provides the most extensive insight into actual spending patterns of recent ex-smokers and shows how they spend their additional money (not spent on tobacco) on day to day products such as food and beverage, clothing, recreational activities, restaurants, and other services. Considering the fact that spending patterns have probably further evolved since 1995, the impact of the various spending patterns on the overall results of the model was tested using several different scenarios of expenditure patterns, i.e. for general consumer (Eurostat data, 2009), for recent ex-smoker adjusted[85] and for consumers with a hypothetical spending pattern[86]. Table 4.2 shows how the net impact on output and employment changes for the different spending scenarios. The sensitivity analysis confirms that the choice of spending patterns in the sensitivity testing do not significantly alter the outcomes of the overall analysis.

Table 4.2: Economy-wide impact on output & employment using different spending patterns (mEUR, 2010 prices)

Spending patterns	**Impact on production** (reduction in tobacco consumption)	**Impact on production** (increase in non-tobacco consumption)	**Net effect on production**	**Employment impact** (reduction in tobacco production)	**Employment impact** (increase in non-tobacco production)	**Net effect on employment**
Ex-smoker	- 290	+ 320	+30	-1,426	+ 1,984	+558
General consumer	- 290	+310	+20	-1,425	+ 2,002	+577
Ex-smoker adjusted	- 290	+340	+50	-1,430	+ 2,237	+807
Hypothetical scenario	- 290	+310	+20	-1,433	+ 2,413	+980

Source: Matrix report, 2012

The above change in the **pattern of consumption** will cause a corresponding change in the pattern of production (input-output model used) which is shown in tables 4.3 and 4.4. It demonstrates that a 188 mEUR reduction in tobacco consumption results overall in 575 mEUR reduction in production in the economy[87], whilst the corresponding increase in consumption of other goods and services amounts to 634 mEUR (net positive effect: around 59,4 million EUR). The impact on overall production in the economy due to a reduction in consumption of tobacco products by 2% thus leads to net gains of 119 mEUR.

[85] The spending patterns for the York study had a significant percentage allocated to housing, electricity, and healthcare. To test the impact of this distribution, the spending pattern was adjusted to remove these categories

[86] The hypothetical spending pattern was based on assuming consumers would spend their additional money only on day to day products, i.e. food and beverages, clothing, recreational activities, restaurants, and other services

[87] The fact that 188 million EUR loss to the tobacco industry generates a 575 million EUR loss overall is due to the fact that the input/output model accounts for direct and indirect effects.

Table 4.3: Production patterns (mEUR, 2010 prices)

	Different percentage of reduction in tobacco consumption				
	1%	2%	3%	4%	5%
Monetary impact of reduction in tobacco consumption	-575.0	-1150.0	-1725.0	-1725.0	-2875.0
Monetary impact of increase in expenditure for other goods	634.4	1268.7	1903.1	1903.1	3171.9
Net effect on output	59.4	118.9	179.6	239.0	298.5

Source: Matrix report 2012; I-O model calculations

The fact that spending on non-tobacco goods and services results in an increase in net production is partially explained by the fact that the tobacco sectors are less input intensive[88].

A.5.2.4.2. Impact on employment

The impact on employment levels is estimated by applying the employment-output ratios for different industries to the changes in production in each industry. The employment-output ratio provides an estimate of the value of each employee within an industry. It is calculated by taking the total market value for each industry across EU-27 and dividing by the total number of employees in that industry across EU-27.

Table 4.4 below shows the change in employment in each industry associated with a 1% reduction in tobacco consumption. It demonstrates that the reduction in production caused by the fall in tobacco consumption will result in a loss of 2,854 jobs. The corresponding increase in consumption on non-tobacco products results in a gain of 3,972 jobs. The impact on employment due to a reduction in tobacco consumption by 1% is thus equivalent to an increase of 1,118 jobs. When comparing production and employment together it is clear that the relationship between production and employment is not linear. The analysis shows that a small gain in production within non-tobacco sectors results in a larger gain in employment. This observation is explained by the fact that non-tobacco sectors which have an increase in production are associated with smaller employment output ratios (i.e. are less capital and more labour intensive).

As explained above, the economy will adjust over time, and broad-scale long-term impacts are unlikely. In this respect, it is important to recall that tobacco consumption will not decrease overnight, but over a longer period of time. By the same token the additional expenditure in other sectors will only be felt over time.

[88] The value added of an industry refers to things such as fixed capital and operating surplus. It would be expected that industries such as tobacco which are heavily dependent on machinery would invest more in items such as fixed capital. In comparison industries which are less machinery dependent most likely rely more on raw inputs such as agriculture to produce food and beverage products. Within the I-O model industries which are less input intensive result in smaller multipliers. As the non-tobacco sectors are more input intensive than the tobacco industry, spending on these goods results in larger multipliers generating an output gain.

Table 4.4: The sectoral impact on production/employment associated with a reduction in consumption of 1%[89]

Industry	Monetary impact of reduction in tobacco consumption (mEUR)	Monetary impact of increase in exp. for other goods (mEUR)	Net effect on output (mEUR)	Employment impact of reduction in tobacco expenditure	Employment impact of increase in exp. for other goods	Net effect on employment
Agriculture	-24.8	16.9	-7.9	-589.8	399.2	-190.6
Mining and petroleum	-1.8	6.4	4.6	-8.4	33.6	25.8
Food industries	-12.1	66.6	54.5	-67.2	366.9	299.7
Tobacco[90]	-196.6	0.2	-196.5	-731.9	0.6	-731.3
Textile	-2.3	21.6	19.3	-22.6	280.4	258.4
Leather products	-0.5	0.9	0.5	-3.9	7.1	3.9
Wood and wood products	-3.3	18.0	14.7	-32.3	206.7	174.4
Paper products and printing	-17.9	7.2	-10.7	-68.5	27.8	-40.7
Chemical products	-11.2	14.4	3.3	-17.4	21.3	3.9
Rubber products	-3.3	5.0	1.7	-20.7	31.0	11.0
Metal and non metal products	-4.1	9.1	5.0	-16.2	35.5	18.7
Basic metal products	-4.0	7.9	3.9	-29.7	59.4	29.1
Machinery	-5.4	9.2	3.9	-28.4	48.5	20.0
Transport devices	-24.5	57.3	32.8	-138.9	288.1	149.9
Miscellaneous	-1.5	2.9	1.4	-28.4	60.7	32.3
Electricity	-11.0	70.2	59.2	-36.8	214.5	177.7
Construction and maintenance	-10.3	13.4	3.0	-97.5	127.3	29.1
Finance and trade and insurance	-18.0	17.8	-0.1	-98.8	98.2	-1.3
Wholesale and retailing	-33.2	44.3	11.1	-355.3	432.2	76.9
Services	-95.2	136.4	41.3	-436.7	1204.1	767.4
Private households with empl. persons	-0.5	0.6	0.1	-25.2	29.1	3.9
TOTAL	**-575.0**	**634.4**	**+59.4**	**-2854**	**3972**	**+1118**

Source: Matrix report 2011

As can be expected, the **tobacco, agriculture, and pulp/paper industry** are the most negatively affected by a reduction in tobacco consumption. It is estimated that within these industries 731, 191, and 41 jobs are lost respectively, with possible short- to medium-term economic disruption in areas that would bear the highest share of adverse employment impacts.

However, the loss of jobs in these industries is offset by an increase in employment in a variety of industries such as **food products and beverages, clothing and furs, furniture,**

[89] The changes associated with a 2% reduction in tobacco consumption are proportionally higher.

[90] The I-O model estimates the direct and indirect effects associated with a change in demand for a particular industry The combination of the direct and indirect effect is known as the I-O multiplier. The I-O multipliers used in the analysis are derived from the Eurostat input-output matrix (Eurostat, 2007). The I-O multiplier for tobacco products sector equals to 1.043.

electrical energy, gas, steam and hot water, health and social work services, hotel and restaurant services and other services. For example, it is estimated the other services, food and beverage, and textiles will see an increase in employment of 767, 300, and 258 jobs respectively. The changes associated with a 2% reduction in tobacco consumption are proportionally higher.

A.5.2.4.3. Redistribution and regional effects

Overall, as shown in the analysis, a reduction in tobacco use will have a positive effect on the total output and employment in the EU. However, reducing tobacco consumption might lead to a change in employment among different sectors and regions. Job losses might occur in (1) those sectors immediately associated with tobacco production, such as tobacco farming and processing, manufacturing, paper products and printing, wholesale and retail services, or in (2) those regions dependent on tobacco growing and manufacturing. However, these losses are generally outweighed by increases in employment in all other industries or in non-tobacco dependent regions. For any country or region, the estimated net change of employment depends on specific assumptions and the structure of the economy.

Production and processing of tobacco takes place in 12 EU Member States. The main tobacco farmers within the EU are Italy, Bulgaria, Poland, Spain, and Greece. These countries, together with France, produce over 90% of the total EU production of unmanufactured tobacco. It is thus estimated that the loss of 1178 jobs in agriculture sector due to a 2% decrease in tobacco consumption would be the jobs of tobacco farmers located in the above-mentioned countries. This corresponds to a reduction of 1.4% of the workforce currently working in this sector[91]. The regions specialised in growing burley, oriental or dark varieties are located in Bulgaria (all regions producing tobacco), southern Poland (Lubelskie, Lodzkie, Mazowieckie, Podlaskie), Northern Greece (Macedonia and Thrace), Italy (Tuscany, Campania, Lazio), but also France, Romania and Spain. In most of these regions tobacco growers are small farmers and tobacco consists of their main revenue. Virginia is mainly grown in Italy (Veneto, Umbria), Spain (Extremadura), southern Poland, Bulgaria, France and Hungary.[92] Compared to the previous restructuring of the sector, the impact is considered small, although non-negligible in some areas. Between 2005 and 2006, partially as a result of the discontinuation of direct subsidies for growing tobacco, the production of raw tobacco in EU25 dropped from 345,600 to 232,400 tonnes.[93]

In 2009, there were overall 48.500 persons employed in **the manufacturing of tobacco products in the EU**. The main tobacco manufacturers are located in Germany (27% of tobacco employment), Poland (17%), Bulgaria (11%), UK (10%), France, Spain and Netherlands (8-9%). It is thus estimated that a 2% decrease in tobacco consumption will ultimately lead to the loss of 1462 jobs in manufacturing sector mainly affecting the countries listed above. However, the overview of employment trends in Germany, France and UK indicates that employment is not to the same extent directly linked to falls in sales in all countries. Furthermore, in order to tackle the challenge of falling sales, there has been a fundamental restructuring of tobacco companies over the past ten years[94]. Some relocations of

[91] Euromonitor; 84228 persons employed in sector
[92] DG AGRI, January 2012 as cited by Matrix 2012
[93] Evaluation des measures de la PAC relatives au secteur du tabac brut, COGEA, August 2009
[94] Euromonitor data, Matrix report 2012

manufacturing premises have also taken place, as shown in the case study below while other two case studies with examples of such restructuring are given in Annex 2.

It can be concluded that further market developments would clearly affect tobacco companies in different countries in different ways and thus the exact impact of further falls in tobacco sales on costs, profits and employment within the tobacco manufacturing sector will differe from country to country.

In 2009, there were **45,900 individuals** employed in the **wholesale** of tobacco products[95] and according to the European retailer association (CEDT), there are almost 990,000 retail premises selling tobacco in the EU, with around 230,000 of these specialised shops which typically generate 45-50% of their turnover from tobacco.[96] In total, **retailers** generate 7.84 bEUR added value which would correspond to maximum of **600,000 FTE's**[97] assuming the average salary in the sector[98] and neglecting any other costs (housing/rent, energies, furniture, communication, transportation etc.). The I/O model predicts that the indirect impact of a 2% decrease in tobacco consumption will ultimately result in the loss of 710 jobs in the wholesale and retail sector of tobacco, representing a 0.11% decline.

A.5.2.4.4. Conclusion

Table 4.4 below shows the impact on overall economic production and employment associated with reduction in tobacco consumption between 1-5%. Overall, the net impact on employment is positive, i.e. the reduction in tobacco consumption is likely to result in an increase in employment. This is due to the fact that, although a reduction in tobacco consumption leads to job losses in the production of tobacco, this is more than compensated by the gain in employment in sectors producing goods and services purchased by former smokers.

Table 4.5: The impact on production/employment associated with a reduction in consumption between 1-5%

Reduction in tobacco consumption (%)	Employment impact of reduction in tobacco expenditure	Employment impact of increase in expenditure for other goods	Net effect on employment
1%	-2854	3972	1118
2%	-5708	7943	2235
3%	-8562	11915	3353
4%	-11416	15886	4470
5%	-14270	19858	5588

Source: Matrix 2012, own calculation

In any event it is very important to underline that it is the tobacco industry itself which is responsible for more lost jobs in a given country's domestic tobacco industry than the most successful tobacco control policies. **Industry induced job losses derive** among other from

[95] Eurostat 2010. Bulgarian farmers represent 50% of the EU tobacco farmers, followed by Poland and Greece (both 17%)
[96] Tobacco Retailers Figures. CEDT (Confédération Européenne des Détaillants en Tabac). sent to DG SANCO in January 2012
[97] Full Time Equivalents
[98] 12879 EUR, Eurostat 2010

(1) mechanisation of tobacco production plants, in which technology replaces factory workers; and (2) purchase of imported tobaccos, replacing domestically grown tobaccos raised by local farmers.