



EC-ILO Action on youth employment policy – Youth Guarantee

**Towards a methodology to estimate
the social costs and benefits of the Youth Guarantee:
*A background paper***



International
Labour
Office
Geneva

**Towards a methodology to estimate
the social costs and benefits of the Youth Guarantee:
A background paper**

Preface

This paper was commissioned by the ILO with the aim of identifying the main elements for estimating the social cost-benefits of the Youth Guarantee (YG). It was drafted by Martha Green, Sophie Hedges, Vahé Nafilyan and Stefan Speckesser of the Institute of Employment Studies (IES) of Brighton (UK).

Together with the “Literature review of the main elements for a social cost-benefit analysis of Youth Guarantees”, this paper was used for the design of the ILO’s learning modules for capacity development programme for senior management of YG schemes. This material was validated during a learning exchange programme that took place at the International Training Centre of the ILO in Turin (Italy) on 12 and 13 July 2017. Gratitude is expressed to the members of the national YG coordination teams of Latvia, Portugal and Spain - who participated in the learning exchange and validation workshop - for their useful comments.

The development of this paper was coordinated and backstopped by Mr Gianni Rosas, Senior Employment Specialist of the ILO, and the various drafts received much appreciated comments by Ms Valli Corbanese, Senior Youth Employment Expert, Mr Niall O’Higgins, Senior Youth Employment Specialist of the ILO, and Mr Gianni Rosas, ILO’s Senior Employment Specialist and Director for Italy and San Marino. Appreciation is expressed to the senior officials of the Ministries in charge of labour and employment of Latvia, Portugal, Slovenia, Spain and Sweden for their feedback on the various drafts of this paper, as well as to Mr Pablo Cornide, Youth Employment Policy Officer at the European Commission, Mr Mauricio Dierckxsens, ILO’s Employment Specialist for Central and Eastern Europe, and Mr Massimiliano Mascherini, Senior Social Policy Research Manager at the European Foundation for the Improvement of Living and Working Conditions.

This background paper is part of the EC-ILO Action on Youth Employment in Europe and its development received financial support from the European Union Programme for Employment and Social Innovation "EaSI" (2014–2020). For further information, please consult <http://ec.europa.eu/social/easi>. The information contained in this publication does not necessarily reflect the official position of the ILO or the European Commission.

Contents

	<i>Page</i>
Preface	
1 Introduction	1
2 Identifying Costs and Benefits	2
2.1 Costs	2
2.2 Benefits.....	3
3 Valuing Costs	7
3.1 Direct programme costs	7
3.2 Travel costs.....	7
3.3 Costs of care	8
3.4 Opportunity cost of education	9
4 Valuing Benefits	11
4.1 Increased economic output	11
4.1.1 <i>In-programme effects</i>	11
4.1.2 <i>Long-term effects: the scarring effects of unemployment</i>	12
4.1.3 <i>Long-term effect of education</i>	15
4.1.4 <i>Returns to firms</i>	19
4.2 Improved health and well-being	19
4.2.1 <i>Unemployment and health: what do we know?</i>	20
4.2.2 <i>Estimating the effect of unemployment on health</i>	21
4.2.3 <i>In-programme effects</i>	22
4.2.4 <i>Potential long-term health benefits from reduced unemployment</i>	23
4.3 Reduced receipt of welfare benefit	23
4.3.1 <i>In-programme effects</i>	23
4.3.2 <i>Potential long-term benefits from reduced unemployment</i>	23
4.3.3 <i>Long-term effects of education</i>	24
4.4 Reduced crime	25
4.4.1 <i>Unemployment and crime</i>	25
4.4.2 <i>In-programme effects</i>	27
4.4.3 <i>Long-term reduction in scarring effect of unemployment</i>	27
4.4.4 <i>Crime reducing effect of education</i>	28
5 Discounting, distributional weights and other adjustments	30
5.1 Distributional weights.....	30
5.2 Deadweight loss of taxation.....	30
5.3 Multiplier effect.....	30
5.4 Displacement effects.....	31
6 Sensitivity Analysis	32
References	35

1. Introduction

Under the Youth Guarantee Member States have committed to ensure that, within four months of leaving formal education or becoming unemployed, young people under 25 should receive a good-quality offer of employment, further education, an apprenticeship or a traineeship. This paper outlines a methodology to estimate the cost and benefits of the Youth Guarantee (YG).

For the social cost-benefit analysis (SCBA) interventions should be clustered according to their outcomes, ie the type of offer young people receive rather than the type of policy intervention that led to the offer being made.

- **An employment** offer is defined as ‘a voluntary but conditional promise, submitted for acceptance by e.g. an employer to the participant [...] that it is made in a manner that a reasonable person would understand its acceptance will result in a binding agreement. Once the participant accepts it becomes an agreement which legally commits both parties’.¹
- **Continued education** covers pathways to continue in or re-enter formal education and training, such as for example ‘quality training programmes leading to a recognised vocational qualification’² or second-chance education programmes for early school-leavers and low-skilled young people.
- **Apprenticeships** formally combine and alternate company-based training with school-based education, and successful completion leads to nationally recognised certification degrees.
- **Traineeships** vary in type, focus, duration, and range from short-term work placements to longer-term schemes linked to education.

While all these types of re-engagement activities bring targeted young people out of unemployment or inactivity, they are likely to entail different costs and generate different individual and social benefits. Analysing the costs and benefits of each intervention separately allows policymakers to see which type of measures is the most cost effective. This would help to design youth employment measures.

The YG is designed to improve the skills and labour market prospects of young people who are currently unemployed or inactive, by providing them employment or training opportunities. In order to derive the benefits generated by the YG, it is necessary to have credible estimates of the direct effect of the YG on employment and qualifications gained by participants. In the absence of the YG, some young people would have nonetheless found a job or a training opportunity. In this paper, we assume that estimates of the causal effect of the YG on engagement in employment, apprenticeship, traineeship or other training are available from Member States.

This paper is structured as follows: in the next Section, the costs and benefits likely to be generated by the Youth Guarantee are discussed. In sections 3 and 4, a method to estimate the costs and benefits of the YG is laid out. Section 5 examines the discount rate

¹ Commission note on Guidance on evaluation of the Youth Employment Initiative, available at <http://ec.europa.eu/social/BlobServlet?docId=13458&langId=en>

² See Council Recommendation, recital 5

that should be used. Section 6 focuses on distributional weights and other adjustments, and the sensitivity analysis is discussed in the last section.

2. Identifying Costs and Benefits

The Youth Guarantee is expected to generate economic and social benefits accruing not only to participants but also to society at large. This section reviews the costs and benefits that are likely to be generated by the YG, and discuss which elements should be taken account in the SCBA.

2.1 Costs

The provision of the YG has certain costs associated with the programme, such as the costs of structural reform or building the capacity of public employment services. These programme costs are borne by the taxpayer and should be included in the SCBA. Estimates of the direct programme costs are available for every Member State. The increase in taxation needed to fund the programme could distort individual behaviour and reduce economic surplus, creating what is usually referred to as the deadweight loss of taxation. Standard microeconomic theory suggests that transferring resources from the private to the public sector may reduce economic efficiency. For instance, an increase in income tax is expected to reduce people's net pay and could have negative employment effects. Including the deadweight loss of taxation gives a more accurate assessment of costs (Greenberg and Knight, 2007).

The YG is also likely to generate indirect costs that are born by participants. Young people who are employed or re-engaged into education as a result of the Youth Guarantee programmes may have to incur additional costs, such as travel to and from work or college, and potential childcare costs for lone parents or families with another earner (Fujiwara, 2010). In addition, they may also have to pay for care of elderly members of the family. These costs reduce the real gains from working or increase the costs of attending education and training. Therefore, these costs should be accounted for in the cost benefit analysis. A methodology for estimating travel and care costs is presented based on Fujiwara (2010). In addition, those who engage in education and training as a result of the YG could have found a paid job in the absence of the intervention. Estimating the opportunity costs of education would be rather challenging, as these are likely to vary not only with the initial status of the individual (unemployed or inactive), but also with the characteristics of the individual jobseeker (educational attainment, prior work experience). In addition, the opportunity cost of education is likely to be relatively small compared to the overall programme costs. The interventions of the Youth Guarantee should be tailored to the needs of the young people who are Not in Education, Employment or Training (NEET), thereby minimising these costs.

Additional indirect costs could be expected to result from the YG. First, participants moving into employment or education from unemployment/inactivity have less time to spend on non-market activities, such as household activities (other than childcare and care for the elderly, which are already accounted for) or on leisure. The loss in non-market time can be considered an opportunity cost of moving from a NEET status. However, providing a value for non-market time is extremely challenging and only a handful of studies have tried to measure it for employment programmes (Greenberg and Robins, 2008). There is no study that tries to measure the value of the loss of non-market time for young NEETs who moved into employment or education. Since time spent at work or in education may also have a positive value (Jahoba, 1982), which could offset the loss in leisure time, the loss in non-market time should be ignored in the SCBA.

Second, whilst the Youth Guarantee ensures young people a job or education/training opportunity, participants are generally still expected to play a part in identifying and applying for these openings. Searching for employment or training has costs attached, such as the costs of travelling to an interview (e.g. transport and/or childcare) as well as the opportunity cost of the time spent searching. However, assuming that not all unemployed young people wish to remain unemployed, it is likely that at least some of them would have incurred these search costs in the absence of the Youth Guarantee programme. Hence, any estimate of the search costs incurred during the scheme could not be wholly attributed to the Youth Guarantee, and would substantially overestimate the true costs involved. For this reason, it may be preferable to omit this element from the cost benefit analysis. Note that these costs are likely to be small so not including them should not be much of a concern.

2.2 Benefits

The YG is designed to improve the skills and labour market prospects of young people who are currently NEET. Therefore, the YG is expected to improve the economic situation of young people, by providing them with good quality employment opportunities. Being provided with a paid job would increase their earnings, thereby reducing poverty and inequality. In addition, by providing either a job or training opportunity, the YG would be expected to reduce poverty and social exclusion among young people, thereby improving their mental health and well-being. If the YG has positive effects on young people's mental health and well-being that would go beyond the financial rewards of work (Jahoba, 1982), meaning the benefits would not be captured by earnings and should be accounted for separately. These benefits are expected to arise not only in the short run while the young participants benefit from the programme but also in the long-term, by preventing the scarring effect of unemployment, i.e. the permanent impact on employment and wages which results from a period of sustained unemployment (Bell and Blanchflower, 2011). Both the short and long-term benefits to earnings and impact on mental health should be accounted for in the SCBA, and are likely to be substantial.

YG interventions that promote continued education are not expected to increase earnings and output while the participants are engaged in the programmes but are likely to raise employability and productivity in the long run. Education and training play an important role in the determination of lifetime earnings (Card, 1999). The lifetime returns to these education and training interventions are expected to be large and should be accounted for in the SCBA. Whereas education interventions are not expected to increase earnings in the short run, they may have a positive effect on mental health and well-being that should be measured. In addition, increased educational attainment could also be expected to improve health in the long run. Whilst numerous studies (see Cutler and Lleras-Muney, 2012, for a survey) have shown that education is strongly associated with better health, there has been much debate about whether there is a causal relationship between education and health. Studies exploiting quasi-experiments to identify the causal effect of education on health tend to find mixed results and suggest health effects of education are much smaller than suggested by studies relying on partial associations³. Therefore, the health benefits of higher educational attainment should not be included, as there is too much uncertainty about the likely benefits triggered by the increase in educational attainment resulting from the Youth Guarantee.

³ Using this identification strategy studies from Germany (Kempter et al, 2011), the Netherlands (Van Kipperluus et al, 2011), Sweden (Spasojevic, 2010) and a selected number of EU Member States, including Southern European countries (Brunello et al, 2015) show small significant impacts of education on health outcomes. However, Arendt (2005) in Denmark, Albouy and Lequien (2009) in France, and Oreopoulous (2007), and Clark and Royer (2013) in the UK all found no effect. Meghir et al (2012) found little if no long-lasting effects of education in Sweden.

Entry into the labour market and the increased educational level of a large number of young people who are currently NEET is expected to benefit society at large. First, it is expected to increase economic output. The increase in economic output is shared by the YG participants, Member States' governments and firms. As mentioned above, YG participants benefit from the increase in output in the form of net earnings. The governments receive the product of income tax and social insurance contributions. Firms are also expected to benefit from the increased output, owing to labour market imperfections (Manning, 2011). These benefits to the government and firms should be taken into account. While the increase in taxes and social contributions are relatively straightforward to capture, because household surveys typically contain information about gross earnings, the share of output captured by employers is much more difficult to measure. However, a way of assessing the magnitude of these benefits is presented.

By improving the short and long-term employment prospects and earnings of participants the YG is expected to reduce poverty and social exclusion. The effects of reducing poverty for the participants are captured by the effects on earnings and on mental health and well-being. However, poverty and social exclusion generate costs for society as a whole that go beyond the effect on productivity discussed above.

They are associated with increased spending on public services, such as social care, benefit payments, social housing, healthcare, police and rescue services (Bramley et al., 2016). Some consequences of poverty such as crime and anti-social behaviours impose additional social costs. The social effects of poverty and social exclusion are difficult to quantify. The analysis should focus on the likely effect of the YG on benefits payment and crime. Crime makes up a large share of the total costs of poverty in the UK estimated by Bramley et al.(2016)⁴ and the effect of unemployment and low skills on crime is well documented in the literature (Fougère, 2009; Machin et al, 2011). Information on benefit payments to different income groups can be obtained from household surveys such as the EU Labour Force Survey. The YG could be expected to reduce healthcare costs, as it is likely to improve participants' health. Healthcare costs in most EU countries are at least publicly funded and therefore a reduction in healthcare requirements would result in savings for society as a whole. However, there is little evidence in the literature about the effect of unemployment on healthcare costs. Given the institutional differences across EU countries and the lack of comparable data, it is suggested to ignore the effect on healthcare costs.

The YG could also be expected to generate indirect benefits for the family and relatives of participants. Partners, parents and other relatives of participants may experience a reduction in anxiety as the participant move on from unemployment or inactivity. There is some evidence that unemployment has a negative effect not only the well-being of those directly affected but also on their spouses (Hurd et al, 2014). The increased education level of participants is likely to benefit their children in the long run, since education may have intergenerational effects (Oreopoulos et al, 2006). While these spillover effects are likely to arise, quantifying their magnitude and valuing them would be extremely challenging and subject to a lot of uncertainty. Therefore, these should not be included in the SCBA.

In addition to the impact of the YG on economic output, the likely effects of the YG on selected other dimensions should be valued. More specifically, the following elements should be included: (i) economic output, (ii) health and (iii) well-being benefits crime.

⁴ According to this study, expenditure on police and the justice system is the third largest component of the total costs of poverty. Additional healthcare and school spending are the two largest elements, but do not fully apply to the target population of the YG – Healthcare costs tend to accrue for older people, while increased school expenditure benefits children.

For each element, a distinction is made between short-term and long-term benefits. Short-term benefits refer to benefits which arise while the young people are engaged in the education programme, apprenticeship or traineeship, or employed. For those who are employed, this period corresponds to the length of time they would have needed to find a job in the absence of the programme. Long-term benefits refer to benefits that arise once young people are no longer enrolled on the programme they gained access to thanks to the YG. Some long-term benefits arise because participating in the labour market integration measures of the YG (i.e. moving young people into employment, apprenticeships or traineeships) is expected to improve some outcomes in the long-run by reducing the scarring effect of joblessness. Other long-run benefits arise because of the improved education level resulting from interventions that enhanced the educational level of young people. A distinction is made between: (i) short-term in-programme effect, (ii) long-term reduction in scarring effect of unemployment, and (iii) long-term effect of education.

Table Error! No text of specified style in document..1 summarises the elements that should be included in the SCBA. It shows what elements should be considered for the different types of interventions. In the last column, the likely size of each element is shown using a colour code. The darker the cell, the larger the expected effects. These are only based on educated guess and therefore should be interpreted with appropriate caution.

Table Error! No text of specified style in document..1: Summary of costs and benefits

	Employment	Further education	Apprenticeship	Traineeship	Exp. Size
Costs					
Direct programme costs	Yes	Yes	Yes	Yes	
Travel costs	Yes	Yes	Yes	Yes	
Care costs	Yes	Yes	Yes	Yes	
Benefits					
<i>Increased economic output</i>					
Short-term in-programme effect	Yes	No	Yes	Yes	
Reduction in scarring effect	Yes	No	Yes	Yes	
Effect of education	No	Yes	Yes	No	
<i>Improved health and well-being</i>					
Short-term in-programme effect	Yes	Yes	Yes	Yes	
Reduction in scarring effect	Yes	No	Yes	Yes	
Effect of education	No	No	No	No	
<i>Reduction in benefit payment</i>					
Short-term in-programme effect	Yes	No	Yes	Yes	
Reduction in scarring effect	Yes	No	Yes	Yes	
Effect of education	No	Yes	Yes	No	
<i>Reduction in crime</i>					
Short-term in-programme effect	Yes	No	Yes	Yes	
Reduction in scarring effect	Yes	No	Yes	Yes	
Effect of education	No	Yes	Yes	No	

Table Error! No text of specified style in document..2 reports the types of costs and benefits by beneficiaries. While the direct programme costs will be borne by the taxpayer, travel costs will be borne by participants⁵. Care costs are likely to be borne both by participants and the taxpayer. As discussed below, increased economic output is shared by the participants (net earnings), the taxpayer (taxes and social contributions) and firms (difference between productivity and labour costs). Improved health and well-being benefits participants, as the effect on healthcare costs is disregarded. Reduction in benefit payment and crime benefit the taxpayer and society at large. The increase in net earnings of participants resulting from the YG is likely to bring further benefits.

Young people tend to have a high marginal propensity to consume. This implies that for a €1 increase in disposable income, they will increase their spending by a relatively high amount (e.g. 80 cents). This increased consumption further raises demand, resulting in a ‘multiplier’ effect. This multiplier effect is likely to be a key determinant of the benefits of the programmes and a methodology is presented to get estimates of its likely size. Benefits arising from this multiplier effect are expected to benefit society at large.

Table Error! No text of specified style in document..2 Types of costs and benefits by beneficiaries

	Economic	Social
Participants	<ul style="list-style-type: none"> • Increased net earnings • Travel costs • Care costs 	<ul style="list-style-type: none"> • Improved health and well-being
Tax payers	<ul style="list-style-type: none"> • Increased income tax and social contributions • Multiplier effect • Reduction in benefit payment • Direct programme costs 	<ul style="list-style-type: none"> • Reduction in crime
Firms	<ul style="list-style-type: none"> • Difference between productivity and labour costs 	

⁵ Unless travel from and to work is subsidised, which may happen in some countries

3. Valuing Costs

3.1 Direct programme costs

Certain costs are associated with offering the Youth Guarantee programme, such as the costs of structural reform or building the capacity of public employment services. The fiscal costs associated with the Youth Guarantee are available from national sources and should be used on the model developed in 2012 by the International Labour Organization (ILO). In theory, EU funding should be deducted from the fiscal costs for the SCBA conducted at the national level.

As laid out in the note produced by the ILO in 2012, the first step is to estimate the costs for introducing subsidised employment, on the basis of expected average amount and length of the subsidy, expected number of beneficiaries and related administrative costs. The second step is to estimate the costs of introducing labour market training based on training costs plus individual compensation for a period of 6 months, expected number of beneficiaries and related administrative costs. The final cost estimates are based on an average of these two types of costs. In addition to estimating the number of young people currently unemployed or inactive, the ILO designed an analysis of labour market flows to obtain a better estimate the potential number of young beneficiaries of the YG. The direct costs of the YG can be seen as an indirect transfer of resources from tax payers (via government, employers and training providers) to participants. They are not, however, pure transfers like an increase in out-of-work benefits would be, and should be regarded as a cost and assessed against the benefits the YG is likely to generate.

Young people who are employed or re-engaged into education as a result of the Youth Guarantee programmes may have to incur additional costs, such as travel to and from work or college, and potential childcare costs for lone parents or families with another earner. These costs reduce the real gains from working or increase the costs of attending education and training. Therefore, these costs should be accounted for in the cost benefit analysis. Even if subsidies are in place to mitigate these costs at the individual level, they would still be considered as costs from a fiscal/social perspective.

3.2 Travel costs

Individuals provided with a job or training opportunity as a result of a Youth Guarantee scheme will incur travel costs as a direct result of this change in circumstances. For example, a young person who is unemployed does not have to commute to a given location each day for employment or education purposes and so, prior to the programme, their travel costs are zero. Once they start work or enrol in a college course, they will have to cover the financial costs of travelling to their place of employment or training. This could be public transport fares or the costs of fuel, but will not include those that live close enough to walk to their work/training.

The methodology highlighted by Fujiwara (2010) would be used to account for the travel costs resulting from the Youth Guarantee. An estimate of the number of days each individual will travel for should first be generated. For example in Italy in 2016, assuming that individuals commute to work or college for five days each week, excluding nine public holidays⁶ and 20 days of minimum statutory annual leave, travel costs would be incurred for

⁶ There were 11 public holidays in Italy in 2016, but two fell on a Sunday.

223 days per year for those in employment, apprenticeships and traineeships. For those in full-time education, the number of days for which travel costs would be incurred is lower. In Italy, it would be between 150 and 160 days.

Data on the breakdown of the proportion of individuals who use each mode of transport for commuting should be collected. Ideally this information about the mode of transport for participants' commute should be collected for Youth Guarantee participants. However, in most countries this will not be a feasible option. Therefore, the general commuting pattern of young people could be used as a proxy for their YG-related commuting patterns. The exact choice of the group to be analysed would depend on the sample size. In many countries, this information would come from the Labour Force Survey (LFS). While EU LFS does not contain data on commuting patterns, national LFS do for some countries.

This information on commuting patterns can then be combined with data on average commuting length and costs for each mode of transport to generate an estimate of average daily commuting costs. This daily cost should be multiplied by 232 to generate an estimate of the annual average commuting costs for those in employment, apprenticeship or traineeship, and by 195 for those in full-time education.

Additional travel costs resulting from Youth Guarantee programmes can be calculated by multiplying the annual average commuting cost by the additional number of years in employment or training.

$$E(TC) = (260 - \text{Holidays}) \times \sum_m s_m \times \overline{C}_m$$

In this case s_m is the proportion of people commuting with each mode of transport, and \overline{C}_m is the average cost of commuting with each mode of transport.

In addition to these direct travel costs, the young people lose time commuting. In principle, this should be valued too. However, as discussed below, leisure time should not be valued in this analysis, as obtaining a shadow price for time is not feasible.

In some countries the data on commuting patterns and costs may not consistently available. In that case, these costs should be ignored, as they are likely to be small in comparison to the programme costs and the expected benefits.

3.3 Costs of care

For those young people who have children or care for elderly parents or relatives, attendance at a full-time job or training course as a result of the Youth Guarantee will mean that they are no longer at home to take care of their children or elderly relatives. Consequently, participants without access to free formal childcare or care for the elderly are likely to incur monetary care costs that they would not have faced in the absence of the programme⁷.

As a first step national surveys, such as the Labour Force Survey, should be used to estimate the proportion of young people who are unemployed or inactive and have children or care for elderly relatives.

⁷ This assumes that informal childcare is provided at zero cost (i.e. this does not account for the opportunity cost incurred by those providing the childcare).

Subsequently, information about the median hours of formal and informal childcare per week should be gathered from the childcare module of the EU statistics on income and living conditions (EU-SILC). Assuming that participants do not pay for care when they take annual leave, the statutory number of weeks of annual leave available for employees should be deducted from the total number of weeks in a year. For example, if employees are entitled to five weeks of annual leave per year, then the median hours of care should be multiplied by 47 (52-5) for an annual number of hours.

Average care costs are available from EU sources⁸. Alternatively national data sources could be used. For instance, data from an online platform in France suggested that the average hourly cost of childcare amounts to 14.21 euros (including taxes) in 2016⁹. Average hourly care costs would be multiplied by the annual number of hours of childcare required, resulting in an average annual cost for childcare per person. This figure should then be multiplied by the number of young people who are likely to need childcare (young people who are unemployed or inactive, have children, and no access to informal childcare).

Finally, the resulting figure should be multiplied by the additional number of years in employment or training. The overall result is the additional childcare costs resulting from Youth Guarantee programmes. This should be conducted for unemployed and inactive young people separately:

$$E(CC) = (260 - \text{Holidays}) \times (\text{Hours} \times \text{Cost}) \times \text{People}$$

3.4 Opportunity cost of education

Those engaged in education and training could have found a paid job in the absence of the intervention. This should be accounted for in the costs of the SCBA, although the opportunity costs should be relatively low for young people who are initially NEET. The opportunity cost is likely to vary depending on the initial status, i.e. whether the young person was unemployed or inactive. Therefore the calculations should be conducted for the two groups separately. To measure the opportunity costs the average duration of the unemployment/inactivity spell (ideally breaking this down by skill level, e.g. ISCED level) should be obtained so that the proportion of unemployed/inactive young people who are currently engaged in education and would have been able to find a job in the absence of a Youth Guarantee scheme could be estimated. The average earnings of employed young people (by skill level in order to match the skill composition of the initial unemployment/inactivity of young people) could be used to derive the opportunity costs.

⁸ http://eacea.ec.europa.eu/education/eurydice/documents/key_data_series/166EN.pdf Figure D6

⁹ <https://yooopies.fr/presse/Tarifs-baby-sitting-2016>

4. Valuing Benefits

4.1 Increased economic output

4.1.1 *In-programme effects*

The labour market integration measures of the YG (i.e. moving young people into employment, apprenticeships or traineeships) are expected to increase the time spent in employment by young people compared to counterfactual non-participation because of a range of programme effects on participants. First, young people who either get into paid employment, start an apprenticeship or a traineeship as a result of the Youth Guarantee are gaining work experience that they would not have had in the absence of the intervention. To measure this direct, short-run effect of the YG on employment, the average length of time the interventions of the YG last for could be used. This is likely to differ by type of intervention (e.g. employment, apprenticeships or traineeships).

Young people who gain employment directly from starting a Youth Guarantee programme are likely to generate additional economic output. In a perfectly competitive labour market, the additional output could therefore be proxied by labour costs, the benefits of additional output being only shared between individuals and the Treasury.¹⁰

In some countries, the gross employee cash or near cash income of employed participants could be observed directly, in administrative registers for instance. However, the majority of countries may not collect such data consistently. Therefore, gross employee cash or near cash income of young people (aged 16-24)¹¹ could be used from national or EU datasets, distinguishing between those who are in paid employment, in apprenticeship and in a traineeship.

The EU Survey of Income and Living Conditions (EU-SILC) contains appropriate information and could be used for that purpose. If the sample size is large enough, the analysis could be conducted separately by level of education in order to match the educational composition of the initial unemployment/inactivity of young people.

The average effect on output per participant with level of education while directly employed as a result of the YG can be written as:

$$D_{educ} = \overline{Dur} \times \overline{Wage}_{educ}$$

where \overline{Dur} is the average duration expressed in years for which the participants benefit directly from the intervention, \overline{Wage}_{educ} is the average gross annual earnings. If possible, this should be estimated separately for men and women.

For those who are enrolled in a traineeship or an apprenticeship, estimating the average earnings by education level is not expected to be possible because of the sample size. In this case, the estimates should not be stratified by level of education.

¹⁰ We discuss how the share of output could be modelled in another section

¹¹ Or up to 29 for the countries in which the YG targets individuals under 30.

4.1.2 Long-term effects: the scarring effects of unemployment

The labour market integration measures of the YG (i.e. moving young people into employment, apprenticeships or traineeships) are expected to have long-term effects, beyond the period when young people benefit directly from the interventions. A prolonged period of unemployment or inactivity in youth may have a long-lasting impact on earnings, which is usually referred to as the ‘scarring effect’ (Bell and Blanchflower, 2011). These scarring effects resulting from unemployment are usually associated with human capital, for example through the deterioration of skills and foregone work experience, or signalling effects as prolonged periods of unemployment may suggest a candidate’s low productivity to a potential employer (Scarpetta et al, 2010). This is problematic for young people, since unemployment early in one’s career is more likely to result in a reduced skill-set (both cognitive and non-cognitive skills) and/or a loss in confidence that could adversely affect one’s ability to obtain an appropriate job in the future (Burgess et al, 2003).

The Youth Guarantee, by shortening this period of unemployment, will have the added benefit of reducing long-term negative effects on both wages and future experiences of unemployment. Firstly, we build a conceptual framework to derive the long-term effects of the YG on employment and wages. Secondly, we review the existing literature to obtain parameters. Finally we describe the selected parameters.

Conceptual framework

We conceptualise how to derive the long-term effects of the YG on employment and wages. The main body of research suggests that the scarring effects of unemployment may be two-fold: unemployment may cause employment scarring, as it increases the risk of subsequent periods of unemployment; however it also has implications for individuals’ future income streams in terms of reduced earnings. Wage scarring refers to the impact on wages resulting from a period of unemployment (Bell and Blanchflower, 2011). This may be a permanent impact and have long-lasting consequences on the wage experiences of young people, as well as the direct loss of income at the time of unemployment.

The benefits of the YG can be thought as removing the cost of the scarring effect of joblessness in youth on both long-term employment and wages. The long-term impact of the YG on employment rate at year t can be expressed as:

$$YG_t^E = \frac{-\sigma_t^E}{(1 + \sigma_t^E)} \bar{E}_t$$

where \bar{E}_t is the counterfactual employment rate (i.e. the proportion of YG participants who would have been employed in year t had the YG not been implemented) and σ_t^E is the scarring effect of joblessness on employment and wages and can be interpreted as the opposite of the long-term effect of YG interventions. This parameter is likely to get smaller as t increases.

While \bar{E}_t cannot be directly observed, it can be proxied by the employment rate of those who faced a spell of unemployment after leaving school. This can be calculated from the EU LFS 2009 ad hoc module on the entry of young people into the labour market, based on the variable TRANSACT. This variable unfortunately does not allow to distinguish between active jobseekers and inactive. One issue is which age range should be used for the different values of t . In theory, employment rate at different ages for the same value of t should be used for participants of different ages. At $t = 1$., employment rate at age 25 should be used for participants who left the YG at the age of 24.

Employment rate at age 24 should be used for participants who left the YG at the age of 23, and so on. Doing so may be difficult since employment rate for a small age band cannot be precisely estimated, which may result in a distorted estimate. Therefore, age bands could be used instead (five or ten years) depending on the sample size. They should be computed until the age of 64.¹²

The YG is also likely to have impacts that go beyond increased probability of being employment. Employed participants may have higher earnings than in the absence of the YG. The long-term impact of the YG on total labour income at year t can be expressed as:

$$YG_t^{inc} = \frac{(\sigma_t^E \sigma_t^W - \sigma_t^E - \sigma_t^W)}{(1 + \sigma_t^E)(1 + \sigma_t^W)} \bar{E}_t \bar{W}_t$$

where \bar{E}_t and \bar{W}_t are respectively the average employment rate and average annual earnings (conditional on being employed) of scarred individuals, that is what would have happened in the absence of the YG; σ_t^E and σ_t^W are negative parameters that respectively refer to the scarring effect of joblessness on employment and wages and can be interpreted as the opposite of the long-term effect of YG interventions. How estimates of \bar{E}_t can be obtained based on the 2009 EU LFS ad hoc module was discussed above. Similar approach should be followed for \bar{W}_t . The main issue, however, is that EU LFS does not contain information on earnings. This information can be retrieved in the national LFS for some countries. If this is not an option, then average earnings by age could be obtained using EU SILC data. The issue is that the average would be calculated on all respondents, not only those who experienced a spell of unemployment after leaving education. To adjust for this, it is suggested to multiply the average by the ratio of the employment rate of those who experienced non-employment after leaving school to the employment rate of the general population, calculated using the 2009 ad hoc module of the EU LFS.

Finally, the individual lifetime costs of scarring effect of unemployment (*LTCS*) that would have been borne by YG participants in the absence of the programme can be calculated¹³ as the discounted sum of the long-term impact of the YG on total labour income for every year post YG participation.

$$LTCS = \sum_{t=1}^T YG_t^{inc} \left(\frac{1+g}{1+d} \right)^t$$

where YG_t^{inc} is the long-term impact of the YG on total labour income at year t g is the long-term real growth rate and d is the discount rate; t refers to the number of years after the intervention finished. T denotes the number of years the lifetime costs should be calculated on. The expected benefits of the YG arising from a reduction in the scarring effect of unemployment are given by multiplying *LTCS* by the number of young people who move into employment, apprenticeship or traineeship.

¹² The question about the main activity after leaving formal education is only asked for respondents aged 15-34. The employment rate of those who experienced a spell of non-employment after leaving education can only be computed up to the age of 34. However, it could be imputed for 35 or above assuming that the employment-age profile is the same among those who experienced a spell of non-employment after leaving education and the general population.

¹³ We assume that earnings of scarred individual (eg YG participant) at time t are given by $\bar{E}_t \times \bar{W}_t$; the

earnings of scarred individuals are given by $\frac{\bar{E}_t \bar{W}_t}{(1 + \sigma_t^E)(1 + \sigma_t^W)}$; the difference between scarred and unscarred individuals is $\frac{\bar{E}_t \bar{W}_t}{(1 + \sigma_t^E)(1 + \sigma_t^W)} - \bar{E}_t \bar{W}_t$ which simplifies to $\frac{(\sigma_t^E \sigma_t^W - \sigma_t^E - \sigma_t^W)}{(1 + \sigma_t^E)(1 + \sigma_t^W)} \bar{E}_t \bar{W}_t$

\overline{EMP}_t and \overline{Wage}_t can be proxied by employment and earnings from EU-SILC of individuals who were not affected by the YG. This can be achieved by using EU SILC data that were collected prior to the implementation of the YG. One issue is which age range should be used for the different values of t . In theory, earnings at different ages for the same value of t should be used for participants of different ages. At $t = 1$, earnings at age 25 for should be used for participants who left the YG at the age of 24. Doing so may be difficult since earnings for a small age band cannot be precisely estimated, which may result in a distorted estimate. Therefore, age bands could be used instead (five or ten years) depending on the sample size. They should be computed until the age of 64.

The other key parameters to obtain are credible estimates of the scarring effect of employment and wages. In the following section, we review the existing literature on this topic.

What do we know about scarring effect of unemployment?

Burgess et al (2003) found that early career unemployment for the low-skilled results in an increased likelihood of further unemployment later in life, and Doiron and Gørgens (2008) estimated that a 13 to 16 percentage point increase in the future unemployment rate followed an additional spell of unemployment for young people without post-secondary education in Australia. Similarly, Gregg (2001) used the National Child Development Survey to investigate the effects of youth unemployment on future employment prospects. Gregg's specific aim was to analyse whether the cumulative unemployment experience up to the age of 23 was a driver for subsequent unemployment. The results showed a persistent effect despite Gregg controlling for a wealth of observable individual characteristics. In addition, an Instrumental Variable technique was implemented, establishing a causal relationship between experiences of youth unemployment and unemployment in subsequent years.

As mentioned, employment scarring is closely related to wage scarring, as employment disadvantage typically translates into reduced wages over the life cycle. This effect is widely evidenced within the literature with many studies gave significant attention to adult experiences of unemployment. For example, a notable paper by Arulampalam (2001) used a sample of men from the British Household Panel Survey (BHPS) data, which allowed the author access to retrospective labour market information. Arulampalam found that unemployment carried a wage scar of approximately six per cent on re-entry to the labour market, increasing to 14 per cent after three years. When focusing specifically on young people, Mroz and Savage (2006) found that six months of unemployment at age 22 in the US would result in a lower wage rate at age 23 by nine per cent. Furthermore, wages at ages 30 and 31 remained three per cent behind what they would have been in the absence of the unemployment episode.

Gregg and Tominey (2004) contributed to current literature by providing an examination of youth unemployment and its effect on the cumulative wage experience up to 20 years later. Their research suggests that although unemployment has sizeable effects for both men and women aged 23 in terms of wage scarring, this is followed by a substantial recovery period during the following decade; although this is only the case in the absence of repeat periods of unemployment. Overall, Gregg and Tominey found that experiences of early unemployment implied wage scars of 12 to 15 per cent at age 42.

For those avoiding repeat periods of unemployment the residual wage scar was slightly lower at approximately eight per cent. In general, the longer the period of unemployment the more individual productivity may be affected and the longer the scarring effects are likely to persist, which is particularly the case for those with low levels of qualifications (Scarpetta et al, 2010).

Furthermore, evidence suggests that those individuals who experience repeat interruptions to employment also enter jobs that are low paid and unstable (Stewart, 2007; Böheim and Taylor, 2002). However, Böheim and Taylor (2002) also found that those who spend more time in unemployment looking for work are rewarded by a better employee-employer match in their subsequent job.

These findings are worrying, particularly as young people are more likely to experience unemployment than other individuals in the labour market (Doiron and Gørgens, 2008). Consequently the Youth Guarantee, by shortening this period of unemployment, will have the added benefit of reducing long-term negative effects on both wages and future experiences of unemployment. This is in line with Gregg and Tominey's (2004) 'prevention is better than cure' philosophy. In the previously cited paper, *The Wage Scar from Male Youth Unemployment*, these academics discussed the importance for intervention when tackling youth unemployment, despite the exit rates from unemployment being lowest among older less educated individuals. They reason that if evidence suggests that unemployment imposes a substantial scar, which individuals carry for much of their future labour market experience, intervention may be better directed towards the youth.

Estimates from Mroz and Savage (2006) could be used to value the scarring effect on employment and wages. Their empirical strategy is very strong, they look at both wages and employment and they focus on young people in their early 20s, the main target population of the YG. The main limitation is that this study was conducted using data from the US and the results may not be fully applicable to EU countries.

However, studies reviewed above suggest that joblessness has a scarring effect in other countries. Compared to some studies these estimates may seem relatively low. However, it is better to underestimate than overestimate the benefits in a SCBA. Their definition of non-employment included both unemployment and inactivity. Therefore, the estimates can be interpreted as an average of the effect of having a spell of unemployed and the effect of having a spell of inactivity when young on subsequent labour market outcomes. Therefore, the analysis cannot be conducted separately for participants who were unemployed and inactive

Table Error! No text of specified style in document..3, shows estimates of the scarring effect on employment and wages based on Mroz and Savage (2006)¹⁴, expressed as percentages of employment rate and earnings of unscarred individuals. While the wage differential diminishes and becomes zero after 16 years, there is no evidence that employment rates of scarred and unscarred individuals converge. The differential is assumed to remain constant for the rest of their working life.

These values can be used for the parameters σ_t^E and σ_t^W in the equations above that shows how the long-term effects on employment and wages can be derived.

¹⁴ More specifically results from Figures 3b and 5b were used. Mroz and Savage (2006) only modelled the effect 10 years after scarring. Their estimates were extrapolated linearly to show that the wage scarring disappears after 12 years.

Table Error! No text of specified style in document.3: Proposed estimates of scarring effects on employment and earnings

Years after intervention	Employment Differential	Wage differential
1	0.070	0.095
2	0.043	0.089
3	0.027	0.082
4	0.022	0.076
5	0.022	0.069
6	0.022	0.063
7	0.022	0.056
8	0.022	0.050
9	0.022	0.043
10	0.022	0.037
11	0.022	0.030
12	0.022	0.024
13	0.022	0.017
14	0.022	0.011
15	0.022	0.004
16+	0.022	0.000

Source: Mroz and Savage (2006)

4.1.3 Long-term effect of education

The economic benefits of education

While education and training programmes are not expected to generate large short-term benefits, they are likely to result in substantial benefits in the medium and long-term, arising from increased earnings. According to standard microeconomic theory, the individual earnings return associated with higher educational attainment can be straightforwardly interpreted as the additional Gross Value Added (GVA). If this is the case, then the economic benefits generated by improved educational attainment brought about by the Youth Guarantee can be derived by aggregating the estimated increase in individual lifetime earnings of participants who gained a qualification as a result of the Youth Guarantee (subject to discounting and further adjustments).

However, in reality the economic benefit of higher level skills is likely to differ from a mere aggregation of individual lifetime earnings for various reasons. Because of market imperfections (mobility barriers, firm specific human capital, and non-perfect competition) individual wages may understate the full return to education (McIntosh, 2007; Hogarth, 2012; and Pfeiffer et al, 2009).¹⁵

¹⁵ The problem posed by market imperfection is discussed in more detail below.

Further, non-individual benefits would not be captured in aggregations without further adjustments. Higher education levels may generate positive externalities and spillovers both within organisations and in the economy at large. Not accounting for externalities and spillover results in underestimating the likely benefits. In contrast, as an increasing fraction of the working population gain higher levels of education, returns to education may fall. As a result, the estimated returns based on today's data may therefore overestimate the likely long-term returns. Understanding the full economic benefits of higher levels of education would require a macroeconomic approach which takes into account externalities, changes in returns to education, as well substitution and displacement effects at the system level. However, because of a lack of suitable data, estimating a macroeconomic model that relates the education level of the population to output is not feasible.

Despite its limitations, an aggregation of individual returns may still be useful to estimate the value of the long-term benefits arising from higher levels of education achieved through the Youth Guarantee. Another assumption is that there are no externalities of education and that the returns to education do not change over time. The presence of externality would imply that our approach underestimates the economic benefit of the Youth Guarantee while falling returns to education would result in lifetime returns being overestimated. The two sources of bias would (partly) cancel each other out.

In recent years, a number of studies have estimated returns to education in EU countries. Badescu et al (2011) estimated returns to education in 24 European countries using data from EU-SILC.

The long-term benefits arising from increased earnings resulting from the additional qualifications generated by the Youth Guarantee should be valued in the SCBA. First, the number of additional qualifications by level (e.g. ISCED levels) that have been generated by the Youth Guarantee should be available. Those engaged in 'continued education' or apprenticeship are likely to gain additional qualifications as a result of the Youth Guarantee. However, those in paid employment or in traineeship are unlikely to achieve higher educational attainment.

Second, an estimate of the likely returns to these qualifications should be obtained. This could be achieved by estimating the returns to qualifications similar to those resulting from the Youth Guarantee. This could be achieved by using the Mincer earning function using individual level data that contain suitable information about earnings (e.g. gross near cash income, number of hours worked) education (highest qualification held) and socio-demographic background (marital situation, parental background). EU level data such as the EU Survey of Income and Living conditions would be a suitable option.

In the Mincer model individual earnings are modelled as a function of education and training experience; and a function of work experience. The log of gross hourly earnings should be used as a dependent variable (e.g. gross near cash income/hours worked). The measure of education should be comparable to the outcomes of the Youth Guarantee in terms of additional qualifications generated. The ISCED level of the highest qualification held could be used and the categories ISCED 0 to 2 collapsed together as most young people participating in education and training programmes will have completed at least lower secondary school. Work experience can be proxied by the difference between the age of the respondent and their age when they left full-time education.

More formally, the model can be written as:

$$\ln(y) = \sum_k \beta_k hqual_k + g(wexp) + \mathbf{x}\gamma + \varepsilon$$

where y is hourly earnings, $hqual_k$ is the set of dummies equal to 1 if the respondent's highest qualification is level ISCED k . $g(wexp)$ is a function of work experience, and is typically proxied by a second-order polynomial. β_k can be interpreted as the difference in hourly earnings between individuals holding a qualification of level k and those with low skills (i.e. with a qualification of ISCED level 0 to 2), for the same level of experience and characteristics included in \mathbf{x} .

In the Mincer model, a causal relationship between educational level and earnings is identified only if all factors that influence both the probability of achieving particular education qualifications and earnings in adulthood are included in the regression model ($E(\varepsilon|hqual, g(wexp), \mathbf{x}) = 0$). If these are not accounted for, the estimated coefficients are likely to be biased. The two main factors that are likely to affect both educational decisions and earnings are parental background and ability. Whereas information on parental background is available in EU-SILC (parents' education level, financial situation of the household and tenancy status when 14) and can be included in the regression model, there is no proxy for individual ability in EU-SILC.

However, as noted by Card (1999), ability bias tends to be relatively small (in the order of ten per cent). In addition, estimates of the returns to education based on instrumental strategies (which overcome the ability bias) tend to be larger than OLS estimates (Card, 2001). Therefore, OLS estimates are likely to be a good proxy for the causal effect on earnings of the increase in educational level caused by the YG. Another potential source of bias arises from the fact that the employment rate of individuals with different levels of education is likely to vary significantly. The probability of observing a wage (i.e. being in paid work) is likely to depend on the level of education, and this would result in a bias. To correct for this selection bias a two-step Heckman selection model could be implemented. The first stage equation can include a number of further observable characteristics affecting labour supply (but not earnings), such as marital status, whether there are any children under the age of 18 in the household, the use of paid childcare and childcare by relatives and the spouse's employment status and level of education (in ISCED-classification).

Based on the estimated returns to education on hourly earnings lifetime returns could be computed.

To estimate the lifetime earnings returns to, say, upper secondary education compared to lower secondary education¹⁶, observed average earnings of young low-skilled adults (for instance, aged 25-30) in the labour force (i.e. unemployed set to zero) could be used. On the basis of the estimated coefficients for lower secondary education and work experience from the Mincer models the earnings profiles over 40 years (until the age of 65) could be derived, assuming an average trend in economic growth and a discount rate (see section 7 about the selection of a discount rate) to obtain such lifetime earnings in present values (PV).

The individual lifetime earnings returns to qualification of level k (e.g. upper secondary qualification) relative to low skill (ISCED 0-2, i.e. lower secondary school or lower) acquired at age a over adulthood (25-64) expressed in present value is given by:

¹⁶ Most qualifications gained from participating in the YG will be ISCED 3 for people who only had ISCED 2. However, our approach can easily be generalised to other level of qualification, as explained below.

$$ILR_{k,a} = \sum_{t=0}^{39} \overline{AAI}_{25,0,2} (1 + \gamma_1 t + \gamma_2 t^2) \beta_k \left(\frac{1+g}{1+d} \right)^{t+25-a}$$

where $\overline{AAI}_{25,0,2}$ is the observed average annual earnings of individuals with low skills aged 25, β_k is the returns to qualification of level k, γ_1 and γ_2 are the coefficient to work experience (included in the Mincer model as a second-order polynomial), g is the long-term real growth rate and d is the discount rate, t denotes the number of years after turning 25 and a the age at which the qualification was gained.

The aggregated benefits arising from the increase in educational attainment caused by the Youth Guarantee is given by:

$$BEduc = \sum_k \sum_a N_{k,a} ILR_{k,a}$$

where $N_{k,a}$ is the number of young people who achieved a qualification at level k at age a thanks to the Youth Guarantee and $ILR_{k,a}$ is the individual lifetime earnings returns to qualifications of level k acquired at age a expressed in present value. This approach could be conducted separately for men and women, if the data allows this, as returns to education can differ significantly between men and women. Note that this method allows deriving benefits arising from acquisition of qualifications of level k for people who have not achieved upper secondary education prior to joining an education or training programme as a result of the Youth Guarantee. This approach can easily be adapted to measure the benefits arising from higher educational attainment achieved by those who already had upper secondary education or higher.

4.1.4 Returns to firms

Because of labour market imperfections (mobility barriers, firm specific human capital, and non-perfect competition), the marginal product of employees may be greater than the value of the wage they receive. Relying on the observed gross earnings may therefore result in underestimating the overall economic benefits of the Youth Guarantee. One way to correct for this is to use a product market corrector (PMC). The earnings of participants (when they find work) can be multiplied by this factor to account for the additional surplus they provide to society (Fujiwara, 2010). One way of obtaining a PMC is to use the reciprocal of the capital share of national income.

$$E(T) = W \times PMC$$

However this approach may result in overestimating the benefits. A proportion of the value of the output accrues to foreign owners of companies. Returns to factors of production that accrue to foreign citizens should not be counted in SCBA. Therefore PMC should only be used in the sensitivity analysis.

4.2 Improved health and well-being

Getting a job or a place on a training course is expected to improve well-being and mental health. Part of the well-being effect is already captured in the increased earnings

discussed above. It is further accounted for by the use of distributional weights (see last section). However, there is evidence that being in work may have benefits that go beyond the financial rewards of work (Jahoba, 1982). These effects on well-being that are independent of earnings are very difficult to estimate, but we present a potential methodology to account for these. These effects should be estimated for all young people who leave unemployment or inactivity thanks to the Youth Guarantee schemes, regardless of whether they are employed, in education, carrying out an apprenticeship or a traineeship.

4.2.1 Unemployment and health: what do we know?

A set of studies based on longitudinal data show evidence of a strong association between unemployment and health that holds when controlling for early life characteristics. Bartley et al (2004) found that unemployment in one year was associated with twice the risk of having a limiting illness in the next year. Unemployment is strongly linked with mental health problems. Thomas et al (2005) showed that transitions from paid employment to either unemployment or long term sick leave were associated with increased psychological distress for both men and women. A recent study from the US (McGee and Thompson, 2015) found that unemployed young people were 3.17 times more likely to suffer from depression than those with a job.

A few studies focus on the association between youth unemployment and health in adulthood (the so called ‘scarring effect’ of unemployment). Using data from a Swedish cohort study, Strandh et al (2014) found that youth unemployment is associated with poorer mental health not only when young but throughout adulthood. Interestingly, unemployment spells later in adulthood did not appear to have the same long-term negative effects. Based on a British Cohort Study, Daly and Delaunay (2015) found evidence that unemployment throughout adulthood is associated with psychological distress at age 50, even when controlling for early adulthood distress and childhood psychological factors. Past unemployment is also found to be associated with lower personal well-being (Clark et al, 2001).

While these studies control for a number of potential confounders, it is possible that the associations they highlight may be due to selection or unobserved confounding factors. Specifically, people who become unemployed may have poorer health than those who are employed and baseline adjustment may not be able to fully capture this (Avendano and Berkman, 2014). Using results from the studies mentioned above as causal effects of unemployment on health could result in considerably overestimating the benefits of the Youth Guarantee. In order to overcome this selection problem, a growing number of studies focus on job losses due to plant closure or mass redundancy plans, which, conditional on observables characteristics, can be deemed exogenous. Job losses due to plant closure or mass redundancy plans are less likely to suffer from selection than other involuntary job losses. Results from studies using this approach are mixed. Böckerman and Ilmakunnas (2009) found that unemployment does not have any causal effect on self-rated health in Finland. Browning et al (2006) found no effect from job loss on hospitalisation for stress-related diseases in Denmark, and Schmitz (2011) found that job loss due to business closure had no effect on hospitalisation, health satisfaction or mental health score.

However, Sullivan and van Wachter (2009) using administrative data from Pennsylvania found that annual death rates for men with stable careers who lost their job as a consequence of mass redundancy increased by 10-15 per cent, even 20 years after losing their job. Eliason and Storrie (2009) found that in Sweden job loss has an impact on hospitalisation due to alcohol-related problems, traffic accidents and self-harm. Browning and Heinesen (2012) described that in Denmark job loss increases the risk of mortality caused by circulatory disease; of suicide and suicide attempts; and of death and hospitalisation due to traffic accidents, alcohol-related disease, and mental illness.

Because most of these studies exploiting ‘natural experiments’ rely on administrative data they cannot capture undiagnosed mental health problems, which are likely to affect the unemployed. In addition they tend to focus on older workers who lost their job, a population that is completely different to those targeted by the Youth Guarantee. Nonetheless, they provide evidence that, in some cases, the strong association between unemployment and poor health may be partly causal. The association between unemployment and health is likely to be driven, to a certain extent, by unemployment having a causal effect on health. The selection problem (those in poorer health are more likely to be out of work) is likely to be less strong for young people than for an older population, as work-limiting health conditions are more prevalent among older than younger individuals. The literature suggests that being unemployed when young has an effect on well-being and the prevalence of mental health problems. Not accounting for the likely effects of the Youth Guarantee on mental health could result in severely underestimating the benefits of the interventions.

However, valuing the health benefits resulting from re-entry into employment or education is very challenging. First, one should be careful not to double count benefits: some of the well-being and mental health effects arise from the increased earnings resulting from (re)entry into employment, which are already accounted for. Second, the effects are likely to vary across countries (Avendano and Berkman, 2014); therefore using results from a study may be heroic. Third, empirical studies analysing the effects of unemployment on health typically do not use outcomes that are easily compatible with valuation techniques generally based on Quality-Adjusted Life Years (QALY). Typically Health differentials between groups are typically measured in QALY weights, an index scale ranging from 0 to 1, where 1 refers to perfect health and 0 to near death. The QALY weight is a measure of current health and denotes the value associated with it. For instance, a value of 0.8 means that the present year of life is estimated to be worth 0.8 year of life in perfect health.

4.2.2 *Estimating the effect of unemployment on health*

A potential approach could estimate the effect of moving out of unemployment or inactivity on measures of QALY weights, controlling for income in order to capture the health effects resulting from increased income due to re-employment. Ideally this would require longitudinal data such as EU-SILC to be used in order to control for individual fixed effects.

There are several ways QALY weights can be obtained from surveys. QALY weights can be derived from health questionnaires such as EQ-5D, SF-12 or SF-36. An alternative method is to estimate ordered probit regressions using information on self-perceived health (Cutler and Richardson, 1997). Groot and Brink (2007) used this method to estimate the effect of education on health in the Netherlands. While EU-SILC does not contain a SF-12 or SF-36 questionnaire it includes self-perceived health questions. Respondents are asked to assess their health based on five categories (from very good to very bad). QALY weights derived from health questionnaires such as EQ-5D, SF-12 or SF-36 should be used if available in national data.

The empirical modelling has to distinguish between the true quality of health, H^* , a latent variable which cannot be directly observed, and H^S , the subjective measure of health, which is measured by the self-perceived health question.

The latent quality of health variable is assumed to be related to labour market status in the following way:

$$H^* = \beta_1 \text{Employed} + \beta_2 \text{Education} + \mathbf{x}\gamma + \varepsilon$$

where *Employed* is equal to 1 if the respondent is employed, 0 otherwise, *Education* is equal to 1 if the respondent is in education or training, 0 otherwise. Being unemployed or

inactive is the omitted category, so that β_1 and β_2 measure the differential in latent health associated with being employed or enrolled in education, compared to being unemployed. x is a vector of individual characteristics and ε is an error term capturing unmeasured factors. Individual fixed effects should be included if using longitudinal data, and income (earnings+benefits) controlled for in order to isolate the effect of unemployment on health that does not run via income.

The observed health status H^S is a categorical ordered response variable and is assumed to be related to the latent variable in the following way:

$$H^S = k \leftrightarrow \alpha_{k-1} < H^* \leq \alpha_k, k = 1, \dots, 5$$

with n being the number of response categories (5 for the general health question in EU-SILC) and α_i the threshold levels. The coefficients can be estimated using ordered probit models.

Cutler and Richardson (1997) provided an easy way to calculate the QALY weight based on coefficients from ordered probit regressions. The β coefficients are not scaled (in theory they can range from $-\infty$ to $+\infty$) and need to be normalised to derive a QALY weight (which ranges between 0 and 1). Normalisation is obtained by dividing the coefficient by the difference in the thresholds of the upper and lower category. The QALY weight for being employed or in education (denoted i) is given by:

$$QALYw_i = \frac{\beta_i}{\alpha_4 - \alpha_1}$$

The QALY weight measured by this approach can be interpreted as the difference in QALY weight between being employed or in education compared to being NEET, controlling for relevant individual characteristics, including fixed-effects, as well as income.

4.2.3 In-programme effects

The likely short term effect of the YG on QALY can be obtained by the following formula:

$$\Delta QALY = N_{Emp} \times \overline{Dur} \times \beta_1 + N_{Educ} \times \overline{Dur} \times \beta_2$$

where N_{Emp} is the number of young people who moved into employment and N_{Educ} is the number young people who moved into education due to the Youth Guarantee. \overline{Dur} is the average duration of an unemployment/inactivity spell in a year¹⁷; β_1 is the effect on QALY weight of being employed compared to being NEET and β_2 is the effect on QALY weight of being in education.

The monetary value to place on a QALY has been subject to an ongoing debate. The EuroVaQ project developed methods to determine the monetary value of a QALY across a number of EU Member States. The resulting values are very high compared to values typically used in cost effectiveness studies. Values in line with those used in countries for the evaluation of cost effectiveness of medical products could be used for the SCBA. In the UK, the National

¹⁷ Because \overline{Dur} is likely to be relatively small, for simplicity sake benefits should not be discounted.

Institute for Care Excellence use QALY values in the range of £20-30,000. In the US, the value of \$50,000 is routinely used (Weinstein, 2008).

The likely health benefits arising from the Youth Guarantee is given by:

$$HealthBen = \Delta QALY \times QALYvalue$$

This analysis does not account for savings in healthcare costs that are likely to result from improved health. While this in theory should be accounted for, the lack of appropriate data makes it virtually impossible.

4.2.4 Potential long-term health benefits from reduced unemployment

As discussed in Section 4.1.2, the labour market integration measures of the YG are expected to increase the time spent in employment beyond the period when young people benefit directly from the interventions. These interventions are likely to have long-lasting effects on employment rates, and therefore impact mental health

the methodology laid out in Section 4.1.2 should be followed with an exclusive focus on out-of-work benefits. The average lifetime health effect caused by the YG can be calculated as:

$$LTHB = \sum_{t=0}^T YG_t^E \beta_t QALYvalue \left(\frac{1+g}{1+d} \right)^t$$

where YG_t^E is the long-term impact of the YG on employment rate at year t (See Section 4.1.2), β_t is the effect on QALY weight of being employed; g is the long-term real growth rate and d is the discount rate; t refers to the number of years after the intervention finished. T denotes the number of years the lifetime costs should be calculated on.

Section 4.2.2 presented a method to obtain an estimate of β – by stratifying the sample by age group, one could derive estimates of β that are different for each age group. However, this may not be possible due to the sample size and therefore an estimate of β obtained on the whole sample could be used. To be consistent with the way long-term effects on earnings are estimated, the benefits should be computed until the age of 64.

4.3 Reduced receipt of welfare benefit

4.3.1 In-programme effects

While the young people who are re-engaged into education and training are expected to still receive benefits, those moving into employment or apprenticeship should stop receiving benefits (or at least receive lower benefits). Some of those engaged in a traineeship may still be receiving benefits. This should be accounted for in the SCBA since lower benefits payments should benefit society as a whole.

Data on the change in the number of benefits claimants should be available at national level, and the savings in benefits payments should be rather easy to derive. Reduction in benefits payment should potentially be multiplied by the weight used to account for the deadweight loss of taxation, since a reduction in benefits payment could translate into lower taxes, and therefore improve economic efficiency.

4.3.2 Potential long-term benefits from reduced unemployment

As discussed in Section 4.1.2, the labour market integration measures of the YG are expected to increase the time spent in employment beyond the period when young people benefit directly from the interventions. These interventions are likely to have long-lasting effects on employment rates, and therefore reduce spending on out-of-work benefits.

The methodology laid out in Section 4.1.2 should be followed with a focus on out-of-work benefits. The average lifetime change in benefit payment caused by the YG can be calculated as follows:

$$LTCB = \sum_{t=0}^T YG_t^E (\overline{OWB}_t - \overline{IWB}_t) \left(\frac{1+g}{1+d} \right)^t$$

where YG_t^E is the long-term impact of the YG on employment rate at year t (See Section 4.1.2) and \overline{OWB}_t and \overline{IWB}_t are respectively the average annual value of benefits received by those in work and those out of work;; g is the long-term real growth rate and d is the discount rate; t refers to the number of years after the intervention finished. T denotes the number of years the lifetime costs should be calculated on.

EU-SILC could be used to estimate \overline{OWB}_t and \overline{IWB}_t . As for earnings and employment rates, it could be calculated using age bands rather than for each age, and should be computed until the age of 64.

4.3.3 Long-term effects of education

Higher educational attainment is likely to result in better labour market outcomes, and hence in lower receipt of unemployment and other mean-tested benefits. The expected life-course differences in gross benefit payments resulting from the higher level of education induced by the Youth Guarantee could be estimated following an approach similar to the one used to derive the lifetime earnings increase associated with higher levels of education.

First the differential in receipts of benefits payment across different qualification levels for different age groups should be estimated, controlling for parental background. The estimation equation can be written as:

$$Ben = \alpha + \sum_k \beta_k hqual_k + \sum_a \gamma_a age_band_a + \mathbf{x}\boldsymbol{\gamma} + \varepsilon$$

where Ben is annual total benefits received by the respondent, $hqual_k$ is the set of dummies equal to 1 if the respondent's highest qualification is level ISCED k . ISCED 0-2 is the omitted category. $g(age)$ is a function of age, and could be proxied by a set of age-band dummies. \mathbf{x} is a vector containing parental background characteristics. β_k can be interpreted as the average amount of benefits received between individuals holding a qualification of level k and those with low skills (i.e. with a qualification of ISCED level 0 to 2), for the same age and characteristics included in \mathbf{x} .

Based on the estimated average differentials in benefits receipts (β_k) lifetime returns could be computed by summing the estimated average differentials in benefits receipts (β_k) over the adult life (25-64), subject to discounting and growth in benefits value. The individual lifetime savings in benefits payments (ILB) resulting from acquiring a qualification of level k at age a can be written as:

$$ILB_{k,a} = \sum_{t=0}^T \beta_k \left(\frac{1+g}{1+d} \right)^{t+25-a}$$

where β_k is the estimated average annual differentials in benefits receipt, g is the expected annual growth rate in benefits payment and d the discount rate.

This approach can be refined by estimating the model for different age groups separately (or introducing interaction terms between the age band and qualifications dummies). If five year age bands (25-29, 30-34, ...60-64.) are used this could be written as:

$$ILB_{k,a} = \sum_{t=0}^{4T} \sum_{ab} \mathbf{1}(t+25 \in ab) \beta_{k,ab} \left(\frac{1+g}{1+d} \right)^{t+25-a}$$

with t denoting the number of years since turning 25, ab the age band (25-29, 30-34, etc.), a the age at which the qualification was gained. $\beta_{k,ab}$ is the estimated average annual differentials in benefits receipt for those in the age band ab .

The aggregated benefits coming from the reduction in benefits payment can be expressed as:

$$BBen = \sum_k \sum_a N_{k,a} ILB_{k,a}$$

4.4 Reduced crime

4.4.1 Unemployment and crime

Evidence from the literature suggests that youth unemployment and inactivity increases criminality (Lin, 2008 for the US; Fougère et al, 2009 for France; Grönqvist, 2011 for Sweden; Bell et al 2014 for the UK and the US). The Youth Guarantee, by reducing youth unemployment and inactivity, are likely to reduce crime. Benefits arising through a reduction in crime are likely to affect society as a whole. Directly estimating the effect of the Youth Guarantee on the propensity of young people to engage in crime may be challenging, but this may potentially be an option for some countries. An alternative option is to use findings from the literature to model the likely effects of the Youth Guarantee on crime. Note that this analysis may not apply to all countries, as the dramatic increase in youth unemployment in recent years may not have resulted in a strong increase in crime.

There is no consistent study on the impact of youth unemployment on crime at EU level. A few studies that looked at the causal effect of a change in youth unemployment on crime were reviewed. However, in order to be used to value the likely benefits arising from the Youth Guarantee, we need estimates that relate to the number of crimes committed rather than the individual probability of committing a crime, which is used as an outcome by Grönqvist (2011). Using individual level register data for Sweden, Grönqvist (2011) showed that long-term unemployed (>180 days) young people (aged 19-25) were more than twice as likely (55 per cent) to engage in crime than otherwise comparable individuals. He controlled for a range of socio-demographic characteristics, as well as whether the individual had been convicted in the past, in order to address the endogeneity problem.

Fallesen et al (2014) estimated the effect of Active Labour Market Policy (ALMP) on the number of arrests using a natural experiment in Denmark. Introducing mandatory ALMP reduced the number of convictions of unemployed young men who did not receive

unemployment benefits by between 31 and 47 per cent, depending on the specification. ALMP was found to have no effects on crime for men who receive unemployment benefits. There are two main limitations that would make it challenging to use estimates from this study to predict the crime-reducing effect of the Youth Guarantee.

Firstly, while the internal validity is very strong, the external validity may be somewhat limited as it was based on a reform in a Danish municipality. Secondly, the number of convictions is a very limited measure of crime, as only a rather small proportion of crimes result in an arrest and a conviction. Third, the Youth Guarantee is not a traditional ALMP. Under Youth Guarantee, all young people who are NEET for four months or more should be offered an employment or training opportunity. Lastly, to use these estimates to derive the likely impact of the Youth Guarantee on crime, one would need to know the number of crimes committed by 18-24 year old NEETs. This figure is unlikely to be available consistently across EU countries.

A simpler approach is to use estimates derived using macro level data, so that the benefits can be calculated based on the number of crimes only, irrespective of who committed them. Ideally estimates of a change in the share of young people who are NEET on the number of property crimes should be used. Fougère et al (2009) analysed the causal effect of youth unemployment¹⁸ on crime using a fixed-effect and instrumental variable¹⁹ model in order to address the fact that crime may have an impact on unemployment rates (if, for instance, companies move away from areas with increasing crime rates).

Based on county level ('département') data from 1990 to 2000, they instrument the local share of young people who are unemployed by the predicted employment growth based on the industry structure. While this study relies on French data, the findings could be used as a proxy for other European countries. Firstly, the relationship between crime and youth unemployment seem to be observed almost universally. Secondly, the share of unemployed young people varies substantially across counties and over time. This variation is likely to make the estimates relevant for other countries.

The impact of a change in the share of unemployed young people in this paper is expressed in the number of crimes per 100,000 inhabitants. To make it useable for the Youth Guarantee SCBA, these figures were converted into elasticities, which would show that a one per cent increase in the share of the unemployed increases the number of crimes by x per cent. The estimated coefficients were divided by the average number of crimes per 100,000 inhabitants. This gives us a semi-elasticity (i.e. a one percentage point increase in the share of the unemployed increases the number of crimes by x per cent). Then the semi-elasticities were divided by the average share of unemployed young people²⁰ to obtain elasticities (i.e. a one per cent increase in the share of the unemployed increases the number of crime by x per cent).

The elasticities of crime to youth unemployment (as a percentage) for several types of property crimes are reported in

Table Error! No text of specified style in document..4. A one per cent increase in the share of young people who are unemployed is expected to increase the number of property crimes by 0.4 per cent.

¹⁸ Because Fougère et al (2009) use youth unemployment, and do not capture inactivity, these results cannot be used to analyse the effect of inactivity on crime. However, the results based on youth unemployment can be used as a proxy and one should bear in mind that this is likely to underestimate the effect, since those who are inactive may have a higher propensity to commit crime than those who are unemployed.

¹⁹ The instrumental variable approach identifies the causal effect of an explanatory variable on the dependent variable by using another variable (the instrument) that has an effect on the explanatory variable but no independent effect on the dependent variable.

²⁰ Obtained from Eurostat [lsfa_pganws].

Table Error! No text of specified style in document..4: Elasticity of crime to youth unemployment, percentage

Armed or violent robberies	1.2
Burglaries	0.2
Car thefts	0.5
Motorbike thefts	1.2
Thefts of objects from cars	0.2
Shoplifting	-
Pickpocketing	0.8
Receiving stolen goods	-
All property crimes	0.4

Source: Fougère et al (2009); Eurostat [lsfa_pganws]; own calculations

4.4.2 In-programme effects

The YG is expected to reduce crime by reducing non-employment while young people are engaged in work or education. The expected short-term change in a given type of property crime (j) is given by the product of the change in the NEET rate of young people aged 18-24 with the elasticity and the number of property crimes (j) committed in a year. More formally it is given as:

$$\Delta N_YG_j = \Delta NEETr \times e_j \times N_j$$

where $\Delta NEETr$ is the change in annual NEET rate of 18-24 year olds caused by the Youth Guarantee, e_j is the elasticity of crime to youth unemployment, and N_j is the number of crimes of type j. The benefits arising from a reduction in crime can be valued using ‘cost of crime’ estimates for the different types of crime. In the UK, estimates for the social costs of different types of crimes are published by the Home Office²¹. The taxonomy of property crimes used in the cost of crime estimates may differ slightly to the one used by Fougère et al (2009), and could therefore have to be adapted. Monetary estimates should be expressed in 2015 or 2016 prices, using inflation figures. If estimates of the cost of crime are not available at country level, the values from the UK could be used and weighted by the ratio of the country’s GDP per capita to the UK’s GDP per capita.

Total (annual) benefits arising from a reduction in crime can be calculated as:

$$B_{crime} = \sum_j \Delta N_YG_j \times \bar{C}_j$$

²¹ See Home Office (2005).

where ΔN_{YG_j} is the expected effect of the Youth Guarantee on the number of crimes of type j committed in a year, and \bar{C}_j is the average social cost of crime of type j .

4.4.3 Long-term reduction in scarring effect of unemployment

As discussed in Section 4.1.2, the labour market integration measures of the YG are expected to increase the time spent in employment beyond the period when young people benefit directly from the interventions. These interventions are likely to have long-lasting effects on employment rates, and therefore reduce crime.

The methodology laid out in Section 4.1.2 should be applied to value the long-term effects on crime. The benefits arising from long-term reduction in crime j can be calculated as:

$$LTRC_j = \sum_{t=0}^T YG_t^E e_j \bar{C}_j \left(\frac{1+g}{1+d} \right)^t$$

Where YG_t^E is the long-term impact of the YG on employment rate at year t (See Section 4.1.2) and e_j is the elasticity of crime to youth unemployment and \bar{C}_j is the average social cost of crime of type j (see section above); g is the long-term real growth rate and d is the discount rate; t refers to the number of years after the intervention finished. T denotes the number of years the lifetime costs should be calculated on.

The time for which the benefits accrue, T , is a key parameter. In their analysis, Fougère et al (2009) find that adult (those aged 25-49) unemployment has no effect on property crime. Indeed, the majority of property crimes are committed by young people. Lochner (2004) found that property crime rates reach a peak during the late teenage years, and then decline. Therefore, benefits should be computed until participants reach the age of 25.

4.4.4 Crime reducing effect of education

There is mounting evidence that education policies can reduce crime (Lochner and Moretti, 2004; Machin et al, 2011; Hjalmarsson et al, 2011; Lochner, 2011; Fella and Gallipoli, 2014) but benefits arising from crime reduction are rarely included in cost benefit analysis. As the population targeted by the Youth Guarantee is particularly at risk of committing crime, it is important to include estimates of the effects on crime of the Youth Guarantee in the SCBA. The method designed for the CBA of the Youth Contract in the UK (See Nafilyan and Speckesser, 2014) could be used.

This section provides a methodology to measure and value the benefits arising from the reduction in the number of crimes caused by the Youth Guarantee. First, it shows how estimates of the change in the number of crimes resulting from higher educational attainment induced by the Youth Guarantee can be derived based on findings from the existing literature.

There is compelling evidence (Lochner, 2011) that improved education is associated with a fall in property crimes but has very little effect on other types of crime. Therefore, the analysis focuses exclusively on property crimes. In addition, the crime reducing effect of education is typically found for men, but not women.

Estimating the expected change in the number of crimes resulting from the implementation of the Youth Guarantee involves measuring the causal effect of increasing education on the propensity to commit crime. Using the 1972 increase of the compulsory schooling age from 15 to 16 in England and Wales, Machin et al (2011) identify the causal impact of gaining a qualification (compared to having no qualification) on the conviction rate. They find the elasticity of crime with respect to reducing the share of people without qualifications to be 0.88. It measures how much the number of crimes change when the number of people without qualifications varies.

If the proportion of people without qualifications decreases by one per cent, the total number of property crime is expected to go down by 0.88 per cent. Therefore, each cohort of participants in the Youth Guarantee programmes is expected to change the number of crimes committed every year according to the following equation:

$$\Delta Crime = \frac{N_{YG}}{N_{NoQual}} \times e_{E/C} \times N_{Crime}$$

where N_{YG} is the additional number of people who gained a qualification because of the Youth Guarantee (and would not have had any qualification in the absence of the programme). Having no qualification is defined as having no upper secondary qualification (ISCED 3) and the crime benefits should only be calculated for participants with no qualification prior to joining an education or training programme. N_{NoQual} is the number of people aged 18-40 without qualifications²². $e_{E/C}$ is the elasticity of crime with respect to reducing the share of people without qualifications and N_{Crime} denotes the number of property crimes committed every year.

The reduction in property crimes is assumed to occur for the next five years only, as most crimes are committed by young people. The net present benefits arising from a decrease in property crimes resulting from a decrease in the proportion of young people without qualification is given as:

$$BenCrime = \sum_{t=1}^5 \Delta Crime \times \bar{C} \left(\frac{1+i}{1+d} \right)^t$$

where \bar{C} is the average cost of property crime, i is the expected inflation rate, d the discount rate, and t denotes the years for which the benefits occur.

²² We use this age group to be consistent with Machin et al (2011).

5. Discounting, distributional weights and other adjustments

5.1 Discounting

While most of the costs of the Youth Guarantee are incurred now some of the benefits will only accrue in the long-term. A social discount rate has to be used to convert benefits that occur in the future in present values, so that benefits can be compared to the costs. The rationale for using a discount rate is that people prefer to receive goods and services now rather than later. In addition, the discount rate accounts for the fact that the benefits may not be reaped (due to, for instance, a natural disaster).

EU guidelines suggest using a social discount rate of four per cent²³. This four per cent rate is in real terms and is applied to costs and benefits expressed in constant prices. This value of the discount rate should be used to discount the benefits. Using this discount rate would ensure consistency with CBA conducted for other projects, which rely on this value. Different values would be used in the sensitivity analysis.

5.2 Distributional weights

The impact of the Youth Guarantee will be experienced differently across different groups. The main benefactors of the Youth Guarantee are young people who are currently NEET while the direct costs are borne by taxpayers. These two groups have different levels of income, and owing to diminishing marginal returns the increase in utility caused by an additional euro for young people who are NEET is expected to be greater than loss in utility for the rest of the taxpayers caused by paying for the Youth Guarantee. This should be accounted for in order to capture the overall social welfare impact of the Youth Guarantee.

A measure of the overall welfare impact could be derived by using a distributional weight that captures the fact that the marginal utility of income is higher for the benefactors than those who bear the costs of the Youth Guarantee.

The Green Book for Appraisal and Evaluation published by the UK HM Treasury as well as the EU Guide to Cost-Benefit Analysis of Investment Projects show that the distributional weights can be obtained using this formula:

$$WW = \left(\frac{y_p}{y_b} \right)^\eta$$

where y_p is the average/median income of those paying for the intervention, y_b the average/median income of the benefactors and η is the elasticity of the marginal utility of income. The HM Treasury Green Book recommends using an elasticity of the marginal utility of income of 1. The EU Guide to Cost-Benefit Analysis of Investment Projects does not

²³ http://ec.europa.eu/smart-regulation/guidelines/tool_54_en.htm

recommend using any specific value. Fujiwara (2010) argued that a higher elasticity should be used, since there is evidence (Layard et al, 2008) that the relationship between income and utility (proxied by happiness) is more concave than implied by $\eta = 1$. Layard et al (2008), using a number of surveys, found the elasticity of the marginal utility of income to be 1.26 (with a 95 per cent confidence interval of 1.16-1.37). This value should be used for deriving the welfare weights.

5.3 Deadweight loss of taxation

Further adjustments to the direct costs of implementing the Youth Guarantee could be made. Standard microeconomic theory suggests that transferring resources from the private to the public sector may reduce economic efficiency. This is typically referred to in the literature as the deadweight loss of taxation. In other words, the increased taxation needed to fund the Youth Guarantee may distort individual behaviour and reduce economic surplus. For instance, an increase in income tax could reduce people's net pay and have negative employment effects. Including the deadweight loss of taxation may therefore give a more accurate assessment of net employment effects (Greenberg and Knight, 2007). Deadweight loss of taxation is routinely included in CBA in Australia, New Zealand and the UK. The main assumption behind the idea that increasing taxation results into distortionary effects is that the starting point is equilibrium in perfect competition. The high level of youth unemployment and inactivity provides evidence of a non-market clearing equilibrium. Therefore, it may not be justified to include deadweight loss of taxation in this SCBA. It is suggested that deadweight loss of taxation should only be used in the sensitivity analysis.

The magnitude of the deadweight loss of taxation has been subject to some debate. The deadweight loss can be measured by the labour supply elasticities with respect to taxes²⁴ (Feldstein, 1999). Many studies focus on specific countries, and use different data and specifications, making them difficult to compare. A notable exception is the recent study by Bargain et al (2014) which estimates labour supply elasticities for 18 EU Member States. reports estimates of deadweight loss of taxation based on their results²⁵. The average estimate could be used for the countries that were not analysed by Bargain et al (2014).

Table Error! No text of specified style in document..5: Estimates of deadweight of taxation based on Bargain et al (2014)

AT	0.20
BE	0.20
DE	0.22
DK	0.22
EE	0.08
ES	0.32
FI	0.11
FR	0.13
GR	0.33
HU	0.11
IE	0.29

²⁴ I.e. by how much labour supply changes when taxes increase by one per cent.

²⁵ Bargain et al (2014) compute labour supply elasticities for men and women separately, and for some countries compute the elasticity for two years. The average of the estimates is used if there are two values for different years and use a weighted average of men and women based on their relative size in the employed population, using Eurostat data for 2015.

IT	0.16
NL	0.18
PL	0.07
PT	0.09
SW	0.11
UK	0.08
Average	0.17

In order to obtain a full estimate of the costs, the direct programme costs should be multiplied by 1+deadweight loss.

5.4 Multiplier effect

The theory of the multiplier was first established as an economic concept in the nineteen thirties by Kahn (1931) and was subsequently developed by Keynes (1936) as a means of explaining the effect of investment. For example, Keynes explained that if there is an investment multiplier, k , and there is an incremental increase in the level of aggregate investment, then income will increase by k times the increment in investment. In other words, the multiplier is the marginal effect of a change in one economic variable on another economic variable. This has gained prominence as a means of describing the effect of government spending hence the development of the fiscal multiplier.

The fiscal multiplier refers to the concept that government spending can stimulate additional private spending, resulting in a rise in GDP which exceeds the initial rise in spending. This has significant implications when considering the effects of public spending as it suggests significant gains for the country's economy as an unintended consequence of the initial fiscal stimulus. As the unemployed move into work they contribute to the economy, and may receive fewer social security payments. However, when in the labour market, individuals typically also have a higher disposable income and their additional spending also drives further gains for the wider economy.

With regards to the Youth Guarantee in particular, government spending on this labour market policy results in improved earnings for participants due to employment or subsidised education or training so that the young people typically have higher disposable incomes. Furthermore, young people tend to have a high marginal propensity to consume, meaning that for a €1 increase in disposable income, they will increase their spending by a relatively high amount (e.g. 80 cents). This increased consumption further raises demand, resulting in a 'multiplier'. According to this phenomenon we would expect governments' investment in the Youth Guarantee to result in greater increases in GDP than the initial cost of delivering the scheme. As such it is important to consider the multiplier and the magnitude of the potential effect the multiplier will have on countries' income levels. The multiplier can be expressed as:

$$M = \frac{1}{1 - MPC(1 - MPI)}$$

Where MPC is the marginal propensity to consume and MPI is the marginal propensity to import. Part of the goods and services purchased by participants will be imported and therefore this would result into a lower multiplier effect. MPC of participants cannot be readily observed but may be proxied by the average propensity to consume, which can be calculated by dividing household consumption by household disposable income. MPI can be proxied by the ratio of imports of goods and services to GDP, which is available from Eurostat²⁶. Using

²⁶ <http://ec.europa.eu/eurostat/web/economic-globalisation-indicators/indicators/trade>

0.8 for MPC and 0.4 for MPI gives a multiplier of 1.92. This value is in line with recent estimates of fiscal multipliers as reviewed in the meta analysis conducted by Gechert et al. (2015). They found that estimates for the fiscal multiplier are significantly higher during economic downturns than under ‘normal’ economic circumstances or times of significant growth. The authors utilised 92 studies between 1992 and 2013, which provided a sample of 1882 observations of multiplier values. Gechert et al. (2015) estimate the multiplier effect of public investment to be 1.5 under average economic conditions and 1.9 for lower than average economic conditions.

5.5 Displacement effects

The Youth Guarantee could crowd out jobs and training opportunities for unemployed and inactive individuals aged above 24. The increased engagement of young people in paid employment and education and training could (partly) come at the expense of slightly older unemployed and inactive individuals. These potential displacement effects could considerably reduce the benefits of the Youth Guarantee. There is some evidence that active labour market policies may have displacement effects (Skedinger, 1995).

More recently, Crepon et al (2012) using a randomised controlled trial in France showed that labour market policies may have very large displacement effects, as untreated unemployed people were much less likely to find a job in local labour markets where a high proportion of unemployed people were allocated to a programme.

Country experts should monitor closely the unemployment rate²⁷ of 25-29 and 30-34 year olds in order to assess whether the Youth Guarantee are likely to crowd out jobs for these age groups. If displacement effects are observed, then they should be valued. The easiest way to do this would be to subtract the number of ‘displaced’ individuals from the estimate of the number of additional young people who re-enter work as a result of the YG. By calculating the effect of the YG net of displacement effect, these would be accounted for in the SCBA.

²⁷ And the employment rate and other labour market outcomes where possible.

6. Sensitivity Analysis

A Monte Carlo simulation should be conducted in order to assess the sensitivity of the SCBA to the assumptions about the parameters.²⁸ A Monte Carlo simulation uses probability distributions to simulate the effects of uncertain parameters on the outcome of the SCBA. It provides a systematic assessment of the combined effects of multiple sources of uncertainty.

While the direct programme costs can be estimated with low uncertainty, the indirect costs and all benefits are associated with some uncertainty, as they are measured with error/based on ad hoc assumptions.

In order to run a full Monte Carlo simulation, we have to assume that each element used in the calculation of the costs and benefits is drawn from a known distribution (e.g. uniform, normal). Some parameters may be considered to be measured with no uncertainty and therefore not be included as a random variable in the Monte Carlo simulation.

In the simulation, a value for each of the elements of the cost is drawn from the relevant distribution and the Net Present Benefits are calculated using this set of values. The procedure is replicated a large number of times (e.g. 10,000). A frequency distribution of Net Present Benefits is obtained so that the analyst can determine the central NPV values (i.e. mean and median) as well as NPV range (i.e. 95 per cent Confidence interval).

We intend to design an Excel spreadsheet that national experts will be able to use to conduct the Monte Carlo Simulation of the Net Present Benefits of the Youth Guarantee.

²⁸ The Monte Carlo method is typically used in CBA to simulate the various sources of uncertainty that affect the costs and benefits.

References

- Albouy V and Lequien L (2009), 'Does Compulsory Education Lower Mortality?', *Journal of Health Economics*, 28(1), pp. 155-168
- Arendt J N (2005), 'Does Education Cause Better Health? a Panel Data Analysis using School Reforms for Identification', *Economics of Education Review*, 24(2), pp. 149-160
- Avendano M and Berkman L F (2014), 'Labor markets, employment policies and health', in Berkman L FL, Kawachi, I and Glymour MM (eds) (2014) *Social Epidemiology* Oxford University Press
- Badescu M, D 'hombres B, Villalba E (2011), *Returns to education in European countries: Evidence from the European Community Statistics on Income and Living Conditions (EU-SILC)*, JRC Scientific and Technical Report
- Bargain O, Orsini K, Peichl A (2014), 'Comparing Labor Supply Elasticities in Europe and the United States', *Journal of Human Resources*, 49(3), pp. 723–838
- Bartley M, Sacker A and Clarke P (2004), 'Employment status, employment conditions, and limiting illness: prospective evidence from the British household panel survey 1991-2001', *Journal of epidemiology and community health*, 58(6), pp. 501–6
- Behrman J R et al (2011), 'Does more schooling reduce hospitalization and delay mortality? New evidence based on Danish twins', *Demography*, 48, pp. 1347–1375
- Bell B, Bindler A, Machin S (2014), *Crime Scars: Recessions and the Making of Career Criminals*, Centre for Economic Performance Discussion Paper, 1284, 2014
- Bell D N F and Blanchflower D G (2011), 'Young people and the Great Recession', *Oxford Review of Economic Policy*, 27(2), pp. 241–267
- Böckerman P and Ilmakunnas P (2009), 'Unemployment and self-assessed health: evidence from panel data', *Health Economics*, 18(2), pp. 161–179
- Böheim R and Taylor M P(2002), 'The search for success: do the unemployed find stable employment?', *Labour Economics*, 9(6), pp. 717-735.
- Bramley G, Hirsch D, Littlewood M and Watkins D (2016), *Counting the cost of UK poverty*, Joseph Rowntree Foundation
- Brunello G, Fort M, Schneeweis N and Winter-Ebmer R (2015), 'The Causal effect of education on health: what is the role of health behaviors?', *Health Economics*, pp. 1099-1050
- Burgess S, Propper C, Rees H, and Shearer A (2003), 'The class of 1981: the effects of early career unemployment on subsequent unemployment experiences', *Labour Economics*, 10, pp. 291-309
- Browning M, Dano A M and Heinesen E (2006), 'Job displacement and stress-related health outcomes', *Health economics*, 15(10), pp. 1061–75

- Browning M and Heinesen E (2012), 'Effect of job loss due to plant closure on mortality and hospitalization', *Journal of Health Economics*, 31(4), pp. 599–616
- Card D (1999), 'The Causal Effect of Education on Earnings', In Ashenfelter, O and Card, D (eds), *Handbook of Labor Economics Volume 3A*, Amsterdam: Elsevier, 1999
- Card, D (2001), 'Estimating the Return to Schooling: Progress on Some Persistent Econometric Problems', *Econometrica*, 69(5), 1127–1160
- Case A, Fertig A, Paxson C (2005), 'The lasting impact of childhood health and circumstance', *Journal of Health Economics*, 24, pp. 365–389
- Clark D and Royer H (2013), 'The Effect of Education on Adult Mortality and Health: Evidence from Britain', *American Economic Review*, 103(6), pp. 2087-2120
- Crépon B, Duflo E, Gurgand M, Rathelot R, Zamora P (2012), *Do Labor Market Policies Have Displacement Effects? Evidence from a Clustered Randomized Experiment*, NBER Working Paper 18597, National Bureau of Economic Research
- Cutler D and Lleras-Muney A (2012), *Education and Health: Insights from International Comparisons*, NBER Working Paper 17738, National Bureau of economic Research
- Daly M and Delaney L (2013), 'The scarring effect of unemployment throughout adulthood on psychological distress at age 50: Estimates controlling for early adulthood distress and childhood psychological factors', *Social Science and Medicine*, 80, pp. 19–23
- Doiron D and Gørgens T (2008), 'State dependence in youth labor market experiences, and the evaluation of policy interventions', *Journal of Econometrics*, 145, pp. 81-97
- Dorsett R and Oswald A J (2014), *Human Well-being and In-Work Benefits: A Randomized Controlled Trial*, IZA Discussion Papers 7943
- Eliason M and Storrie D (2009), 'Does Job Loss Shorten Life?' *Journal of Human Resources*, 44(2), pp. 277–302
- Eurofound (2012), *NEETs - Young people not in employment, education or training: Characteristics, costs and policy responses in Europe*, Luxembourg: Publications Office of the European Union
- Fallesen P, Geerdsen L P, Imai S, Tranæs T (2014), *The Effect of Workfare on Crime: Incapacitation and Program Effects*, IZA Discussion Paper, 8716
- Fella G and Gallipoli G (2014), 'Education and Crime over the Life Cycle', *The Review of Economic Studies*, 81(4), pp. 1484–1517
- Feldstein M S (1999), 'Tax Avoidance and the Deadweight Loss of the Income Tax', *Review of Economics and Statistics*, 81(4), pp. 674-680.
- Fuchs V (1982), 'Time Preference and Health: An Exploratory Study', In Fuchs, V (ed) *Economic Aspects of Health*, Chicago: University of Chicago Press
- Fujiwara D (2010), *The Department for Work and Pensions Social Cost-Benefit Analysis Framework*, Department for Work and Pensions Working Paper No 86
- Gechert, S, A Hughes Hallett, and A Rannenberg (2015), "Fiscal multipliers in downturns and the Effects of Eurozone Consolidation", CEPR Policy Insight 79.

- Greenberg D and Robins P (2008) 'Incorporating nonmarket time into benefit-cost analyses of social programs: An application to the self-sufficiency project', *Journal of Public Economics*, 92, pp. 766-794
- Gregg, P. and Tominey, E.(2005) 'The wage scar from male youth unemployment'.*Labour Economics*, 12(4), pp.487-509
- Grönqvist H (2011), *Youth Unemployment and Crime: New Lessons Exploring Longitudinal Register Data*, Working Paper Series 7/2011, Swedish Institute for Social Research
- Groot W and Massen van den Brink H (2007), 'The Health Effects of Education', *Economics of Education Review*, 26, pp. 186-200
- Home Office (2005), *The economic and social costs of crime against individuals and households 2003/04*, Home Office Online Report 30/05
- Hurd M D, Rohwedder S, Tassot C (2014), *The Impact of Employment Transitions on Subjective Well-being: Evidence from the Great Recession and its Aftermath*, (RAND Working Papers,
- ILO (2012), *Eurozone Job Crisis: Trends and Policy Responses*, International Labour Organization (International Institute for Labour Studies)
- Jahoba M (1982), *Employment and Unemployment: A Social-Psychological Analysis*, Cambridge University Press
- Kahn, R.F, (1931), 'The relation of home investment to unemployment', *The Economic Journal*, 41(162), pp.173-198.
- Keynes, J.M., (1936), *General theory of employment, interest and money*, Atlantic Publishers & Dist.
- Kempter D, Juerges H and Reinhold S (2011), Changes in Compulsory Schooling and the Causal Effect of Education on Health: Evidence from Germany, *Journal of Health Economics*, 30(2), pp. 340-354
- Lochner L (2004), 'Education, Work, and Crime: A Human Capital Approach', *International Economic Review*, 45(3), pp. 811–843.
- Manning A (2011), 'Imperfect competition in the labor market', *Handbook of Labor Economics* (Vol. 4)
- McGee R E and Thompson N J (2015), 'Unemployment and Depression Among Emerging Adults in 12 States, Behavioral Risk Factor Surveillance System, 2010', *Preventing Chronic Disease*, 12, p.140451
- Meghir C, Palme M and Simeonova E (2011), *Education, health and mortality: Evidence from a social experiment*, mimeo, Stockholm University
- Mroz, T and Savage T (2006), 'The Long-Term Effects of Youth Unemployment', *The Journal of Human Resources*, 41(2), pp. 259-293
- Oreopoulos P, Page M E, Stevens A H (2006), 'The Intergenerational Effects of Compulsory Schooling', *Journal of Labor Economics*, 24(4), pp. 729–760
- Oreopolous P (2007), 'Do Dropouts Drop Out Too Soon? Wealth, Health, and Happiness from Compulsory Schooling', *Journal of Public Economics*, 91(1112), pp. 2213-2229

- Scarpetta S, Sonnet A and Manfredi T (2010), *Rising youth unemployment during the crisis*, OECD SEM Working Papers
- Skedinger P (1995), 'Employment Policies and Displacement in the Youth Labour Market', *ICY REVIEW*, 2, pp. 135–171
- Stewart M B (2007), 'The interrelated dynamics of unemployment and low-wage employment', *Journal of applied econometrics*, 22(3), pp. 511-531
- Strandh M et al (2014), 'Unemployment and mental health scarring during the life course', *The European Journal of Public Health*, 24(3), pp. 440–445
- Spasojević J (2010), 'Effects of Education on Adult Health in Sweden: Results from a Natural Experiment', in Slottje D, Tchernis R (ed) *Current Issues in Health Economics* (Contributions to Economic Analysis, Volume 290), pp. 179 – 199
- Sullivan D and von Wachter T (2009), 'Job Displacement and Mortality: An Analysis Using Administrative Data'* *Quarterly Journal of Economics*, 124(3), pp. 1265–1306
- Thomas C, Benzeval M, Stansfeld S A (2005), 'Employment transitions and mental health: an analysis from the British household panel survey', *J Epidemiol Community Health* 2005, 59, pp. 243–9
- Van Kippersluis H, O'Donnell O and Van Doorslaer E (2011), 'Long Run Returns to Education: Does Schooling Lead to an Extended Old Age?' *Journal of Human Resources*, 46(4)
- Weinstein M C (2008), 'How much are Americans willing to pay for a quality-adjusted life year?', *Medical Care*, 46(4),

Copyright © International Labour Organization, 2017.

The information contained in this publication does not necessarily reflect the official position of the ILO or the European Commission.