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Study on Distributional Impact Assessment



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Abstract (EN)

This study first aims to understand to what extent and how do EU Member States make use of (ex-ante) distributional impact assessment (DIA) for budgetary measures. It also aims to identify the main reasons limiting the use of DIA in Draft Budgetary Plans (DBPs) and to assess the degree of similarity in the use of DIA among Euro Area Member States. The study then aims to provide suggestions for increasing the use of DIA in EU Member States and suggestions regarding the design of a possible EU Common Framework in this area. The study shows that, even if most of the Member States performed at least some DIA in recent years for budgetary matters, they could still do much more in this respect and that they (Euro Area Member States) rarely included DIA in their Draft Budgetary Plans due to organisational issues (e.g., lack of time and no specific request from the ministerial hierarchy). To encourage the use of DIA as well as its inclusion in budgetary documents, such as the DBPs, the study makes several suggestions to both the European Commission (such as hosting workshops on DIA for Member States and offering to interested Member States some guidance on DIA) and to the Member States (depending on their frequency of DIA use). Most of these suggestions to the Member States are then further structured into a possible EU Common Framework for DIA use in official documents (including in DBPs), which aims to help interested Member States to increase their use of DIA and ensure its quality. This Framework is split into two different sets of suggestions which reflect two possible levels of ambition for Member States regarding their use of DIA (a basic level and an advanced level). The basic level, which proposes good practices for DIA, would aim to help some of the EU Member States (those with no or little DIA use) to perform more DIA (and of sufficient quality). The second level – acting as an additional layer on top of the basic level and proposing best practices for DIA - would aim to help those Member States with more frequent DIA use to perform more advanced forms of DIA.

Abstract (FR)

Cette étude vise tout d'abord à comprendre, dans quelle mesure et comment, les États membres de l'UE utilisent l'outil qu'est l'évaluation (ex ante) de l'impact des mesures budgétaires sur le revenu des individus, selon leur position dans la distribution des revenus (« DIA » en anglais). Elle vise également à identifier les principales raisons limitant l'utilisation de la DIA dans les projets de plans budgétaires (PPB), ainsi qu'à évaluer le degré de similitude dans l'utilisation de la DIA parmi les États membres de la zone euro. Dans un second temps, cette étude vise à formuler des suggestions pour accroître l'utilisation de la DIA dans les États membres de l'UE et des suggestions concernant l'élaboration d'un éventuel cadre commun à l'UE dans ce domaine. L'étude montre que, même si la plupart des États membres ont utilisé au moins en partie la DIA ces dernières années pour des mesures budgétaires, ils pourraient encore faire beaucoup plus à cet égard et qu'ils (pour les États membres de la zone euro) ont rarement inclus la DIA dans leurs PPB en raison de problèmes organisationnels (par exemple, le manque de temps et l'absence de demande spécifique en la matière de la part de la hiérarchie ministérielle). Afin d'encourager l'utilisation de la DIA ainsi que l'inclusion de ses résultats dans les documents budgétaires tels que les PPB, l'étude formule plusieurs suggestions pour la Commission européenne (comme l'organisation d'ateliers sur la DIA pour les États membres et le fait de fournir aux États membres intéressés des conseils en matière de DIA) ainsi que plusieurs suggestions pour les États membres (selon leur fréquence d'utilisation de la DIA). La plupart de ces suggestions aux États membres sont ensuite structurées au sein d'un éventuel cadre commun à l'UE pour l'utilisation de la DIA dans les documents officiels (y compris mais pas uniquement dans les PPB), qui vise à aider les États membres intéressés à accroître leur utilisation de la DIA et à en assurer la qualité. Ce cadre est divisé en deux différentes séries de suggestions qui reflètent deux niveaux d'ambition possibles pour les États membres en ce qui concerne leur utilisation de DIA (un niveau de base et un niveau avancé). Le niveau de base, qui propose des bonnes pratiques en matière de DIA, vise à

aider certains États membres de l'UE (ceux qui n'utilisent pas ou peu la DIA) à utiliser davantage la DIA (et ce, avec une qualité suffisante). Le second niveau, qui vient s'ajouter au premier et propose des pratiques d'un niveau avancé en matière de DIA, vise quant à lui à aider certains autres États membres (ceux qui utilisent plus fréquemment la DIA) à utiliser des formes plus avancées de DIA.

Abstract (DE)

Diese Studie zielt zunächst darauf ab, zu verstehen, in welchem Umfang und auf welche Weise die EU-Mitgliedstaaten Ex-ante-Abschätzungen der Verteilungswirkungen (Distributional Impact Assessment - DIA) für haushaltspolitische Maßnahmen nutzen. Sie zielt ebenso darauf ab, die Hauptgründe zu ermitteln, die den Einsatz von DIA beim Entwurf der Haushaltspläne in den Mitgliedstaaten der Eurozone einschränken, sowie den Grad der Ähnlichkeit des Einsatzes von DIA in den Mitgliedstaaten der Eurozone zu bewerten. Darüber hinaus soll die Studie Vorschläge für eine stärkere Nutzung von DIA in den EU-Mitgliedstaaten sowie Vorschläge für die Gestaltung eines möglichen gemeinsamen EU-Rahmens in diesem Bereich erbringen. Die Studie zeigt, dass die meisten Mitgliedstaaten, auch wenn sie in den letzten Jahren zumindest einige DIA in Haushaltsangelegenheiten durchgeführt haben, in dieser Hinsicht noch viel mehr tun könnten und dass die Mitgliedstaaten des Euroraums DIA aus organisatorischen Gründen (z. B. Zeitmangel und keine spezifische Aufforderung seitens der Ministerialhierarchie) nur selten in seine Haushaltsplanentwürfe aufnehmen. Um die Verwendung von DIA und ihre Aufnahme in Haushaltsdokumente wie den Entwurf des Businessplans (Draft Business Plan – DBP) zu fördern, enthält die Studie mehrere Vorschläge sowohl für die Europäische Kommission (z. B. Veranstaltung von DIA-Workshops für die Mitgliedstaaten und Bereitstellung einiger Leitlinien für interessierte Mitgliedstaaten) als auch für die Mitgliedstaaten selbst (je nach Häufigkeit ihrer Verwendung von DIA). Die meisten dieser Vorschläge an die Mitgliedstaaten werden dann in einem möglichen gemeinsamen EU-Rahmen für die Verwendung von DIA in amtlichen Dokumenten gegliedert, der den interessierten Mitgliedstaaten helfen soll, die Nutzung von DIA zu steigern und deren Qualität zu gewährleisten. Dieser Rahmen unterteilt sich in zwei Gruppen von Vorschlägen, die zwei mögliche Anspruchsniveaus der Mitgliedstaaten in Bezug auf die Verwendung von DIA widerspiegeln (ein Basisniveau und ein fortgeschrittenes Niveau). Das Basisniveau, das bewährte Praktiken für die DIA vorschlägt, würde darauf abzielen, einigen EU-Mitgliedstaaten, die keine oder nur wenig DIA nutzen, dabei zu helfen, mehr DIA und in ausreichender Qualität durchzuführen. Das fortgeschrittene Niveau – das als zusätzliche Ebene dient und bewährte Verfahren für die DIA vorschlägt – würde darauf abzielen, jenen Mitgliedsstaaten, die DIA häufiger nutzen, bei der Durchführung fortgeschrittenerer Formen der DIA zu unterstützen.

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List of official Member State abbreviations, other acronyms and glossary

Official Member State abbreviations

Abbreviations	Member State	Abbreviations	Member State
AT	Austria	IE	Ireland
BE	Belgium	IT	Italy
BG	Bulgaria	LT	Lithuania
CY	Cyprus	LU	Luxembourg
CZ	The Czech Republic	LV	Latvia
DE	Germany	MT	Malta
DK	Denmark	NL	The Netherlands
EE	Estonia	PL	Poland
EL	Greece	PT	Portugal
ES	Spain	RO	Romania
FI	Finland	SE	Sweden
FR	France	SI	Slovenia
HR	Croatia	SK	Slovakia
HU	Hungary		

Other acronyms

AROP	At Risk Of Poverty
AROPE	At Risk Of Poverty or social Exclusion
CGE	Computable General Equilibrium
DBP	Draft Budgetary Plan
DG EMPL	Directorate-General for Employment, Social Affairs & Inclusion
DIA	Distributional Impact Assessment
DSGE	Dynamic Stochastic General Equilibrium
EC	European Commission
ECOFIN	Economic and Financial Affairs Council
EU	European Union
EU27	European Union, 27 Member States
GDP	Gross Domestic Product
ILO	International Labour Organization
IFI	Independent Fiscal Institutions
JRC	Joint Research Centre
MS	Member State
NRP	National Reform Programme
OECD	Organisation for Economic Co-operation and Development
OLG	Overlapping Generations
SCP	Stability or Convergence Programme
SDG	Sustainable Development Goals
UN	United Nations

Technical glossary

Gini Index:

The most common index of income inequality measures the distribution of the cumulative proportions of income for the cumulative proportions of the population in a country.¹ In other words, it measures what percentage of the domestic income of a country each cumulative percentile of the population owns and converts it into an index. The index ranges from 0 (perfect equality) to 1 (perfect inequality). Perfect equality means that the first 10% of the population own 10% of the domestic income, 20% of the population own 20% of the income and so on. Perfect inequality means that one person in the country owns all of the income while the rest of the population does not own anything.

Atkinson Index:

A measure of income inequality that includes the level of aversion to inequality (measured in the coefficient ϵ), which weights incomes along with the distribution differently. Depending on the level of inequality aversion, the index becomes more or less sensitive to changes at different ends of the distribution. For example, if the inequality aversion is high, the marginal social welfare of an increase in income is higher for the lower end of the distribution. If there is no aversion ($\epsilon = 0$), the marginal social welfare for an income increase for the lower end of the income distribution is the same as for an increase for the higher end.

Theil Index:

A measure of income inequality that is built on statistical information theory and belongs to the generalised entropy family of inequality indices. The Theil index, like all members of the generalised entropy family, can be exactly decomposed in between and within the inequality of mutually exclusive groups. The value of the index can range from 0 (perfect equality) to infinity (Cowell, 2011).

Reynolds-Smolensky Index:

The most commonly used index of redistribution. It measures redistribution as the difference between the Gini index of income before tax and the concentration index of post-tax income (Lambert, 2011).

Kakwani Index:

A measure of the progressivity of the tax-benefit system. It uses the same approach as the Gini index and it consists of the difference between the Gini index before the intervention and the Gini index after the policy intervention (Kakwani, 1977). The value of the index can range from -1 to 1; the closer to 1 the more progressive the intervention is (Lambert, 2011).

¹ <https://data.oecd.org/inequality/income-inequality.htm>

Brief explanations on DIA

- Distributional Impact assessment (DIA) can be referred to as an analysis, usually quantitative in nature, which assesses the distributional effects of policy measures across the population, i.e., it assesses how these measures may impact various groups in the population. It is important to mention that what is provided by such assessment analysis are often estimates of the actual distributional impacts of these measures and even more so for more complex measures.
- By assessing the impacts of these measures respectively for different groups in the population, DIA doesn't only aim to assess differences in the extent of the respective impacts for these groups (i.e. differences between the groups), but also to simply assess if these impacts are negative/neutral/positive from an "absolute" perspective for each of these groups².
- Distributional impacts of these measures can in theory be assessed regarding various dimensions. In this study, DIA refers to the assessment of the distributional impacts of these measures regarding the income³ dimension, i.e., assessing what are their impacts on people's income across the whole income distribution.
- DIA can be undertaken both ex-ante (i.e., before the implementation of a measure, but possibly also after its adoption) or ex-post (i.e., after the implementation of a measure). In this study, DIA refers most often to ex-ante DIA.
- DIA can be undertaken for a single measure (i.e., the distributional impacts of only this specific measure are assessed) or for several measures together⁴ (i.e., the overall distributional impacts of cumulating these measures are assessed, as done, for instance, when assessing the overall distributional impacts of all the measures in a budget).
- The measures on which DIA is undertaken are often budgetary measures (i.e., measures in the budget). This doesn't mean that DIA would be only conducted for those measures related to taxes or in-cash social transfers, as DIA is also conducted for any other measures (regardless of its field) that may impact disposable income.
- Amongst other things, DIA enables to:
 - Identify ex-ante that a measure would have strong adverse distributional impacts on disposable income - also from an "absolute perspective" - if implemented, which could cause strong adverse reactions (even more so if the measure has regressive distributional impacts).
 - Give ex-ante a clearer picture of who in the population would benefit or not (regarding disposable income) – and to what extent - from a measure, which is useful to avoid only favouring a small share/group of the population (with maybe only a small gain for this group) to the detriment of the others.
 - Assess more precisely, ex-post, the distributional impacts of an implemented measure, which could be useful for improving/fine-tuning the design of similar ones still to be endorsed in the budget.

² For instance, a measure which would imply a drop of -5% in disposable income for the 1st income decile and increasingly higher drops for each subsequent income decile (i.e., with the largest drop for the top income decile) would appear to have progressive distributional impacts, but it would still imply a drop in disposable income for the 1st income decile (and for all the others).

³ Considering equivalised disposable income.

⁴ Often called "joint DIA" in this study.

I. Main findings (overview)

This study on distributional impact assessment (DIA) aims to show and understand the practices of EU Member States with regard to the use of (ex-ante⁵) DIA regarding budgetary measures in the budget preparation process and, in particular, in the draft budgetary plans (DBPs). More precisely, the study shows to what extent the EU Member States use DIA in the DBPs and outside the DBPs and what is their approach for implementing DIA. In addition, it highlights what may limit the use by the EU Member States of DIA in their budget preparation process.

The study's main findings concerning the use of DIA by Member States (both in and outside DPBs) are:

- The first result emerging from the analyses is that only a few Euro Area Member States usually include DIA in the DBPs. Among the 19 Euro Area Member States, only two included DIA for every fiscal year between 2015 and 2020⁶ in their DPBs (i.e., Ireland and the Netherlands) and eight included DIA occasionally (i.e., Austria, Estonia, Finland, France, Greece, Lithuania, Latvia and Malta) in their DPBs. This means that almost 50% of the Member States do not present any DIA in their DBPs.
- Concerning the use of DIA outside the DBPs, the analysis shows that most of the Member States performed at least some DIA (even if they did not necessarily include the performed DIA in any budgetary document, i.e., DIA results are not necessarily published). However, there is a high diversity among Member States and much room for improvement with regard to the frequency of DIA use. Only Cyprus, Luxembourg and Romania do not perform any DIA at all during the budget preparation process.

The study's main findings concerning the obstacles and enabling factors to the use of DIA in DPBs and concerning the degree of similarity in DIA approaches for DPBs (for Euro Area Member States) are:

- The analysis – based on the interviews of those in charge of conducting DIA in Member States – points out that there are four main obstacles preventing the conduct and inclusion of DIA in the DBPs, applying to most but not all of the Member States. First, there is not a specific request for DIA within the DBPs' preparation coming from the ministerial hierarchy. Second, the ministry officials stress the complexity of the budget's approval process as a major impediment for including DIA in the DBPs. Third, they point out to a limitation in personnel (though not in technical expertise within the organisation), as DIA does not have precedence over other tasks. The fourth, and often recognised as the most critical, is the lack of time to perform and include DIA in the DBPs.
- The analysis – also based on the aforementioned interviews - identified some factors that could enable more Euro Area Member States to start including DIA in DPBs or to do it more regularly. The main enabling factors that emerge support the importance of the Commission providing: a web interface to access DIA-dedicated software (note: such interface is already available to Member States: it is the EUROMOD-JRC Interface), (more) trainings on software for DIA (note: the JRC already provides regular training on EUROMOD) as well as providing guidance on how to perform DIA. These requests come mostly from the Member States without a long and autonomous tradition of DIA.

⁵ Ex-ante DIA means assessing the distributional impacts of a measure before its implementation. The ex-ante DIA could be performed either before the adoption of the measure (i.e., in the budget preparation) or shortly after it. In this report, "DIA" refers, unless said otherwise, to ex-ante DIA.

⁶ In this study, the years mentioned for DPBs relate to the fiscal years (i.e. budget years) covered by these DPBs. For instance, DPB 2015 means DPB related to the fiscal year 2015.

- As regards the degree of similarity in Euro Area Member States' respective approaches when using DIA, the analysis shows that most of them tend to use mainly national microsimulation models, to feed these models with administrative data and that it is usually economists working within the Ministry of Finance who perform the DIA.

The study's main suggestions for increasing the use of DIA by EU Member States are:

- This study supplies rich empirical evidence that can be used to provide a set of suggestions for increasing the use of DIA by Member States and its inclusion in budgetary documents, whether in or outside DBPs. These suggestions are targeted both at the Commission and at the Member States.

For instance, the European Commission should continue providing the EUROMOD tool (and its interface) and could organise more trainings on DIA. It could also consider organising workshops for officials of Member States to come together and share ideas and good practices about DIA. Furthermore, it could provide feedback on the non-inclusion of DIA in some of the Member States' budgetary documents (starting with DPBs) and provide some (non-binding) guidance on how to perform DIA to those Member States interested in it. It could also raise awareness about DIA at the ECOFIN.

The suggestions to the Member States are grouped in this study depending on the Member States' intensity of DIA use. They concern the tools (models) and data used to perform DIA, the quality of DIA, as well as the inclusion of DIA results in budgetary documents. Most of these suggestions are then further structured into a possible EU Common Framework for the use of DIA in official documents (cf. below).

- The study's findings can be also used to determine what could be the suggested features of a non-binding EU Common Framework for the use of DIA in official documents, which objective would foremost be to help all interested Member States to increase their use of DIA (in official budgetary documents), also ensuring it is of good quality, as well as, to the extent possible, to enhance comparability of DIA results across (some of) the Member States. Based on the aforementioned suggestions to Member States and proposing good/best practices regarding DIA production and DIA presentation in official documents, this Framework could serve as a useful guide for those Member States interested in building their DIA expertise and DIA production, as well as for those interested in expanding and improving them (many of the Member States are already implementing at least some of the good/best practices for DIA outlined in the Framework). The Framework is split in two levels: a basic level (good practices for Member States with no or little DIA use) and an advanced level (best practices for Member States with more frequent DIA use). The basic compliance level could be met by using EUROMOD (or at least the EUROMOD-JRC Interface) or other relevant micro-simulation tools if they are already in place in some Member States. The advanced level could be met through an improvement in data quality and through accounting for behavioural responses and economic feedback in the building of DIA estimates (by feeding insights from labour supply/macroeconomic models into the micro-simulation).

II. Executive summary

Fighting poverty and income inequalities is important for several reasons, especially for fairness, economic growth, social cohesion and for improving the living conditions of financially vulnerable persons in the EU.

In this respect, and amongst many other elements, it is important to ensure that the measures in the EU Member States' budgets would not exacerbate poverty and income inequality, at the very least, and that they would even contribute to an increase in both social and economic welfare (and not only in the latter). This requires assessing the impacts of these measures along the income distribution (i.e., distributional impacts), which is also known as Distributional Impact Assessment (DIA). More specifically, DIA refers to the assessment of the impact of policies on the income distribution in a country by analysing their impact on disposable income, poverty and income inequality indicators (e.g., AROP rate, Gini index, S80/S20 ratio, etc.). This can be done either before the policy is implemented (i.e., ex-ante DIA, the main focus of this study), by simulating and predicting its distributional impacts through microsimulation models, or after the policy is implemented (ex-post DIA) to evaluate its performance and impact. DIA is important as, for instance, even a limited decrease (in amount) in households' annual disposable income, because of a new measure, could strongly impact the purchasing power of some of them (e.g. for low and middle income households).

However, little is currently known regarding the extent to which and how the EU Member States conduct (ex-ante) DIA in their budget preparation process.

Therefore, a reliable assessment of the use of DIA during the budget process by EU Member States in recent years – and of what could increase it - is of great importance. To do so, this study aims to answer the following five research questions:

- To what extent do Euro Area Member States use DIA in DBP? How do they approach the distributional impact requirement set out in Article 6(3)(d) of Regulation No 473/2013? How has this approach evolved over the past few years?
- To what extent do EU27 Member States use DIA (outside DBP) in their budget preparation process or for other purposes? What is their approach in this respect?
- What may limit the use by Euro Area Member States of DIA in DPB?
- What could be concrete suggestions for increasing the use by Member States of DIA in and outside DBP?
- What could be concrete suggestions as regards the design of a possible EU Common Framework for the use of DIA in budgetary documents (incl. in DPB)? To what extent does limited testing/validation confirm the relevance and the feasibility of these suggestions?

To answer these questions, the available national official documentation related to the budget (incl. DBPs, Stability/Convergence Programmes, National Reform Programmes) as well as information retrieved from interviews with officials from the respective ministries of 27 Member States were used.

Three methods to analyse the occurrence and nature of DIA in the documentation of the Member States during the period 2015-2020 (fiscal years)⁷ have been implemented. First, DIA occurrences in DBPs have been identified through a systematic reading review of Member States' DBPs. Second, text-mining software has been used to detect the presence of DIA in the Stability/Convergence Programmes (SCP) and the National Reform Programmes (NRP). Third, officials were interviewed about DIA performance in the budgetary process for all Member States. These interviews were meant to collect

⁷ I.e. for documentation concerning the fiscal years 2015-2020.

information to complement the description of DIA use in the DBP (for Euro Area Member States) and, in general, in the budget preparation process (for all Member States). Moreover, the interviews were used to identify what may prevent Member States from using DIA more often (for their budget preparation process or for ex-ante evaluation of adopted budgetary measures) or (for Euro Area Member States) from including DIA, when performed, in their DBPs. The interviews also allowed to identify the degree of similarity between the Member States as regards their respective approaches when using DIA.

Main findings concerning the use of DIA by Member States:

The results emerging from the systematic review of the DPBs (fiscal years 2015-2020) are (Table I):

- Among the 19 Euro Area Member States, only two implemented DIA in all the years considered (i.e., Ireland and the Netherlands) and eight others performed DIA occasionally (i.e., Austria, Estonia, Finland, France, Greece, Lithuania, Latvia and Malta). This means that almost 50% of the Member States do not include any DIA in the DBP.
- The average number of DIA occurrences⁸ in a DPB in a given year is below two. However, an upward trend in the number of policy measures covered by DIA in DBPs is observed from 2016 onwards. The systematic review also revealed that Euro Area Member States generally do not perform separate DIAs for revenue and expenditure policies. The policy measures are usually combined and analysed jointly in a single DIA exercise, whereas in rare cases, the focus is placed only on one type of policy measure for a given fiscal year.
- While a wide range of poverty and income inequality indicators is used in DIA in DBPs, the most common type of analysis focuses on the effect of policies on the equivalised disposable income by deciles, followed by the impact on the Gini index and on the poverty rate and the poverty gap. Another interesting finding, which emerges from the systematic reading review and the interviews, is that most policy makers request DIA only when new specific measures are introduced and need justification. The table below shows the exact occurrence of DIA in DBPs among all Euro Area Member States for the fiscal years 2015-2020.

Concerning the use of DIA outside the DBPs:

- Very few Member States include DIA in the SCP or the NRP. More precisely, Hungary is the only country that presents a DIA analysis in the Convergence Programme, and Belgium, Hungary, Italy, Malta and Portugal have included DIA in the National Reform Programme.
- The overall picture somehow changes when other national documents (on top of DBPs, SCP and NRP) are also taken into account. Most of the Member States perform at least some DIA analysis in the budget preparation process (though not necessarily including it in any official budgetary document), except Cyprus, Luxembourg and Romania, which do not perform any DIA at all. However, when also counting DIA performed for DPBs, the number of DIA performed vary between Member States (from 0 to 11 per year in recent years) and is rather small for most of them (there are 19 Member States with less than 8 DIA performed per year in recent years), which suggests that there is still much room for improvement in the intensity of DIA use. The most common national documents containing DIAs are the ones that introduce revenue (10 out of 27 Member States) and expenditure measures (10 Member States), followed by documents with an ex-ante (6 MS) or ex-post (5 MS) evaluation of adopted or past budgetary measures.

⁸ DIA occurrence stands for an inclusion by a Member State of a DIA analysis (which can each cover only one or several measures) in a DPB for a given year. For a more detailed definition see Section 3.

- In contrast to the DIAs included in DBPs, the most common indicators used for DIA analysis outside DBPs are ‘winners and losers’ measures across different income groups (19 MS), followed by the Gini coefficient (18 MS) and tax burden (17 MS).
- As well, most ministries (around 16 out of 23, 4 did not answer the question) stated that Independent Fiscal Institutions (IFI) do not perform nor check DIAs in DBPs and other national budget documents.

Table I – Count of DIA occurrences (*) in the DBP over the period 2015-2020, for the Euro Area Member States by fiscal year

MS	2015	2016	2017	2018	2019	2020
AT	-	1	-	-	-	-
BE	-	-	-	-	-	-
CY			-	-	-	-
DE	-	-	-	-	-	-
EE	-	-	-	1	1	-
EL					1	1
ES	-	-	-	-	-	-
FI	-	-	-	-	3	-
FR	-	-	-	2	-	1
IE	1	1	1	1	1	1
IT	-	-	-	-	-	-
LT		-	1	-	2	-
LU	-	-	-	-	-	-
LV	-	-	-	1	-	-
MT	-	-	4	1	-	-
NL	1	1	1	1	1	1
PT	-	-	-	-	-	-
SI	-	-	-	-	-	-
SK	-	-	-	-	-	-
Total	2	3	7	7	9	4

(*) A joint DIA (where several measures are jointly analysed) is counted only as one DIA occurrence.
Notes: Missing values on a white background imply that no DBP was produced.

Main findings concerning the obstacles to the use of DIA in DPBs (Euro Area Member States):

The interviews highlighted that all of the four main obstacles preventing the inclusion of DIA in the DBP relate to the internal functioning of the ministries in charge of these tasks. They are (from the most to the least frequently mentioned by interviewees):

- Lack of time to perform and include DIA in the DBP. The officials mentioned in the interviews that the final details of the measures to be included in the DBP are

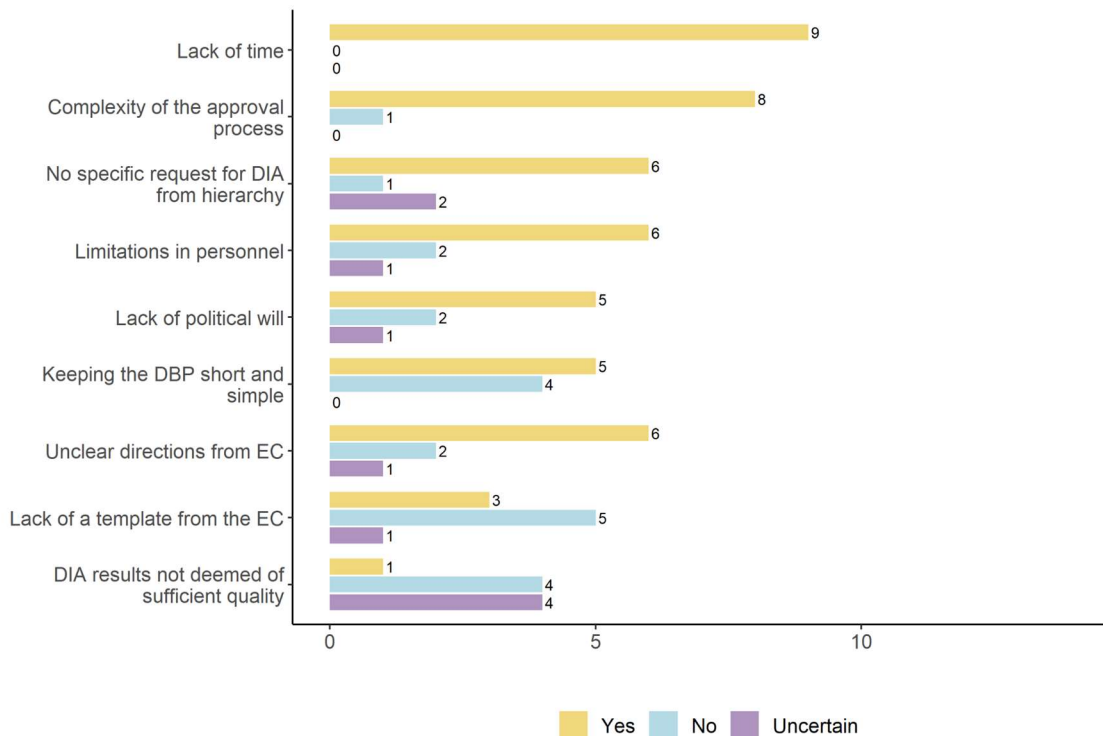
disclosed to them very late and too close to the DBP submission deadline (15th October), due to the length of the negotiation process at the political level.

- The complexity of the approval process. Many officials said that there would be too many steps and too much work to get DIAs approved by the ministry. This discourages members of the ministries to include DIA in DBPs.
- There is not a specific request for DIA within the DBP preparation coming from the ministerial hierarchy.
- Many ministries face a limitation of human resources qualified to conduct DIAs: although technical capacities are available in the organisation, their priorities are directed towards other tasks.

Figure I shows the overall response to the suggested obstacles in the interviews with Euro Area Member States without at least one DIA occurrence in at least one of their DBPs during the period 2018-2020 (fiscal years).

Figure I: Main obstacles that prevent the inclusion of DIA in the DBP

Euro Area Member States without at least one DIA occurrence in at least one of their DBPs during the period 2018-2020 (fiscal years)



We also asked the ministry officials for their views on Article 6 (3)(d) in the EU Regulation 473/2013, which foresees the inclusion of DIA in the DBP.

- Here, the analysis suggests that there is no consistency across Member States regarding how Article 6 is perceived. While to some officials, like those from Malta, Slovakia and Greece, Article 6 is useful as it stresses the importance of DIA, many others stated that they would conduct DIAs even in the absence of Article 6.
- Some officials (Italy and Latvia) regarded Article 6 as a recommendation, whereas those from three other Member States would not see the need for any formal request regarding DIA from the EU, as they already use DIA in the budget process and a formal request could distort the way they perform DIA and become an additional, undesired administrative burden.

Furthermore, the interviews carried out with the officials have also been very useful for identifying which factors – out of a set of pre-determined factors on which interviews were asked to give their position - could best help to expand the use of DIA in the DBP.

- The main factors, that most officials interviewed agreed upon, support the importance of the Commission providing: a web interface to access DIA-dedicated software (note: such an interface is already available to Member States: it is the EUROMOD-JRC Interface), (more) training on software for DIA (note: the JRC already provides regular training on EUROMOD) as well as providing guidance on how to perform DIA. These requests were mostly raised by officials from Member States without a long and autonomous tradition of DIA. Other common factors that would increase the use of DIA have been of a political and organisational nature, e.g., an increase in political will towards DIA and a specific budget for DIA staff.

Main findings concerning the degree of similarity in Euro Area Member States' approaches to conducting DIA:

The information collected in the interviews also enabled to assess the degree of similarities in the DIA approaches of Euro Area Member States, based on several dimensions which are detailed below:

- As regards staff: DIA is usually performed by a medium-sized team (3-4 people), consisting mostly of economists working within the Ministry of Finance. Some countries (Slovenia, Germany, Ireland and Latvia) employ external consultants (e.g., research institutes) to support them in conducting DIA analyses.
- Regarding DIA training for staff: on-the-job training is largely the preferred option. This training is often complemented by the participation in the courses organised by the EUROMOD network.
- Regarding the model used for conducting DIA: EUROMOD proves to be the most frequently used model, followed by national microsimulation models, sometimes complemented by QUEST (with the Euro Area Member States, that include DIA in DBP, tending to use either national microsimulation models or EUROMOD).
- Regarding the statistical software used (which shall not be understood as the same tool as the model used): the most commonly used statistical software to carry out DIA analyses is STATA, although most Member States use more than one type of software (R, SPSS, etc.).
- Regarding the data set, most Member States use both surveys (e.g., EU-SILC, labour force survey, etc.) and administrative data (tax data, social security contribution data, benefit recipients data). Austria, Lithuania and Greece constitute exceptions to this, as they rely solely on EU-SILC survey data. Administrative data tend to be more up-to-date (referring to one year or six months before the budget year) than survey data (mostly referring to two years before the budget year). The countries that only rely on survey data are aware of the timing limitations and aim to include administrative data in the future.
- The interviews have also shown that in most countries (15 out of 17) ex-ante DIA is conducted, but in some countries (Germany, Ireland, Latvia, Italy, Malta and the Netherlands) both ex-ante and ex-post DIA are conducted. It is also worth stressing that the officials interviewed pointed out that DIA is considered in the policymaking process in most of the Member States, although DIA is often not included in the DBP, linked to a low demand from policymakers to include it in.

Main suggestions for increasing the use of DIA (EU Member States):

The results emerging from the review of the documents and the interviews supply rich empirical evidence that can be used to design suggestions to increase the conduct and inclusion of DIA in budgetary documents (incl. in DPBs for Euro Area Member States). The suggestions identified stem from the findings presented in the section of this report about the obstacles and enabling factors. These suggestions are targeted both at the Commission and at the Member States.

The suggestions to the Commission include:

- The Commission should continue providing the EUROMOD tool (and its interface).
- The Commission could provide (more) training on DIA. This should include training programmes on EUROMOD as well as on technical aspects on how to perform DIA analysis and which data to use for it.
- The Commission could consider organising workshops for officials of Member States to come together and share ideas and good practices⁹ about DIA.
- The Commission could provide feedback on the non-inclusion of DIA in some of the Member States' budgetary documents, starting with DPBs.
- The Commission could provide some (non-binding) guidance on how to perform DIA to those Member States interested in it (cf. below EU Common Framework on DIA use in official documents).
- The Commission could raise awareness about DIA at the ECOFIN.

The suggestions to the Member States are grouped depending on the Member States' intensity of DIA use. They concern:

- The tools (models) used to perform DIA.
- The data used for DIA.
- The quality of DIA.
- The inclusion of DIA results in budgetary documents.

Most of these suggestions to Member States are then further structured in a possible EU Common Framework for DIA use in official documents.

Main suggestions concerning the design of a possible EU Common Framework to increase the use of DIA in official documents by Member States:

The study's findings can be also used to determine what could be the suggested features of a non-binding EU Common Framework for DIA. The objectives of such framework would foremost be to help all interested Member States to increase their use of DIA (in official budgetary documents), also ensuring it is of good quality, as well as, to the extent possible, to enhance comparability of DIA results across (some of) Member States. Based on the aforementioned suggestions to Member States and proposing good/best practices regarding DIA production and DIA presentation in official budgetary documents, this Framework could serve as a useful guide for those Member States interested in building their DIA expertise and DIA production, as well as for those interested in expanding and improving them. Many of the Member States are already implementing at least some of the good/best practices for DIA outlined in the Framework.

⁹ The European Commission provides a useful tool for DIA analysis through the maintenance of the EUROMOD microsimulation model, which is a valuable tool, in particular, for those countries that have not yet produced their own microsimulation models. Highlighting and sharing good DIA practices through the use of EUROMOD can also be fruitful for countries that already use a country-specific microsimulation model, promoting the exchange of experiences and providing mutual inspiration

The Framework considered is split into two levels: a basic level (good practices for Member States with no or little DIA use) and advanced level (best practices for Member States with more DIA use). The basic level could be met by using EUROMOD (or at least the EUROMOD-JRC Interface) or other relevant micro-simulations tools if already in place in some Member States. The advanced level could be met through an improvement in data quality as well as through accounting for behavioural responses and economic feedback in the building of DIA estimates (by feeding insights from labour supply/macroeconomic models into the micro-simulation).

- The basic level is targeted at Member States with no or (very) little use of DIA. It proposes a set of good practices to perform DIA. It could be an efficient method for fulfilling the legislative requirement (Regulation (EU) No 473/2013, Article 6(3d)). At this level, it is suggested that DIA rely on microsimulation. For the Member States lacking a national microsimulation model, the basic level can be satisfied using the EUROMOD model – or at least its Interface - based on survey data (EU-SILC), which is produced and validated by Eurostat. It can also be met by using a national microsimulation model (if a Member State already has one). It is also suggested that the staff performing DIA receives training on EUROMOD (if this is the model used) from JRC and possibly other trainings on poverty and inequality indicators, to ensure the quality of DIA results.
- The advanced level is targeted at Member States already using DIA to some extent. It proposes a set of best practices (which already exist) to perform DIA. It could encourage those Member States that perform rather modest forms of DIA analysis to incorporate more advanced practices over time. To reach this goal, the quality of the DIA data can be improved through the incorporation of administrative data into the microsimulation approach. In addition, the DIA estimates could be enhanced by incorporating behavioural responses and macroeconomic feedback supplementing microsimulation models with labour supply/macroeconomic models to capture and/or predict changes in the macroeconomic environment caused by the policy (e.g., changes in direct income tax).

To give an illustration of this possible Framework, the study presents three hypothetical case studies in the form of simulations. These have been chosen in accordance with the Member States that they concern so that they reflect realistic policy reforms. These simulation examples are conducted in line with the suggestions made in the basic level or the advanced level of the Framework:

- The first one relates to the basic level and is about a personal income tax reform in Romania to introduce more progressivity in the Romanian tax system. EUROMOD is used to simulate the effect of a more progressive tax policy on the income distribution by analysing the impact on different poverty and income inequality measures (e.g., change in AROP rate, Gini index, S80/S20, S80/S50, etc.).
- The second case study is about a guaranteed minimum income (GMI) and low pension benefit reform in Cyprus, which also relates to the basic level of the Framework. EUROMOD is used to simulate how an increase in the threshold to receive certain income benefits affects the income distribution. Moreover, the simulation also includes the impact on the income distribution of withdrawing GMI and the low pension benefit.
- The third case study relates to the advanced level and illustrates, from a more elaborated perspective based on a combination of micro and macro modelling, the distributional impact of a reduction in personal income tax in Italy.

III. Résumé

La lutte contre la pauvreté et les inégalités de revenu est importante pour plusieurs raisons, notamment pour l'équité, la croissance économique, la cohésion sociale et l'amélioration des conditions de vie des personnes financièrement vulnérables dans l'UE.

À cet égard, et parmi de nombreux autres facteurs, il est important de veiller à ce que les mesures prévues dans les budgets des États membres de l'UE n'aient, tout du moins, pas pour effet d'accentuer la pauvreté et les inégalités de revenu, voire même de veiller à ce qu'elles puissent être simultanément bénéfiques sur le plan social et sur le plan économique (et pas seulement sur ce dernier). Cela nécessite d'évaluer les impacts de ces mesures sur le revenu des individus tout le long de la distribution des revenus (« DIA » en anglais). Plus précisément, la DIA fait référence à l'évaluation de l'impact d'une mesure sur le revenu des individus, selon leur position dans la distribution des revenus dans un pays. La DIA évalue l'impact de cette mesure sur les indicateurs de pauvreté et d'inégalités de revenu (par exemple, le taux AROP, l'indice de Gini, le quotient S80/S20, etc.). Cette évaluation peut être faite soit avant la mise en œuvre de cette mesure (c'est-à-dire *ex ante*, ce qui est l'objet principal de la présente étude), en simulant et en prédisant son impact sur les revenus au moyen de modèles de microsimulation, soit après sa mise en œuvre (*ex post*) pour évaluer son impact. La DIA est importante car, par exemple, même une faible baisse (en montant) du revenu annuel disponible des ménages, suite à une nouvelle mesure, pourrait fortement impacter le pouvoir d'achat de certains d'entre eux (ex : pour des ménages à bas ou moyens revenus).

Toutefois, on sait actuellement peu de choses sur la façon dont les États membres de l'UE utilisent la DIA (*ex ante*), ainsi que sur sa fréquence d'utilisation, dans la préparation de leur budget.

Par conséquent, il apparaît comme important de disposer d'informations précises sur l'utilisation, lors de ces dernières années, de la DIA par les États membres de l'UE au cours de leur préparation budgétaire, ainsi que sur ce qui pourrait contribuer à intensifier cette utilisation. Pour ce faire, cette étude vise à répondre aux cinq questions suivantes :

- Dans quelle mesure les États membres de la zone euro utilisent-ils la DIA dans leur projet de plan budgétaire (PPB¹⁰)? Comment abordent-ils l'exigence de DIA énoncée à l'article 6(3)(d), du règlement n° 473/2013 ? Comment leur approche par rapport à cette exigence a-t-elle évolué au cours des dernières années ?
- Dans quelle mesure les États membres de l'UE utilisent-ils la DIA (en dehors du PPB) dans la préparation de leur budget ou à d'autres fins ? Quelle est leur approche à cet égard ?
- Qu'est-ce qui peut limiter l'utilisation par les États membres de la zone euro de la DIA dans leur PPB?
- Quelles pourraient être des suggestions concrètes pour accroître l'utilisation par les États membres de la DIA dans et en dehors de leur PPB?
- Quelles pourraient être des suggestions concrètes concernant la conception d'un éventuel cadre commun de l'UE pour l'utilisation de la DIA dans les documents budgétaires (y compris dans le PPB) ? Dans quelle mesure quelques brefs exemples pourraient-ils soutenir la pertinence et la faisabilité de ces suggestions ?

Pour répondre à ces questions, la documentation budgétaire officielle disponible au point de vue national (couvrant divers types de documents budgétaires, dont les PPB, les programmes de stabilité/convergence et les programmes nationaux de réforme) a été

¹⁰ « DPB » en anglais.

utilisée, ainsi que des informations issues d'entretiens avec des fonctionnaires des ministères compétents en matière de DIA des 27 États membres.

Trois méthodes d'analyse de la présence et des caractéristiques des analyses de DIA, dans les documents budgétaires des États membres pour la période 2015-2020, ont été mises en œuvre. Premièrement, la présence de DIA dans les PPB a été répertoriée sur base d'un examen systématique des PPB des États membres. Deuxièmement, un logiciel d'analyse de texte a été utilisé pour détecter la présence de DIA dans les programmes de stabilité/convergence (CPD) et les programmes nationaux de réforme (PNR). Troisièmement, des entretiens ont été conduits avec des fonctionnaires des ministères compétents concernant l'utilisation de la DIA dans le processus budgétaire pour chaque État membre. Les entretiens visent à recueillir des informations pour compléter la description de l'utilisation de la DIA dans le PPB (pour les États membres de la zone euro) et, plus généralement, son utilisation dans le processus de préparation du budget (pour tous les États membres). En outre, les entretiens sont utilisés pour déterminer ce qui empêche les États membres d'utiliser plus souvent la DIA (pour leur processus de préparation budgétaire ou pour l'évaluation ex ante des mesures budgétaires adoptées) ou (pour les États membres de la zone euro) d'inclure la DIA, s'ils en ont effectué une, dans leur PPB. Les entretiens nous ont également permis d'identifier le degré de similitude entre les États membres, pour ce qui est de leur approche en matière d'utilisation de la DIA.

Principales conclusions concernant l'utilisation de la DIA par les États membres :

Les résultats de l'analyse systématique des PPB (budgets 2015-2020) sont les suivants (tableau I):

- Parmi les 19 États membres de la zone euro, seuls deux (l'Irlande et les Pays-Bas) ont utilisé la DIA au cours de chacune des années considérées et huit autres ont utilisé la DIA occasionnellement (l'Autriche, l'Estonie, la Finlande, la France, la Grèce, la Lituanie, la Lettonie et Malte). Cela signifie que près de 50 % des États membres n'incluent aucune DIA dans leur PPB.
- Le nombre moyen d'analyses de DIA¹¹ figurant dans un PPB au cours d'une année donnée est inférieur à deux, mais une tendance à la hausse du nombre de mesures ayant été évaluées par une DIA dans les PPB est observée à partir de 2016. En outre, l'analyse systématique des PPB a révélé que les États membres de la zone euro n'effectuent généralement pas d'analyses de DIA distinctes pour les politiques de recettes et de dépenses. Généralement, les mesures du budget sont analysées conjointement dans une seule et même analyse de DIA (laquelle analyse l'effet combiné de plusieurs mesures de différents types) alors que, dans de rares cas, il se peut que les analyses de DIA ne soient effectuées que pour un seul type de mesures lors d'un exercice financier donné.
- Un large éventail d'indicateurs de pauvreté et d'inégalités de revenu est utilisé dans les analyses de DIA figurant dans les PPB. Toutefois, les indicateurs les plus couramment utilisés concernent l'effet des mesures sur le revenu disponible (au niveau individuel) par décile, suivi de l'impact sur l'indice de Gini, sur le taux de pauvreté et sur l'écart de pauvreté. Une autre constatation intéressante, qui ressort de l'analyse systématique des PPB et des entretiens, est que les décideurs politiques, pour la plupart, n'exigent la conduite d'une analyse de DIA que lorsque de nouvelles mesures sont proposées dans le budget et ont besoin d'être justifiées. Le tableau ci-dessous détaille le nombre d'analyses de DIA dans les PPB pour tous les États membres de la zone euro pour les budgets entre 2015 et 2020.

Pour ce qui concerne l'utilisation de la DIA en dehors des PPB :

¹¹ Ce nombre comptabilise le nombre des différentes analyses DIA incluses par un État membre dans un PPB pour une année donnée. Pour une définition plus détaillée, voir le Chapitre 3.

- Quelques États membres incluent la DIA dans le CPD ou le PNR. Plus précisément, la Hongrie est le seul pays à inclure une analyse de DIA dans son programme de convergence, et la Belgique, la Hongrie, l'Italie, Malte et le Portugal ont inclus une analyse de DIA dans leur programme national de réforme.
- Le tableau d'ensemble change plus ou moins lorsque d'autres documents budgétaires au niveau national (en plus des PPB, du CPD et du PNR) sont également pris en compte. Il apparaît que tous les États membres effectuent au moins une analyse de DIA dans le processus de préparation budgétaire (sans toutefois forcément l'inclure dans un de leurs documents budgétaires officiels), à l'exception de Chypre, du Luxembourg et de la Roumanie qui n'effectuent aucune analyse de DIA. En résumé et en tenant compte également des analyses de DIA figurant dans les PPB, le nombre d'analyses de DIA effectuées varie d'un État membre à l'autre (de 0 à 11 par an en moyenne au cours des dernières années) et est plutôt faible pour la plupart d'entre eux (il y a 19 États membres avec moins de 8 analyses de DIA effectuées par an en moyenne ces dernières années). Cela suggère qu'il y a encore une grande marge d'amélioration au niveau de l'intensité de l'utilisation de la DIA. Les documents budgétaires au niveau national, pour lesquels la DIA est le plus fréquemment utilisée, sont ceux proposant des mesures de recettes (10 États membres sur 27) et des mesures de dépenses (10 États membres), suivis des documents concernant l'évaluation ex ante (6 États membres) ou ex post (5 États membres) de mesures budgétaires ayant déjà été votées ou mises en application.
- Contrairement aux indicateurs les plus couramment utilisés pour la DIA dans les PPB, les indicateurs les plus couramment utilisés pour la DIA en dehors des PPB sont un indicateur des « gagnants et des perdants » dans différents groupes de revenu (19 États membres), suivi du coefficient de Gini (18 États membres) et de la charge fiscale (17 États membres).
- De plus, les entretiens nous ont également permis de recueillir des informations sur le rôle éventuel d'institutions fiscales indépendantes (IFI) dans la conduite des analyses de DIA. La plupart des ministères compétents en matière de DIA (environ 16 sur 23, quatre n'ayant pas répondu à la question) ont déclaré que les IFI n'effectuent aucune DIA pour les PPB et autres documents budgétaires nationaux ni ne commentent les analyses de DIA figurant dans ces documents.

Tableau I – Nombre d'analyses de DIA (*) dans le DBP 2015-2020, pour les États membres de la zone euro par exercice budgétaire

MS	2015	2016	2017	2018	2019	2020
AT	-	1	-	-	-	-
BE	-	-	-	-	-	-
CY			-	-	-	-
DE	-	-	-	-	-	-
EE	-	-	-	1	1	-
EL					1	1
ES	-	-	-	-	-	-
FI	-	-	-	-	3	-
FR	-	-	-	2	-	1
IE	1	1	1	1	1	1

IT	-	-	-	-	-	-
LT		-	1	-	2	-
LU	-	-	-	-	-	-
LV	-	-	-	1	-	-
MT	-	-	4	1	-	-
NL	1	1	1	1	1	1
PT	-	-	-	-	-	-
SI	-	-	-	-	-	-
SK	-	-	-	-	-	-
Total	2	3	7	7	9	4

(*) Une DIA conjointe (où plusieurs mesures sont analysées conjointement) n'est comptée que comme une seule analyse de DIA.

Principales conclusions concernant les obstacles à l'utilisation de la DIA dans les PPB (États membres de la zone euro) :

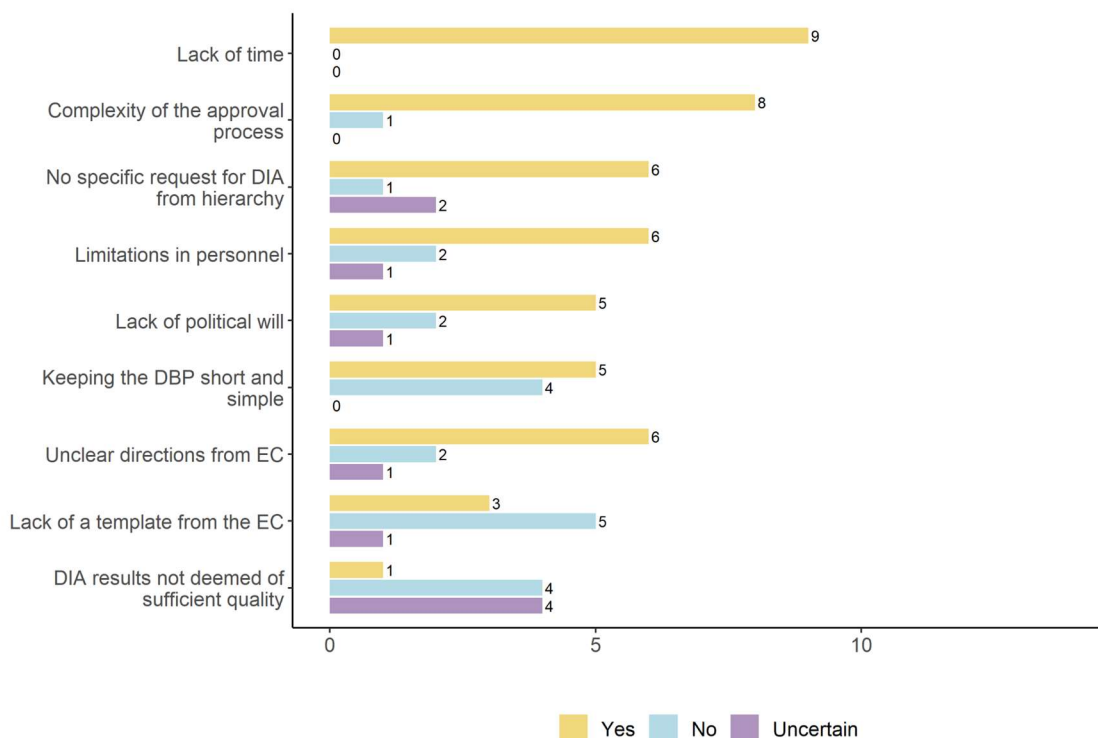
Les entretiens ont mis en évidence que les quatre principaux obstacles à l'inclusion de la DIA dans les PPB sont tous liés au fonctionnement interne des ministères compétents en la matière. Ces obstacles sont (du plus fréquemment ou moins fréquemment sélectionnés dans le questionnaire utilisé pour les entretiens):

- Le manque de temps pour effectuer et inclure une analyse de DIA dans le PPB. Les personnes en charge de la DIA ont indiqué, lors des entretiens, que les aspects finaux des mesures, pour lesquelles une analyse de DIA doit être effectuée et incluse dans le DBP, ne leur sont communiqués que très tardivement en raison de la longueur du processus budgétaire au niveau politique. Ils ne sont informés de ces aspects qu'à une date très proche de celle de la remise des PPB (15 octobre),.
- La complexité du processus pour faire approuver en interne les résultats des analyses de DIA. De nombreuses personnes en charge de la DIA ont indiqué qu'il y avait un nombre important d'étapes pour faire approuver ces résultats en interne et que cela nécessitait beaucoup d'efforts, contribuant ainsi à dissuader de chercher à inclure des analyses de DIA dans les PPB.
- Il n'y a pas de demande spécifique pour une analyse de DIA, lors la préparation du PPB, émanant de la hiérarchie ministérielle.
- Les ministères compétents en matière de DIA disposent souvent d'un nombre limité de ressources humaines pouvant effectuer une analyse de DIA: bien que de telles compétences existent au sein de ces ministères, elles sont orientées en priorité vers d'autres tâches que la DIA.

Le graphique I montre les réponses fournies lors des entretiens concernant les obstacles à l'inclusion de la DIA dans les PPB. Ces réponses sont celles pour le total des États membres de la zone euro n'ayant inclus aucune analyse de DIA dans leurs PPB au cours de la période 2018-2020 (années du budget)

Graphique I : Principaux obstacles empêchant l'inclusion de la DIA dans le PPB (DBP)

Total pour les États membres de la zone euro n'ayant inclus aucune analyse de DIA dans leurs PPB au cours de la période 2018-2020 (années du budget)



Lors des entretiens, nous avons également demandé aux fonctionnaires du ministère compétent en matière de DIA, pour chaque État membre de la zone euro, leur avis sur l'article 6 (3) (d) du règlement (UE) 473/2013, qui prévoit l'inclusion de la DIA dans les PPB.

- L'analyse des réponses fournies lors des entretiens n'a pas dégagé d'avis prépondérant quant à la façon dont l'article 6 est perçu. Alors que pour certains fonctionnaires, comme ceux de Malte, de la Slovaquie et de la Grèce, l'article 6 est utile car il souligne l'importance de la DIA, beaucoup d'autres ont déclaré qu'ils effectueraient des analyses de DIA même en l'absence de l'article 6.
- Certains fonctionnaires (Italie et Lettonie) considèrent l'article 6 comme une recommandation, tandis que ceux de trois autres membres de la zone euro estimeront préférable qu'il n'y ait aucune demande formelle concernant la DIA de la part de l'UE car ils utilisent déjà la DIA dans leur processus budgétaire. Une demande formelle pourrait selon eux modifier la façon dont ils exécutent les analyses de DIA et devenir une charge administrative supplémentaire indésirable.

En outre, les entretiens menés avec les fonctionnaires ont également été très utiles pour identifier les facteurs qui pourraient contribuer à intensifier l'utilisation de la DIA dans les PPB:

- Les principaux facteurs, au sujet desquels la plupart d'entre eux est d'accord, soulignent l'importance du rôle de la Commission pour ce qui serait de fournir : une interface web avec accès à des outils de modélisation de DIA (note : une telle interface est déjà disponible pour les États membres : il s'agit de l'interface EUROMOD-JRC), (davantage) de formations sur les outils de modélisation de DIA (note : le JRC organise déjà régulièrement des formations sur EUROMOD) ainsi que des conseils sur comment effectuer une analyse de DIA. Ces facteurs ont été, pour la plupart, mis en avant lors des entretiens avec les États membres qui n'utilisent pas ou peu de DIA. D'autres facteurs ayant été mentionnés sont de nature

politique et organisationnelle, par exemple une augmentation de la volonté politique d'effectuer une DIA et un budget spécifique pour le personnel s'occupant de DIA.

Principales conclusions concernant le degré de similitude, entre les approches des États membres de la zone euro, en matière de DIA :

Les informations recueillies lors des entretiens ont également permis d'évaluer le degré de similitude entre les États membres de la zone euro en matière de DIA, sur la base de plusieurs dimensions, relatives à la façon dont les analyses de DIA sont effectuées, qui sont détaillées ci-dessous :

- En ce qui concerne le personnel en charge des analyses de DIA: les analyses de DIA sont généralement effectuées par une équipe de taille moyenne (3-4 personnes), composée principalement d'économistes travaillant au sein du ministère des Finances. Certains pays (Slovénie, Allemagne, Irlande et Lettonie) emploient des consultants externes (par exemple des instituts de recherche) pour les aider à effectuer des analyses de DIA.
- En ce qui concerne la formation de ce personnel en matière de DIA: le plus souvent, les personnes en charge des analyses de DIA apprennent à maîtriser cet outil en l'utilisant régulièrement dans leur travail. Cet apprentissage est par ailleurs souvent complété par une participation aux formations organisées par le réseau EUROMOD.
- En ce qui concerne les outils de modélisation utilisés pour effectuer les analyses de DIA : EUROMOD s'avère être l'outil de modélisation le plus fréquemment utilisé, suivi par les modèles nationaux de microsimulation et parfois (en complément) par QUEST (les États membres de la zone euro, qui utilisent la DIA pour leurs PPB, ayant tendance à utiliser soit des modèles nationaux de microsimulation soit EUROMOD).
- En ce qui concerne le logiciel statistique utilisé (qui ne doit pas être confondu avec l'outil de modélisation): le logiciel statistique le plus couramment utilisé pour effectuer des analyses de DIA est STATA, bien que les États membres utilisent pour la plupart plus d'un seul logiciel (R, SPSS, etc.).
- En ce qui concerne les données utilisées pour les analyses de DIA, les États membres utilisent pour la plupart à la fois des enquêtes (par exemple EU-SILC, enquête sur le travail, etc.) et des données administratives (données fiscales, données sur les cotisations de sécurité sociale, données sur les bénéficiaires de prestations/transferts sociaux). L'Autriche, la Lituanie et la Grèce constituent des exceptions à cet égard, car elles s'appuient uniquement sur les données de l'enquête EU-SILC. Les données administratives ont tendance à être plus récentes (se référant à un an ou six mois avant l'année budgétaire) que les données d'enquête (se référant principalement à deux ans avant l'année budgétaire). Les pays qui ne s'appuient que sur les données d'enquête sont conscients des délais et visent à inclure des données administratives à l'avenir.
- Les entretiens ont également montré que, pour la plupart, les pays (15 sur 17) effectuent des DIA ex ante, mais que certains pays (Allemagne, Irlande, Lettonie, Italie, Malte et les Pays-Bas) effectuent à la fois des DIA ex ante et ex post. Il convient également de mentionner que les responsables interrogés ont souligné que la DIA est prise en compte dans le processus d'élaboration des politiques dans la plupart des États membres (bien que la DIA ne soit souvent pas incluse dans les PPB en raison du peu de demande des décideurs politiques pour l'inclure).

Principales suggestions pour accroître l'utilisation de la DIA (pour tous les États membres de l'UE) :

Les résultats de l'analyse de la documentation budgétaire et des entretiens peuvent être utilisés pour formuler des suggestions visant à accroître l'utilisation et l'inclusion de la DIA dans les documents budgétaires (y compris dans les PPB pour les États membres de la zone euro). Les suggestions formulées ici découlent notamment des obstacles à l'utilisation de la DIA et des facteurs pouvant y aider ayant été mentionnés précédemment. Elles s'adressent à la fois à la Commission et aux États membres.

Les suggestions pour la Commission comprennent :

- La Commission devrait continuer à mettre à disposition l'outil de modélisation EUROMOD (et son interface).
- La Commission pourrait dispenser davantage de formations sur la DIA. Ces formations devraient entre autres concerner EUROMOD, ainsi que les aspects techniques et les données nécessaires pour effectuer une analyse de DIA.
- La Commission pourrait envisager d'organiser des réunions entre les fonctionnaires des États membres afin qu'ils puissent échanger idées et bonnes pratiques¹² sur la DIA.
- La Commission pourrait souligner l'absence de DIA dans les documents budgétaires officiels des États membres (en commençant par les PPB).
- La Commission pourrait proposer, aux États membres intéressés, des principes directeurs (non obligatoires) sur la façon d'exécuter une analyse de DIA (voir ci-dessous le Cadre commun de l'UE sur la DIA dans les documents officiels).
- La Commission pourrait insister sur l'importance de la DIA lors de l'ECOFIN.

Les suggestions faites aux États membres sont groupées en fonction du degré auquel ils utilisent la DIA. Elles concernent :

- Les outils de modélisation (modèles) utilisés pour effectuer la DIA.
- Les données utilisées pour la DIA.
- La qualité des analyses de DIA.
- L'inclusion des résultats des analyses de DIA dans les documents budgétaires officiels.

Pour la plupart, ces suggestions aux États membres sont ensuite, dans cette étude, regroupées dans un éventuel cadre commun de l'UE pour l'utilisation de la DIA dans les documents budgétaires officiels.

Principales suggestions concernant les caractéristiques d'un éventuel cadre commun de l'UE pour accroître l'utilisation de la DIA, par les États membres, dans les documents budgétaires officiels:

Les résultats de l'étude sont également utilisés pour déterminer quelles pourraient être les caractéristiques d'un éventuel cadre commun de l'UE (non obligatoire) pour l'utilisation de la DIA. L'objectif de ce cadre commun serait principalement d'aider les États membres intéressés à accroître leur utilisation de la DIA (dans les documents budgétaires officiels et en veillant également à ce qu'elle soit de bonne qualité) ainsi que, dans la mesure du

¹² La Commission européenne fournit un outil de modélisation utile pour les analyses de DIA, grâce à la mise à disposition du modèle de microsimulation EUROMOD. Il s'agit d'un outil utile en matière de DIA, en particulier pour les pays ne disposant pas d'un modèle national de microsimulation. L'échange sur des bonnes pratiques en matière de DIA, y compris celles relatives à l'utilisation d'EUROMOD, peut également être intéressant pour les pays qui ont déjà développé et utilisent un modèle national de microsimulation (qui leur est propre).

possible, d'améliorer la comparabilité des résultats des analyses de DIA entre (certains d'entre) eux. S'appuyant sur les suggestions aux États membres mentionnées ci-dessus et proposant des bonnes ou très bonnes pratiques pour la conduite des analyses de DIA et la présentation de leurs résultats dans les documents budgétaires officiels, ce cadre pourrait servir de guide aux États membres cherchant à développer ou à améliorer leur expertise en matière de DIA. Chez de nombreux États membres, certaines des bonnes ou très bonnes pratiques en matière de DIA décrites dans ce cadre sont déjà observées.

Cet éventuel cadre commun se composerait de deux ensembles de principes directeurs pour l'utilisation de la DIA, lesquels reflèteraient deux niveaux d'exigence différents en la matière: un niveau de base (qui proposerait des bonnes pratiques pour les États membres n'utilisant pas ou peu de la DIA) et un niveau avancé (qui proposerait de très bonnes pratiques pour les États membres qui utilisent davantage la DIA). Le niveau de base pourrait être atteint en utilisant EUROMOD (ou au moins l'interface EUROMOD-JRC) ou d'autres modèles de microsimulation adaptés s'ils sont déjà en place dans certains États membres. Le niveau avancé pourrait être atteint grâce à une utilisation de données de meilleure qualité et à la prise en compte d'effets comportementaux lors de l'élaboration des résultats des analyses de DIA (en intégrant les résultats de modèles macroéconomiques dans la microsimulation de base pour l'analyse de DIA).

- Le niveau de base serait destiné aux États membres qui n'ont pas ou (très) peu d'utilisation de la DIA. Il proposerait un ensemble de bonnes pratiques pour effectuer des analyses de DIA. Il pourrait s'agir d'une méthode efficace pour satisfaire à l'exigence législative (règlement (UE) n° 473/2013, article 6(3)(d)). Ce niveau suggérerait d'utiliser la microsimulation pour les analyses de DIA. Pour les États membres dépourvus d'un modèle national de microsimulation, le niveau de base pourrait être atteint grâce à l'utilisation du modèle EUROMOD (de microsimulation) – ou tout du moins de son interface – basé sur des données d'enquête (EU-SILC), qui sont produites et validées par Eurostat. Ce niveau pourrait également être atteint grâce à l'utilisation d'un modèle national de microsimulation (si un État membre en possède déjà un). Ce niveau suggérerait également que les personnes en charge de la conduite de la DIA bénéficient d'une formation du JRC sur EUROMOD (si tel est le modèle utilisé), ainsi que d'autres formations sur les indicateurs de pauvreté et d'inégalité, afin de garantir la qualité des résultats des analyses de DIA.
- Le niveau avancé serait destiné aux États membres qui utilisent déjà la DIA dans une certaine mesure. Il proposerait un ensemble de très bonnes pratiques (qui existent déjà) pour effectuer des analyses de DIA. Il pourrait inciter les États membres effectuant des formes relativement peu complexes d'analyses de DIA à en effectuer de plus élaborées. Pour atteindre cet objectif, la qualité des données utilisées pour les analyses de DIA pourrait être améliorée en y ajoutant des données administratives. De plus, les résultats des analyses de DIA (obtenus sur base de la microsimulation) pourraient être améliorés en tenant compte d'effets comportementaux, par le biais de modèles macroéconomiques, afin de saisir et/ou de prédire les changements dans l'environnement macroéconomique causés par la mesure (p. ex. changements dans l'impôt direct sur le revenu) analysée.

Pour fournir une brève illustration de cet éventuel cadre commun, l'étude présente trois exemples d'analyses de DIA concernant des mesures hypothétiques. Ces mesures ont été choisies avec les États membres afin que ces trois exemples, bien qu'hypothétiques, soient néanmoins réalistes. Ces analyses de DIA sont effectuées en suivant soit les suggestions du niveau de base de l'éventuel cadre commun, soit celles du niveau avancé:

- Le premier exemple illustre le niveau de base de l'éventuel cadre commun. Il concerne une réforme de l'impôt sur le revenu en Roumanie cherchant à introduire plus de progressivité dans le système fiscal roumain. Le modèle de microsimulation EUROMOD est utilisé pour simuler l'effet sur la distribution des revenus d'une politique fiscale plus progressive, en analysant l'impact d'une telle mesure sur

différents indicateurs de pauvreté et d'inégalités de revenu (par exemple, changement du taux AROP, de l'indice de Gini, du S80/S20, du S80/S50, etc.).

- Le deuxième exemple illustre le niveau de base de l'éventuel cadre commun. Il porte sur le revenu minimum garanti (RMG) et sur une réforme des catégories basses des prestations de retraite à Chypre. Le modèle de microsimulation EUROMOD est utilisé pour simuler l'effet, sur la distribution des revenus, d'une augmentation du seuil maximal de revenus pour percevoir ces prestations sociales. En outre, cette simulation inclut également l'impact sur la distribution des revenus d'une suppression du RMG et des catégories basses des prestations de retraite.
- Le troisième exemple illustre le niveau avancé de l'éventuel cadre commun. Il illustre de manière détaillée l'impact, sur la distribution des revenus, d'une réduction du taux de taxation de certains niveaux de revenus en Italie, à l'aide de la combinaison d'un modèle de microsimulation et d'un modèle macroéconomique.

1. Introduction

1.1. Aims of the study and research questions

The overall objective of this study is first to provide empirical evidence about the use of DIA in the budget preparation process of EU Member States (and in particular in their DBPs for Euro Member States), as well as about the obstacles that prevent the use of DIA in DPB and the degree of similarities in Member States' approaches to DIA. Based on these findings, the overall objective of this study is also to provide suggestions to increase the use of DIA (in and outside DPB) and suggestions on the design of a possible EU Common Framework in this area. To reach this overall objective, the study investigates five main research questions:

- Q1. To what extent do Euro Area Member States use DIA in DBP? How do they approach the distributional impact requirement set out in Article 6(3)(d) of Regulation No 473/2013? How has this approach evolved over the past few years?
- Q2. To what extent do EU27 Member States use DIA (outside DBP) in their budget preparation process or for other purposes? What is their approach in this respect?
- Q3. What may limit the use of DIA in DPB by Euro Area Member States?
- Q4. What could be concrete suggestions for increasing the use by Member States of DIA in and outside DBP?
- Q5. What could be concrete suggestions as regards the design of a possible EU Common Framework for the use of DIA in budgetary documents (incl. in DPB)? To what extent do limited testing/validation confirm the relevance and the feasibility of these recommendations?

To provide an answer to these questions, the research work has been organised along with three tasks (Table 1.1). The first task is devoted to the mapping and the description of DIA use in and outside the DBP. In the second task, the main obstacles to the use and inclusion of DIA in the DBP are identified as well as the degree of similarity of the Euro Area Member States' respective approaches when using DIA. The last task concerns the policy suggestions for increasing the DIA use (whether in or outside DPB) and the design of a possible EU Common Framework in this area.

Table 1.1 – Study’s research questions grid

Study’s research questions		Study’s tasks	
<i>N</i>	<i>Description</i>	<i>N</i>	<i>Description</i>
Q1	To what extent do Euro Area Member States use DIA in DBP? How do they approach the distributional impact requirement set out in Article 6(3)(d) of Regulation No 473/2013? How has this approach evolved over the past few years?	1.1	Mapping of DIA use in DBP over the period 2018-2020: <ul style="list-style-type: none"> 1.1.1. Count and list DIA occurrences over the period 2018-2020 1.1.2 Describing DIA use in DBPs
		1.2	Mapping of DIA use in DBP over the period 2015-2017 <ul style="list-style-type: none"> 1.2.1 Count and list DIA occurrences in DBP over the period 2015-2017
Q2	To what extent do EU27 Member States use DIA (outside DBP) in their budget preparation process or for other purposes? What is their approach in this respect?	1.3	Mapping of DIA use outside of DBP: <ul style="list-style-type: none"> 1.3.1 Count and list DIA occurrences in the budget preparation process, as well as in ex-ante evaluations of already adopted budgetary measures 1.3.2 Describing DIA use in the budget preparation process and in ex-ante evaluations of already approved budgetary measures
Q3	What may limit the use of DIA in DPB by Euro Area Member States?	2.1	Identification of the obstacles and motivations that prevent Euro Area Member States from using DIA in DPB
		2.2	Assessment of the degree of similarity of the Euro Area Member States’ respective approaches when using DIA
Q4	What could be concrete suggestions for increasing the use by Member States of DIA in and outside DBP?	3.1	Providing suggestions for increasing the use of DIA (whether in or outside DBP)
Q5	What could be concrete suggestions as regards the design of a possible EU Common Framework (guidelines) for increasing the use of DIA in budgetary documents (incl. in DPB)? To what extent does limited testing/validation confirm the relevance and the feasibility of these suggestions?	3.2	Providing suggestions on the design of a possible EU Common Framework for increasing DIA use
		3.3	Brief validation of the recommended design of a possible EU Common Framework for increasing DIA use

1.2. Background and motivation

After efficiency took precedence over equity in the economic debate during the 1980s and 1990s, equity has taken centre stage in the public debate since the 2008 financial crisis. Over the last decades, the wealthiest people in most parts of the world have seen their share of the economy soar relative to that of the rest of the population (Atkinson et al. 2011, Alvaredo et al. 2018). The resulting political and social pressures have posed harsh new

challenges for governments and created a pressing demand for reliable data and a far-reaching request for policymakers to provide solutions. Although income differences between countries have diminished worldwide (including between EU MS), income inequality has been steadily increasing in almost every nation (at least when considering the income share of the very top of the income distribution), with the top 1% national income share increasing disproportionately relative to the bottom 50%, which remained rather stagnant from 1980 onwards (for details on single countries, see Alvaredo et al. 2018). However, while still remaining significant, the latter trend has been less prevalent in the EU compared to Anglo-Saxon countries, Asia, Africa and Latin America, suggesting the importance of institutional and policy frameworks in coping with inequality.

Compared to other regions around the world, the societies of the European Union experience a high quality of life and standards of living, with relatively high levels of social protection¹³. Nevertheless, poverty, social exclusion and inequality are a big concern – even more so with the socio-economic impacts of the COVID-19 crisis– and the feeling of economic insecurity increased as a consequence of the Great Recession of 2008 and the sovereign debt crisis of 2011, which have indeed worsened (income) inequality (Jenkins et al. 2013; Figari and Fiorio 2015; Piazzalunga and Di Tommaso 2019; European Commission 2019, 2020). Across the European Union (EU27) in the survey year 2019¹⁴, 20.9% of the population, namely 91.3 million people, was at risk of poverty or social exclusion after in-cash social transfers (AROPE¹⁵), and in 14 countries out of 27, one fifth or more of the population was at risk of poverty or social exclusion. However, since 2010, there has been a decrease of 12.3 million people at risk of poverty or social exclusion for EU27 (Eurostat 2020), especially due to the decrease in the severe material deprivation rate and in the (quasi-)jobless households rate¹⁶.

Addressing inequalities is important not only for social cohesion but also for economic reasons, as inequality can hamper economic growth, affect capital vs labour shares (Fiorio et al. 2020) and jeopardise macroeconomic stability (European Commission 2019, Vergolini 2011). Indeed, “Reduced inequalities within and among countries” is one of the Sustainable Development Goals (SDG 10)¹⁷ to be reached by 2030, as set out by the United Nations in 2015 (United Nations Agenda 2030). The European Union, one of the leading forces behind the UN SDG Agenda, is strongly committed to reducing inequality. It has proclaimed the European Pillar of Social Rights, which embeds several principles contributing (directly or indirectly) to inequality reduction and for which the recent Action Plan¹⁸ acknowledges the importance of distributional impact assessment (“the Commission encourages national and regional authorities to carry out ex-ante distributional impact assessments as part of their budgetary and wider policy processes”). Moreover, Art. 2 of the Treaty on the Functioning of the European Union highlights that: “The Union is founded on the values of respect for human dignity, freedom, democracy, equality, the rule of law and respect for human rights, including the rights of persons belonging to minorities”, aimed at reducing inequalities within and between the Member States.

¹³ All Member States of the European Union have a very high Human Development Index (Human Development Report 2020); ILO data for the Sustainable Development Indicators, Goal 1, Target 1.3 (Implement nationally appropriate social protection systems and measures for all) show a higher proportion of the population covered by at least one social protection benefit in Europe than in other areas. (UN STATS - SDGs indicators).

¹⁴ SILC2019 data refer to the situation in income year 2018.

¹⁵ Based on the definition of AROPE before its recent revision, i.e., AROPE is defined here as persons either at risk of poverty, living in (quasi-) jobless households (0-59y) or severely materially deprived.

¹⁶ See Figure 1 at: <https://tinyurl.com/h6zyfr2f>.

¹⁷ For instance: “Target 10.1: By 2030, progressively achieve and sustain income growth of the bottom 40 % of the population at a rate higher than the national average”.

¹⁸ The European Pillar of Social Rights Action Plan - COM(2021) 102 final.

Nevertheless, inequality in both outcomes and opportunities remains a challenge, particularly for vulnerable groups, whose socio-economic inclusion continues to be inadequate. For instance, based on SILC 2019 data, the income quintile share ratio in the EU27, which compares the share of total income received by the 20% of the population with the highest disposable income to that received by the poorest 20%, stood at 4.99, still above levels in SILC 2010¹⁹ (at 4.89) but lower than the peak reached in SILC 2014-2015 (5.22). At the same time, the income share of the bottom 40% of the population has remained rather constant²⁰ (at around 21.3%) when comparing SILC 2019 to 2010. However, during the economic recovery, labour market improvements have generally favoured high-income families, whereas levels of long-term unemployment and inactivity remain high, in particular for vulnerable groups, while low job quality, job security and uncertain work contracts mainly affect low-income families, with 9.0% of employed people (18-64y) affected by income poverty (i.e., in-work poverty) in SILC 2019.

Low-income families are also more at risk of income shocks, such as the one produced by the economic implications of COVID-19. The lockdown measures introduced in response to the COVID-19 pandemic are causing a new major economic crisis. For the European Union as a whole, the European Commission recorded a reduction in GDP of 6.1% in 2020²¹, but it was even worse for some countries (between 8 and 11% for Croatia, France, Greece, Italy, Portugal, and Spain) (European Commission 2020²²)²³. Ongoing research is still examining if the consequences will be a reduction in income inequality (e.g., Beirne et al. 2020; O'Donoghue et al. 2020) or an exacerbation of social and income inequalities (e.g., Adams-Prassl et al. 2020; Brunori et al. 2020; Figari and Fiorio 2020; Cantó et al. 2021), with some of the differences due to country specificities and to the counteracting policies implemented. Eurostat early estimates of income inequalities for the income year 2020 (Eurostat, 2021) suggest for instance that the poverty rate was stable compared to the previous year at EU level (with however strong differences between most of the Member States and between some population groups).

Besides the COVID-19-related factors influencing income inequality in Europe, another driver of inequality that becomes increasingly relevant, especially in developed countries, is what many social scientists call Skill-Biased Technological Change (Acemoglu, 2002; Card and DiNardo, 2002). This refers to the phenomenon that rapid technological change (digital transformation, artificial intelligence, etc.) from around 1990 onwards has affected skill groups differently and thereby increased income inequality. This is because modern technologies tend to be complementary for high-skilled labour (advanced technologies require more skill and high-ability workers adapt faster to changing technologies) but substitutional for low-skilled workers (automation replaces routine work) (Galor and Moav, 2000; Acemoglu, 2000; Acemoglu and Restrepo, 2019). Thus, labour demand for high-skilled workers increases while low-skilled labour demand decreases, which increases wage differentials between the two groups. In particular, Acemoglu and Autor (2011) highlight the job polarisation caused by technological change throughout the EU, which calls on policymakers to redirect technological change to decrease income inequality.

In the context of high poverty and income inequality as described above, a reliable ex-ante assessment of the distributional impact of planned budgetary measures is of great importance, even more so than in the past. It is indeed essential for budgetary measures²⁴ to avoid, at least, exacerbating poverty and income inequality. An appropriate ex-ante

¹⁹ See at: https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=ilc_di11&lang=en.

²⁰ See at: https://ec.europa.eu/eurostat/databrowser/view/ilc_di11f/default/table?lang=en.

²¹ See at: https://ec.europa.eu/info/business-economy-euro/economic-performance-and-forecasts/economic-forecasts/spring-2021-economic-forecast_en1.

²² See at: https://ec.europa.eu/commission/presscorner/detail/en/ip_20_2021.

²³ More recent and precise figures may have been published since the preparation of this study.

²⁴ Budgetary measures refer to any measure, whatever its type/purpose (i.e., so not only referring here to (social) measures that concern the fight against poverty and income inequality), in a budget.

evaluation of the impact of such measures on the income distribution is necessary to build up a proper and efficient cost-benefit analysis, considering that costs and benefits of (to be) adopted measures may affect, in a disproportionate way, different groups of the population (Livermore and Rosenberg 2014). Thus, mainstreaming distributional concerns in policy making should be considered by the EU Member States, and in particular by the Member States of the Euro Area. Following the provision contained in the EU Regulation 473/2013 of the European Parliament and the Council, the Member States of the Euro Area, in the context of the European Semester, shall make their Draft Budget Plans for the forthcoming year public by October 15. According to Art.6(3)(d), the Draft Budgetary Plans shall contain “where possible, indications on the expected distributional impact of the main expenditure and revenue measures”. Accordingly, distributional impact assessments should be used when preparing the following year’s budget.

Typically, standard summary income inequality measures, such as quantile ratios, Gini, Atkinson or generalized entropy indices, and several poverty indicators, among which are the AROP rate and the poverty gap, (Cowell, 2011) are, inter alia, used to assess the level of fairness of income distribution, while standard decomposition methodologies, such as dividing the population into subgroups (e.g., by age or employment type or education level), are used to understand the structure of inequality (Bourguignon, 1979; Cowell, 1980; Shorrocks, 1980, 1982; Cowell and Fiorio, 2011). To provide indications of the distributional impact of their policies, Member States may use a wide range of simulation models, ranging from those focussing on microunits, such as individuals, households and firms, to those that integrate macroeconomic feedback when assessing the distributional impact, such as dynamic stochastic general equilibrium (DSGE) models, overlapping generations (OLG) models and computable general equilibrium (CGE) models, to macroeconomic models linked to microeconomic ones, with increasing levels of complexity (e.g. Barrios et al., 2019; d’Andria et al., 2020).

Among the many simulation models that could ex-ante inform the EU Member States about the distributional impacts of their policies, EUROMOD deserves a special mention for some of its particular features (Sutherland and Figari 2013). First, it is a static tax-benefit microsimulation model covering all EU Member States, enabling researchers and policy analysts to simulate personal income tax, social insurance contributions or social benefit reforms and calculate the budgetary and personal income implications of those reforms, allowing for standardised analysis across EU countries’ tax and benefits systems. Second, EUROMOD has been developed in collaboration with national experts who update the tax and benefit coding and provide reports on the tax and benefit system of each country, including validation of the model against national statistics while providing extensive and freely accessible documentation. Third, the model is open access; any researcher can use it for research purposes and make use of data from the European Union Statistics on Income and Living Conditions (EU-SILC), which are cost-free for non-commercial use. These are key features of EUROMOD, which have characterised it since it was first developed and then updated by the Microsimulation Unit of the Institute for Social and Economic Research, based at the University of Essex, jointly with National Teams, and that will remain even after the ongoing process of transfer of maintenance and development responsibilities to the EC Joint Research Centre in Seville will be terminated.

Whereas many examples of the distributional impacts of reforms are provided in the literature (e.g., Roeger et al. 2019, Badenes-Plà and Buenaventura-Zabala 2017 and the long list of EUROMOD working papers available at <https://www.microsimulation.ac.uk/research-and-policy-analysis/publications/euromod-working-paper-series/>) and despite its importance, it is unclear if the Member States carry out similar analyses during the preparation process of their DBPs and/or national budgets or at least before implementing the already adopted measures. As described in the introduction, the aim of this study is first to establish the extent to which Member States use DIA in their DBP, in their budget preparation process or other stages, and the trend of DIA use over time. The study then aims to provide suggestions for increasing the use by Member

States of DIA and concrete proposals regarding the design of a possible EU Common Framework in this area.

1.3. Report structure

The report is organised as follows: section 2 is devoted to a summary of the methodology employed; section 3 reports the results from the systematic review of the DBPs (and of SCP and NRP) as well as from the interviews of officials from the Member States. The systematic review is intended to map the use of DIA (especially in DPB). The interviews are intended to describe in-depth the use of DIA, to identify the obstacles to DIA use and to assess the similarity between the EU Member States' approaches when using DIA. Section 4 reports the suggestions that can be derived from the results presented in the report with regard to increasing the use of DIA and section 5 supplies a general conclusion to the report.

2. Methodology

In this section, the methodology adopted for Task 1 and Task 2 is briefly explained. As mentioned in the introduction, Task 1 consists of mapping and describing the use of DIA in and outside the DBP, while Task 2 is used to identify the obstacles to DIA use in the DBP and the degree of similarity between Member States' approaches when using DIA. To complete Task 1, two sources of data are used: publicly available documentation related to the budget (DBPs, Stability/Convergence Programmes (SCP), National Reform Programmes (NRP) and information, coming from interviews of Member States' officials, on other types of national budgetary documents (of which some are also submitted to the EC). The interviews also served to collect the necessary information for Task 2.

The first step of the analysis consists of reviewing the relevant documents.

For DPB (i.e. only for Euro Area Member States): a systematic reading review of the DBPs is carried out (considering for most of them their English version) to identify the presence of DIA occurrences²⁵. This systematic review of the DPBs is complemented by text mining, namely an automatic analysis of text performed through the use of algorithms utilising the software R. Text mining²⁶ is used only to double-check that the researchers did not miss anything relevant.

For two types of documents other than DPB (SCP and NRP): a systematic review was conducted using a text-mining algorithm that was applied to the SCP and NRP for the period 2019-2020 (fiscal years) for the EU Member States for which these documents were available in English, French, German, Italian or Spanish (the selective review was not carried out for countries with documents only available in other languages. Information for these countries directly came from the interviews). For all the SCP and NRP available in English, French, German, Italian or Spanish, the algorithm extracted the pages containing the words that are strictly related to DIA and the Research Team then conducted a systematic reading review of each of these pages to identify DIA occurrences.

²⁵ DIA occurrence is defined below in "3. Main results".

²⁶ The algorithm exploits the use of regular expressions, an instrument that enables searching for specific word patterns, giving, as a result, the position of the searched pattern in a character string. After capturing the entire DBP's text in a character vector, some polishing is performed removing double spacing, putting everything into lower case and erasing the most common articles and conjunctions (e.g., the, of, the verb to be). Then, the algorithm extracts the pages that include the words strictly related to DIA. Should the analyst find another word that refers to DIA but was not on the list, the analyst can update the list. Nonetheless, to maintain comparability among States, the same finalised list has been run on the DBPs of all MS.

The results from the reading review – on the use of DIA in and outside DPB - of the aforementioned documents were shared for validation with the interviewees before the interviews (cf. below) took place.

For the other types of budgetary documents (National Growth Strategy, progress towards EU2020 indicators, progress in implementing country-specific recommendations, national document introducing expenditure and revenue measures and documents with an ex-ante or ex-post evaluation of budgetary measures) also considered in this study, the insights on DIA occurrences directly came from the interviews (cf. below).

The second step of the analysis is based on the consultation of officials of all Member States through structured online interviews (referred to as “the interviews” in this study). Ministry officials involved in the draft budgetary process and the distributional impact assessments were interviewed to gather relevant information about the use of DIA in the DBP²⁷ as well as in other national budgetary documents. Interviews also served to identify what may prevent Euro Area Member States from including DIA more often in their DBP (also when having, however, performed the underlying DIA analysis). Interviews also enabled to identify the degree of similarity between the Member States as regards their respective approaches when using DIA. It has to be noted that officials²⁸ from all the EU 27 Member States were interviewed (for only 8 Member States, the interviews were conducted by local experts instead of by members of the research team of this study) (see Table A1 in the Annex for more details). To facilitate the interview process, an interview questionnaire was sent in advance to the interviewees. The questionnaire is composed of five sections. In the first section, information about the role of the interviewees as well as their involvement in the budget process and their familiarity with DIA are collected. The second section asks about the inclusion of DIA in DBP, SCP, final national budget or in supporting documents to the final national budget and in other documents (e.g., NRP, national growth strategy, progress toward EU2020 indicators and other national documents). The third section collects detailed information about the details of DIA used in the budgeting process (e.g., characteristics of the staff in charge of DIA analysis, details of the analysis²⁹ and factors that could help to expand the use of DIA). The fourth section asks the reasons for not including DIA in the DBP (for Euro Area Member States), while the last section asks the reasons for not performing any DIA at all (for the few Member States that do not conduct any DIA).

The interviews’ findings are then summarised in specific charts and tables, which focus on their different aspects. Some important tables summarise the interviews’ findings regarding the respective approaches to conducting DIA across the Member States. These tables assess the degree of similarities between Member States’ DIA approaches with respect to several dimensions, including:

- Staff: including the size (e.g., the number of working days needed to perform DIA for the DBP) and educational qualifications of the team in charge of the DIA analysis, as well as to which entity this team belongs.
- Tools/models: including the models (e.g., EUROMOD, national models, etc.) and software used to perform DIA.
- Data employed: including the type of data used for DIA, such as survey data, administrative archives or a merge of the two sources, as well as the timeliness of these data.

²⁷ Indeed, it has been observed that DBPs (documents) typically lack the level of detail and depth needed to answer some of the study’s research questions pertaining, for instance, to the characteristics of the use of DIA (if any) by a Member State. In the DBPs, the only information found is typically the data and the software used (e.g., Greece, Finland, France).

²⁸ The interviewed officials have a leading role in the respective Ministry of Finance as directors, deputy directors, head of units in the divisions in charge of the drafting of the relevant documents for the budgeting process.

²⁹ The reference for the analysis is to the last two fiscal years (2019 and 2020).

- Methodology and type of analysis: including the indicators used in the DIA analysis, as well as the sub-group decompositions and the counterfactuals/baseline used.
- Policy selection method: including how the main revenue and expenditure measures are selected to be subject to DIA (e.g., considering their financial weight, or taking into account the reliability and the relevance of the results, or only concerning certain policy areas).
- Schedule of the activities: including the timing of the DIA (in particular, if it will be inserted in the DBP).
- DIA relevance for policy-making: including the consideration of DIA results by policymakers.

Some important charts summarise the interviews' findings regarding the identification of obstacles and motivations that prevent Member States from using DIA more often or even at all (especially in DPB for Euro Area Member States). They are based on several dimensions, including:

- Role of the European Commission: including (absence of) requests coming from the EC regarding DIA and the level of support that EC can provide to the Member States for DIA (e.g., preparation of a specific template).
- Organisational issues: including the possible lack of personnel able to carry out DIA, the schedule of the activities and the lack of time, the complexity of the budgetary process that complicates the inclusion of DIA in the DBPs or other documents, and the necessity to keep the DBP simple and concise.
- Soundness of the results: including the availability and timeliness of the data and the quality and reliability of the DIA results.
- Political will: including the relevance of DIA for the national governments and their will to use it.

3. Main results

In this section, the results that emerged from the review of the relevant budgetary documents as well as from the interviews are detailed. Before proceeding to the analysis, a brief definition of the main terms it is based on is provided:

- **DIA occurrence:** this refers to each inclusion by a Member State, in a given official document for a given year, of a DIA analysis (which may assess the distributional impacts of only one budgetary measure or of (jointly) several different budgetary measures). A DIA occurrence should provide (at least some) details on the methodology adopted for the analysis (for DBPs, SCP and NRP³⁰). As they concern budgetary measures that have not yet been adopted (e.g., that are in the DBP), DIA occurrences concern ex-ante DIA.
- **Count of DIA occurrences:** the total number of distinct DIA occurrences in a given official document in a given year for a Member State (e.g., in its DBP for a given year), irrespective of the number of budgetary measures considered in any of these DIA occurrences. Note that a given DIA occurrence may thus assess the distributional impacts of one or more budgetary measures. For the latter, the "overall" (i.e., combined) distributional impacts of several different measures (i.e., pool of measures) are assessed jointly in a single DIA (called "joint" DIA in this report) rather than assessing the respective distributional impacts of each of these

³⁰ However, for budget-related documents at the national level, a DIA occurrence is identified even if no details on the analysis performed are provided in the document.

measures separately in (individual) DIA. The assessed distributional impacts in a “joint” DIA thus reflects the combined effects of all the measures analysed jointly (with no detailed view provided on the respective distributional impacts of each of these measures). Such a “joint” (i.e., pooled) DIA – jointly analysing several measures – is counted only as one DIA occurrence in the count of DIA occurrences.

- **Count of budgetary measures:** the total number of budgetary measures considered (i.e., assessed) by a Member State in its DIA occurrences in a given official report in a given year (e.g., in its DBP for a given year). Measures jointly assessed in a “joint” DIA occurrence are counted as separate.
- **Revenue or expenditure measures (policy types):** this is the first level for the classification of budgetary measures into aggregated groups. Revenue policies are measures related to the collection of government revenues mainly through the collection of direct taxes (i.e., taxes on incomes earned by households and firms), or indirect taxes (i.e., taxes on consumption), while expenditure policies include transfer payments (such as welfare and unemployment benefits), current expenditures (i.e., wages and salaries of public employees) and capital expenditures (i.e., investments made by the government in capital equipment and infrastructure).
- **Policy areas:** this is the second (and more granular) level for the classification of budgetary measures into aggregated groups, providing a more granular level of classification than simply revenue or expenditure measures. The full list of policy areas considered is reported in Table A2 in the Appendix.

3.1. Mapping the use of DIA by the Member States

This section aims to provide a precise view of the use of DIA in recent years by Member States, based – as mentioned above - on the insights from the review of various budgetary documents and from the interviews of national officers for each of the EU27 Member States.

3.1.1. Mapping DIA use in DBPs

This subsection aims to count all the DIA occurrences in the DBPs for the period 2015 to 2020 (fiscal years) and to describe the nature of the use of DIA in these DBPs based on their aforementioned systematic reading review.

3.1.1.1. Count and list of DIA occurrences in the DBPs over the period 2015-2020

This subsection provides a descriptive analysis regarding the use of DIA in the DBPs of Euro Area Member States over the period 2015-2020 (fiscal years). The objectives are to see if Euro Area Member States include at least one DIA occurrence in their DBP in a given year, as well as to analyse in-depth the diversity of the budgetary measures assessed through DIA. A strong focus is placed on exploring differences in the use of expenditure or revenue policies, and on detecting the main policy areas reflected in the budgetary measures assessed through DIA in the DBP.

As described in section 2, a systematic reading review of the DBPs of the period 2015 to 2020 was conducted for all 19 Euro Area Member States. The following steps were followed. First, all the DBPs were examined to identify all the DIA occurrences³¹ they contain and to

³¹ See Figure A.2 in the Appendix for an example of a DIA occurrence.

identify all the budgetary measures³² analysed in each of these DIA occurrences³³. Moreover, the review of each DBP also looked at whether its DIA occurrences analysed the impact of all (or most of) the main budgetary measures included in this DBP (through a joint DIA) or only a subset of them. Following that, the budgetary measures were classified by type (revenue or expenditure measures) and by policy area according to the classification provided in Table A3 in the Appendix. Each budgetary measure was counted and classified individually, irrespective of whether it was analysed in a separate DIA or in a joint DIA with other budgetary measures³⁴. This is because in most cases, Euro Area Member States did not perform separate DIA for each expenditure and revenue budgetary measure, or even separate DIA for different policy areas. Instead, those Euro Member States having included DIA in their DBPs tended to include only a single joint DIA for some (and sometimes all) of the measures covered in their DBPs. If some doubts persisted in this respect, clarification was sought from the national officers in charge of conducting DIA for the DBPs during the interviews.

A graphical summary of the systematic reviews of the DBPs of all the Euro Area Member States for the 2015-2020 period was produced to facilitate the understanding of the information collected, to observe the dynamics across time and to ensure straightforward comparability across these Member States. The following sets of figures consist of:

1. A table indicating where at least one DIA occurrence is present (or not) in the 2015-2020 DBPs, by year and by Euro Area Member State (Table 3.1).
2. A table indicating the number of DIA occurrences in the DBPs in the period 2015-2020, by year and by Euro Area Member State (Table 3.2).
3. A figure indicating the average number of DIA occurrences and the average number of distinct budgetary measures analysed via DIA (alone or jointly with other measures) in the DBPs in the period 2015-2020, by year (with the average being computed in a given year from the total number of Euro Area Member States with at least one DIA occurrence in that year) (Figure 3.1).
4. A figure indicating the average number of distinct budgetary measures grouped by type (i.e., revenue or expenditure measures) analysed via DIA (alone or jointly with other measures) in the DBPs in the period 2015-2020, by year (with the average being computed in a given year from the total number of Euro Area Member States with at least one DIA occurrence in that year) (Figure 3.2).
5. A set of figures indicating: the number of distinct budgetary measures analysed via DIA (alone or jointly with other measures) in the DBPs in the period 2015-2020, by year and by Euro Area Member State with at least one DIA occurrence in that year, considering two levels of grouping for these measures: a) measures are grouped by type (i.e., revenue or expenditure measures) (Figure 3.3), b) measures are further grouped by policy area, respectively for revenue measures and expenditure measures (Figures 3.4 and 3.5).

³² Budgetary measures are the set of policy changes analysed via DIA in the DBP; e.g., changes in taxes, social security contributions, benefits, labour market policies, etc.

³³ As mentioned above, if, in a given DBP, a DIA is conducted to assess the distributional impacts of several different budgetary measures jointly, only a single DIA occurrence is counted for this (joint) DIA. If instead (individual) DIA are performed separately for each budgetary measure, each of these (individual) DIA is counted as a DIA occurrence.

³⁴ i.e., as already mentioned: measures jointly assessed in a "joint" DIA occurrence are all counted in the count of budgetary measures (which is not the same as the count of DIA occurrences).

Table 3.1 – At least one DIA occurrence in the DBP over the period 2015-2020, for the Euro Area Member States by fiscal year

MS	2015	2016	2017	2018	2019	2020	Total Years
AT	No	Yes	No	No	No	No	1/6
BE	No	No	No	No	No	No	0/6
CY			No	No	No	No	0/4
DE	No	No	No	No	No	No	0/6
EE	No	No	No	Yes	Yes	No	2/6
EL					Yes	Yes	2/2
ES	No	No	No	No	No	No	0/6
FI	No	No	No	No	Yes	No	1/6
FR	No	No	No	Yes	No	Yes	2/6
IE	Yes	Yes	Yes	Yes	Yes	Yes	6/6
IT	No	No	No	No	No	No	0/6
LT		No	Yes	No	Yes	No	2/5
LU	No	No	No	No	No	No	0/6
LV	No	No	No	Yes	No	No	1/6
MT	No	No	Yes	Yes	No	No	2/6
NL	Yes	Yes	Yes	Yes	Yes	Yes	6/6
PT	No	No	No	No	No	No	0/6
SI	No	No	No	No	No	No	0/6
SK	No	No	No	No	No	No	0/6
Total Euro MS with DBP	2/16	3/17	4/18	6/18	6/19	4/19	

Notes: Cells with a darker yellow background indicate DIA occurrences with joint analysis of all budgetary measures in a given year. Cells with a blue background indicate that separate budgetary measures are included in the DIA. Missing values on a white background imply that no DBP was produced.

Table 3.1 indicates, for each year over the period 2015-2020, whether the 19 Euro Area Member States had at least one DIA occurrence in the DBP of the given year. Dark yellow cells signal instances where a given Member State analysed (jointly) the (combined) distributional impacts of all (or most of³⁵) the budgetary measures considered in the DBP in a given year³⁶. In contrast, blue cells indicate DIA occurrences where only a limited number of budgetary measures were analysed (separately). White cells indicate that the Euro Area Member States were not obliged to submit a plan, namely Cyprus and Greece (at the time under a macroeconomic adjustment programme) and Lithuania (joined the Euro Area in 2015). It is evident from the table that among Euro Area Member States, the inclusion of DIA analyses in the DBPs was not a common practice. Ireland and the Netherlands are the only Euro Area Member States with at least one DIA occurrence every year since 2015. Ireland analysed the distributional effects of the same set of budgetary measures in each year³⁷, while the Netherlands focused on the effect of the main measures considered in each of their DBPs. Nine Member States (Belgium, Cyprus, Germany, Italy, Luxembourg,

³⁵ In some cases, the DBP does not provide sufficient information to establish with certainty whether all budgetary measures are considered or not. In other cases, some specific measures are excluded, but the majority of the budgetary policies are included in the DIA.

³⁶ Greece excludes policies which do not directly affect households (e.g., changes in corporate income taxation) and secondary effects of social security contribution changes.

³⁷ The budgetary measures concern changes in the income tax, PRSI, universal social charge and child benefits.

Portugal, Slovakia, Slovenia and Spain) had no DIA occurrence over the entire period. Some of the other Euro Area Member States (e.g., Austria, Finland and Latvia) had at least one DIA occurrence only for a given year, followed by no occurrence thereafter. It must be noted that the number of Euro Area Member States including at least one DIA occurrence in their DBPs (in a given year) has been steadily increasing from only two in 2015 to six in the period 2018-2019 but decreased to four in 2020 (bottom row of Table 3.1). Three countries (Estonia, Finland and Lithuania) did not include a DIA in 2020, in contrast to the previous fiscal year. This heterogeneity in the DIA use comes as a consequence of the fact that most policymakers request distributional impact analysis only when new specific measures are introduced and need justification.

Table 3.2 – Count of DIA occurrences³⁸ in the DBP over the period 2015-2020, for the Euro Area Member States by fiscal year

MS	2015	2016	2017	2018	2019	2020
AT	-	1	-	-	-	-
BE	-	-	-	-	-	-
CY			-	-	-	-
DE	-	-	-	-	-	-
EE	-	-	-	1	1	-
EL					1	1
ES	-	-	-	-	-	-
FI	-	-	-	-	3	-
FR	-	-	-	2	-	1
IE	1	1	1	1	1	1
IT	-	-	-	-	-	-
LT		-	1	-	2	-
LU	-	-	-	-	-	-
LV	-	-	-	1	-	-
MT	-	-	4	1	-	-
NL	1	1	1	1	1	1
PT	-	-	-	-	-	-
SI	-	-	-	-	-	-
SK	-	-	-	-	-	-
Total	2	3	7	7	9	4

Based on Table 3.1, which focuses on the presence of at least one DIA occurrence, Table 3.2 also shows the number of DIA occurrences in the DBP of a given year for all 19 Euro Area Member States and each year over the period 2015-2020. Blue cells indicate at least one DIA occurrence for a given year. It can be observed that, for those Euro Area Member States with at least one DIA occurrence in a given year³⁹, most of them had only one DIA occurrence in this year. One should, however, be cautious when drawing some conclusions here since all of these single DIA occurrences were joint DIA (counted as only one DIA occurrence for a given DPB), which covered several (if not all sometimes) of the measures considered in the DBP of the Member State in the given year. The exceptions (i.e., Euro Member States with more than one DIA occurrence in their DBP in a given year) are Finland

³⁸ A joint DIA (where several measures are jointly analysed) is counted only as one DIA occurrence.

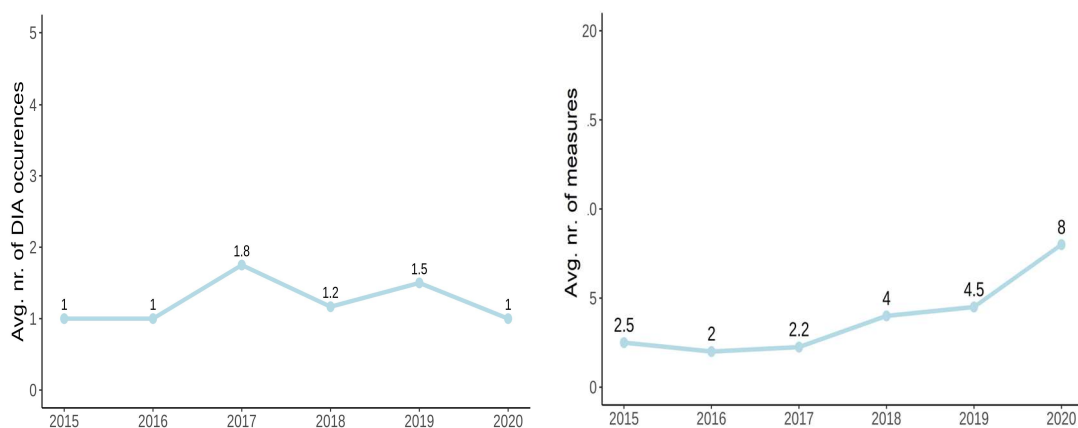
³⁹ i.e., those with a value "yes" in the considered year in table 3.1.

in 2019, France in 2018, Lithuania in 2019⁴⁰ and Malta in 2017 (note that Malta DBP 2017 is the only instance where a Member State performed DIA analyses on single budgetary measures⁴¹, followed by a joint DIA analysis to estimate their combined distributional impacts).

The left graph in Figure 3.1 below shows, for each year, the average number of DIA occurrences among Euro Area Member States with at least one DIA occurrence in this fiscal year⁴². The Figure confirms that the average number of DIA occurrences is low, ranging from only 1 in 2015, 2016 and 2020, to 1.8 in 2017. The higher value in 2017 is driven by the unique case of Malta described above. While the average number of DIA occurrences is relatively stable over time, the number of distinct budgetary measures analysed via DIA in DBPs shows an upward trend from 2016 onwards⁴³. This can be observed in the right graph of Figure 3.1, which plots, for each year, the average number of distinct DIA budgetary measures analysed via DIA among the Euro Area Member States with at least one occurrence in this year⁴⁴. From 2016, the number of measures increased steadily, reaching 8.5, on average, in 2020. As will be seen subsequently, this is mainly because countries such as Finland and France, without any occurrences before 2018, performed joint DIA over a wide range of budgetary measures.

Figure 3.1 – Average number of DIA occurrences⁴⁵ and average number of distinct budgetary measures analysed⁴⁶ via DIA in the yearly DBP over the period 2015-2020

(with the average being computed in a given year from the total number of Euro Area Member States with at least one DIA occurrence in that fiscal year)



Turning to the classification of budgetary measures into expenditure and revenue measures, Figure 3.2 shows that, on average, among the Euro Area Member States with at least one DIA occurrence in a given year, revenue and expenditure measures are analysed in roughly equal shares with only a slightly stronger focus on revenue measures (except for 2020). The systematic review of DPB revealed that Euro Area Member States

⁴⁰ The 3 Euro Area Member States performed joint DIAs on different sets of budgetary measures in the specified years.

⁴¹ The budgetary measures considered are: income tax reduction, in-work benefit scheme and the minimum pension.

⁴² This implies that the pool of Member States over which the average is computed changes from year to year. For instance, in 2015 the average is computed for Ireland and the Netherlands, while for 2016 Austria is included as well.

⁴³ In the case of DIA occurrences analysing the joint impact of several budgetary measures, each budgetary measure is counted separately.

⁴⁴ If a Member State analyses the impact of a given budgetary measure in two distinct DIA occurrences (e.g., individually and then jointly with other budgetary measures), the budgetary measure is counted only once.

⁴⁵ A joint DIA (where several measures are jointly analysed) is counted only as one DIA occurrence.

⁴⁶ If it were analysed in a separate DIA occurrence or analysed jointly with other measures in a joint DIA occurrence.

generally do not perform separate DIA for revenue and expenditure measures. The budgetary measures are usually combined and analysed jointly in a single joint DIA, whereas in rare cases, the focus is placed only on one type of budgetary measure for a given fiscal year.

Figure 3.2 – Average number of distinct budgetary measures by type analysed in the DBP over the period 2015-2020

(with the average being computed in a given year from the total number of Euro Area Member States with at least one DIA occurrence in that fiscal year)

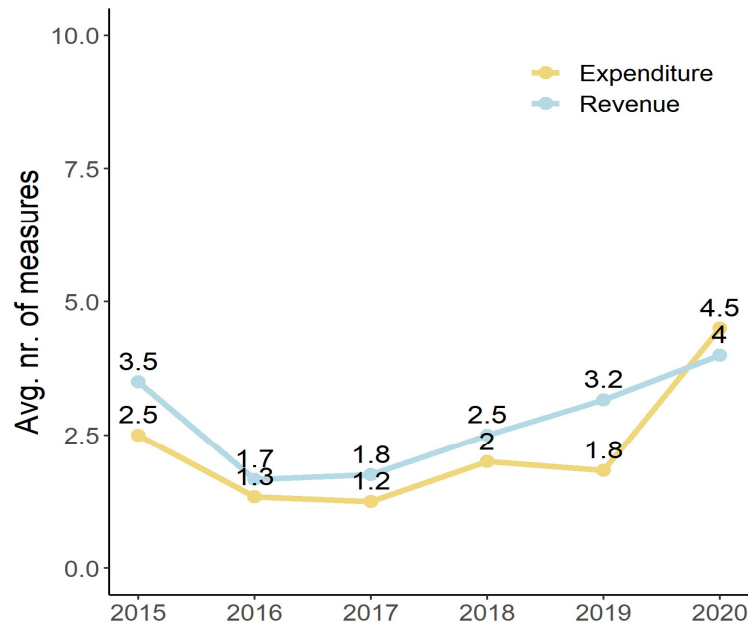
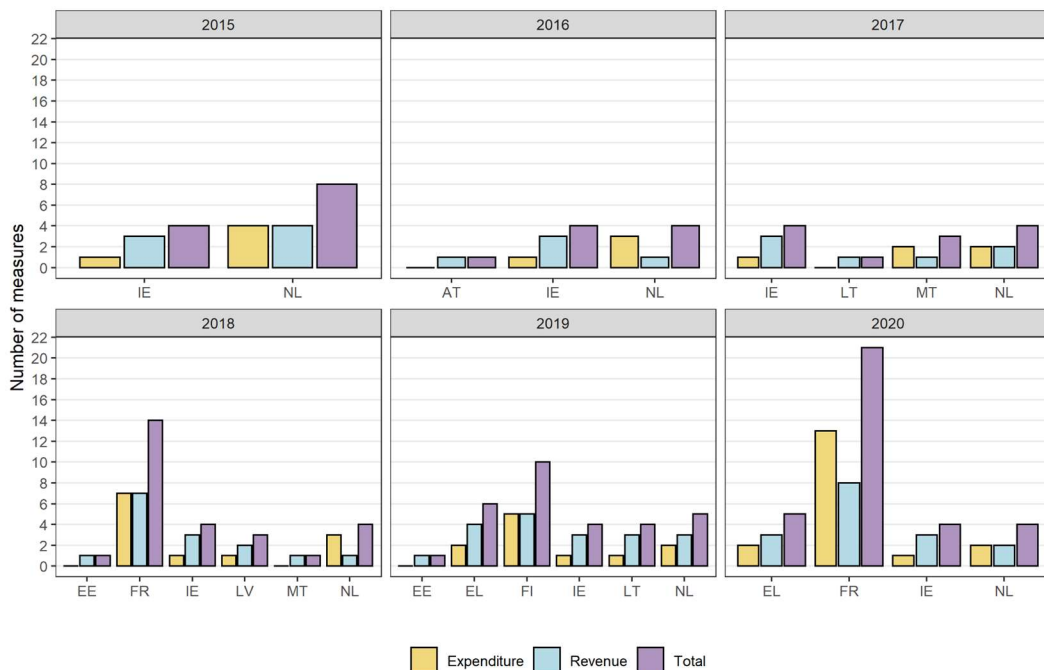
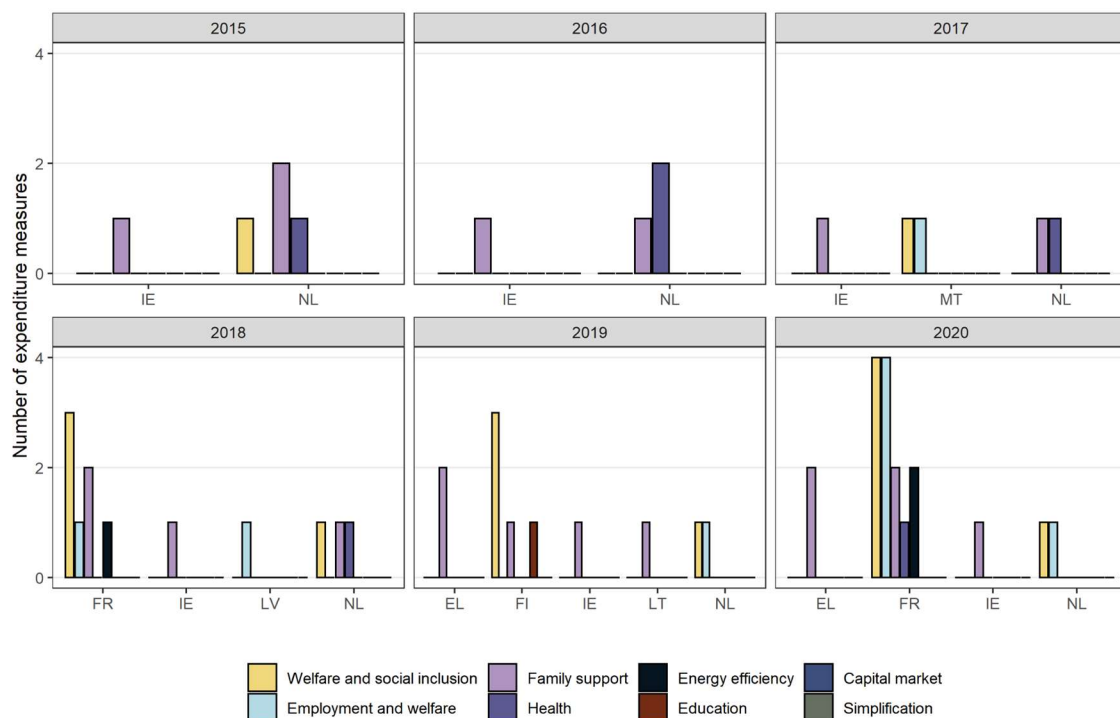


Figure 3.3 – Count of distinct budgetary measures by type (i.e., expenditure and revenue) which are covered in the DIA occurrences in the DBP over the period 2015-2020 for the Euro Area Member States with at least one DIA occurrence in a given year



Moving to the results disaggregated by Member State, type of budgetary measures (i.e., expenditure or revenue) and fiscal year⁴⁷ presented in Figure 3.3, it can be observed that there are both differences between the Member States and changes for a given Member State across time. The number of budgetary measures considered in a given year varies greatly, ranging from only one in Estonia in the period 2018-2019 to 21 for France in 2020 (shown by the purple bars). By type of measure, a clear pattern does not emerge, even though some Member States appear to consider certain types of measures more than others.

Figure 3.4 – Count of distinct expenditure budgetary measures by policy area which are covered in the DIA occurrences in the DBP over the period 2015-2020 for the Euro Area Member States with at least one DIA occurrence in a given year



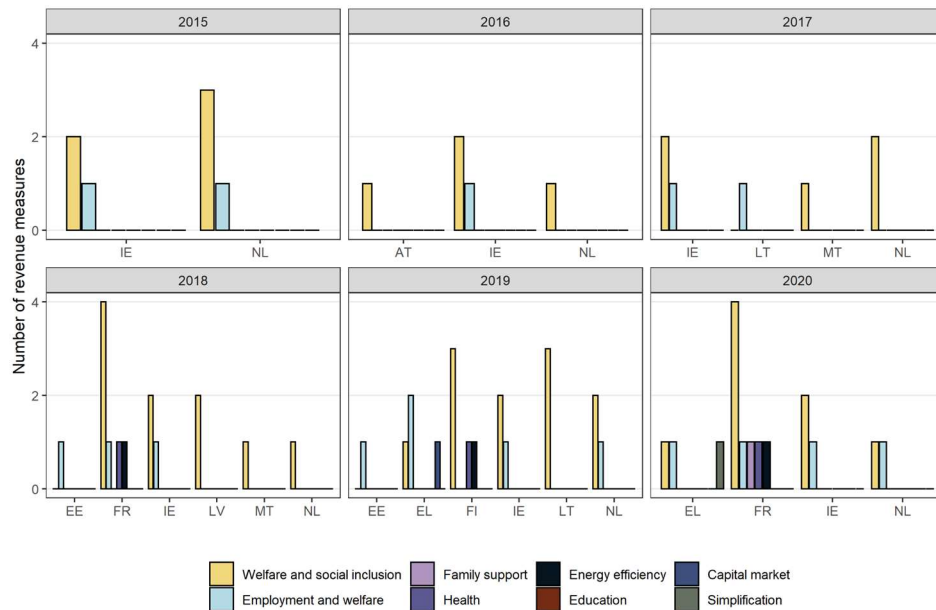
Figures 3.4 and 3.5 classify budgetary measures into policy areas, separately for expenditure and revenue budgetary measures. Several findings emerge. First, only eight policy areas were identified in the DBPs of Euro Area Member States. Second, welfare and social inclusion measures are the most common types of budgetary measures considered, especially in the case of revenue measures⁴⁸. Third, employment and welfare, family support and health budgetary measures are also frequently included. However, this varies considerably between the Euro Area Member States. Fourth, only France and Finland include environmental and energy-related measures in their DIA. Finally, education measures are also rarely considered, except for Finland in 2019. Similarly, the distributional impacts of measures focusing on capital markets or simplification⁴⁹ are analysed only once: by Greece in 2019 and 2020, respectively.

⁴⁷ In several instances, it was difficult to identify the precise set of policies considered for a given DIA occurrence. For instance, in the case of the Netherlands in 2015, it would appear that all policy changes were included in one DIA analysis, but a clear list of policies is not explicitly stated. As a result, it is likely that in several cases, the number of policies identified through systematic review is underestimated.

⁴⁸ The revenue budgetary measures classified as “Welfare and social inclusion” are represented mainly by changes in taxes having an impact at household or individual level (e.g., income tax, consumption taxes). “Employment and welfare” budgetary measures are represented mainly by changes in taxes affecting firms or workers.

⁴⁹ Simplification measures include policies aimed at simplifying administrative procedures and regulations (e.g., e-government services), transactions (e.g., through digitalisation), etc.

Figure 3.5 – Count of distinct revenue budgetary measures by policy area which are covered in the DIA occurrences in the DBP over the period 2015-2020 for the Euro Area Member States with at least one DIA occurrence in a given fiscal year



In summary, the systematic review of the DBPs of all the Euro Area Member States reveals that DIA occurrences in DBPs are infrequent over the period 2015-2020. Out of the 19 Euro Area Member States, for any given year in the selected period, six of them⁵⁰ at most included at least one DIA analysis in their DBP. Among the ten Euro Area Member States with at least one DIA occurrence (in at least one of the years for the period 2015-2020), the average number of DIA occurrences in a given year was below two, with most Member States performing only a single joint DIA. In general, Euro Area Member States do not perform separate DIAs for each budgetary measure. In most cases, all or most of the budgetary measures are analysed simultaneously in a single joint DIA, irrespective of budgetary measure type (revenue/expenditure) and area, their aggregated impact being reported by income level or by specific socio-demographic groups. Since 2017, the average number of distinct budgetary measures, computed from countries with at least one DIA occurrence in the given year, displays a positive trend. Revenue and expenditure measures are, on average, included in roughly equal numbers, even though some differences between the Euro Area Member States and across time do exist. Finally, the most frequent policy areas considered are those regarding welfare and social inclusion.

We conclude this section with a brief note on the potential usefulness of text-mining algorithms in detecting possible DIA occurrences. In addition to identifying if a DIA section is present in a given DBP, text mining is also used to count the frequency of the use of DIA-related words in the DBPs of Euro Area Member States over the period 2015-2020. The list of words considered is listed in Table A4 in the Appendix. A descriptive analysis is performed by computing the average use of all related words over the entire period. Results are plotted in separate word clouds for each Euro Area Member State and reported in Figure A1 in the Appendix. Words printed in larger font sizes indicate a higher frequency of use over the period. Those with a black font colour belong to a subset of words more strictly related to DIA. Euro Area Member States with denser plotting areas are those with a higher frequency of use of DIA-related words. The figure shows a clear association between DIA occurrences and the use of DIA-related words. Ireland, Estonia, Malta, France and especially Greece have a much larger use of DIA-related words than the remaining Euro Area Member States. Conversely, Member States with no DIA occurrence (in their DPB

⁵⁰ These were not all the same every year.

2015-2020) such as Austria, Belgium, Cyprus, Germany, Portugal, Slovenia and others have much less dense plotting areas. The Netherlands is a notable exception: despite having one DIA occurrence each year, the use of DIA-related words is relatively low, possibly due to shorter and less technical DIA sections. On the contrary, Spain had no DIA occurrence, notwithstanding their use of DIA-related words is relatively high, pointing to a general interest for the distributional thematic per se but with other constraints being present. Nevertheless, the results suggest that text mining is an efficient and precise tool for detecting possible DIA occurrences in DBPs, with potential applications to other national documents.

3.1.1.2. Describing the characteristics of the use of DIA by Euro Area Member States in their DBPs

This subsection describes the use of DIA by Euro Area Member States in their DBP in recent years based on insights gained through the aforementioned interviews. The goal is to highlight which are the characteristics of their DIA use. More specifically, the characteristics of DIA are presented using two main tables. The first one focuses on the data and the methodology that is usually used in their DIA analysis, while the second one presents a set of information about the human resources involved in these analysis. Among the Euro Area Member States, only Ireland and the Netherlands had at least one DIA occurrence in all their DBPs during the period 2018-2020 (fiscal years), while Greece had at least one DIA occurrence in 2019 and 2020 (no DBP was submitted with reference to the fiscal year 2018 by Greece). France had at least one DIA occurrence in both 2018 and 2020, while for Estonia it was in both 2018 and 2019. Latvia and Malta had at least one DIA occurrence only in 2018, while for Finland and Lithuania it was only in 2019. All the other Euro Area Member States did not include any DIA analysis in their DBPs over the period 2018-2020 (fiscal years).

The data and methodology used when conducting DIA differed across the Euro Area Member States, as well as the measures for which DIA was conducted. For example, in the 2018 DBP for Malta, the effect of the tax refunds measure on the Gini index using administrative data is reported. In Latvia, the DIA was conducted on the labour tax reform as well as its effects on wages, tax wedge and the Gini index. In Ireland, the DIA is intended to assess the effect of the whole budget on a variety of household types across different income classes. In the Netherlands, DIA is carried out considering almost all the policies, since there is huge interest at the political level about the effects of the new budget on the purchasing power of all citizens. The distributional effects of the budget are evaluated through analysis by income quintiles. At the moment, Greece supplied the most detailed DIA in terms of indicators used. A common trait of both Ireland and Greece is that only a subset of the results of the whole DIA that has been carried out is included in the DBP.

Table 3.3 is intended to present the data and the methodology used by the Euro Area Member States that have at least one DIA occurrence in their DBPs in at least one of the years over the period 2018-2020 (fiscal years). In these Euro Area Member States, DIA was performed using national models or (for some of them) EUROMOD, with data coming from both administrative and survey archives, with only Greece and Lithuania relying mostly on EU-SILC survey data. EUROMOD is the preferred model for DIA in Estonia, Greece, Lithuania as well as in Malta, where other models developed jointly with Cambridge Econometrics (STEM and SEMM) are also used. The interviews indicated that the officers from Ireland and Latvia would use EUROMOD if training were provided, while the Dutch officers are not willing to adopt EUROMOD because they rely on their micro-simulation

model based on administrative data. Also, the officers from Finland and France are not likely to use EUROMOD as the only advantage it would have in comparison to the presently-used models is to allow comparability with the other EU Member States, which is, however, not a key concern for either country.

The officers interviewed stated that they were well aware of the limitations of the data⁵¹ used for conducting DIA. As will be explained in depth in section 3.2, the officers in Greece and Lithuania point out that the time lag of the data (i.e., the fact that the survey data used refers to the income situation in the two years previous) is an issue in analysing the policy responses to an unexpected crisis. Another issue consists of missing relevant details in the data to perform in-depth DIA. For example, the French officers would like to have information on monthly income, while in Finland there would be an interest in having data on alcohol and tobacco consumption. In Greece, the officers report the lack in their data of detailed information on people in the upper tail of the income distribution.

Concerning the selection of budgetary measures to be assessed in a DIA, in Finland, Greece, Ireland and Latvia, the main criterion is the feasibility to conduct a reliable DIA, meaning that these Member States tend to perform DIA on every policy introduced, provided relevant data is available. In Estonia, Malta and France, the policies to be considered for DIA are chosen based on their relative economic importance, focusing on major ones only. In the Netherlands, all the policies are combined and a single joint DIA is performed on their total impact.

⁵¹ The data used for DIA are freely available to the general public in Lithuania. Data can be easily accessed by registered people (usually researchers) in Ireland, Finland, France and Greece, while in Latvia there is no such possibility. In Malta, the situation is more complex, because the administrative data used are considered internal, but a researcher could, in principle, apply to obtain the data and their request is subsequently reviewed. In Estonia, survey data used in the microsimulation model are accessible to the general public, while administrative data are only available to researchers.

Table 3.3 – Characteristics of DIA use in DBPs: data, models, methodology and policy selection criteria, for Euro Area Member States with at least one DIA occurrence in one of the DBPs over the period 2018-2020 (fiscal years)

MS	Data used(*)	DIA model	Indicators used	Subgroups decomposition	EUROMOD add-on (if EUROMOD used as DIA model)	Policy selection criteria	Measures analysed jointly (pooled) or separately
EE	Survey (LFS, EE-SILC, HBS) and admin data (tax, social security and benefit)	EUROMOD	Wide range of indicators: i) Average tax burden by deciles; ii) Winners and losers across deciles; iii) AROP (rate and gap); iv) Gini; v) S80/S20	Type of household and type of employment	Statistics presenter	Measures that can be easily evaluated in EUROMOD and measures with a large fiscal impact	Some measures are examined independently
EL	EL-SILC	EUROMOD	Wide range of indicators: i) Equivalised mean disposable income by decile; ii) AROP (rate and gap); iii) Gini, Theil, Atkinson; iv) Wealth indicator.	Age groups	Statistics presenter, in-depth analysis	Measures that can be simulated in a reliable way	Pooled
FI	Survey (HBS) and admin data (tax, social security and benefit)	National model (Tuja and Sisu)	Wide range of indicators: i) Mean disposable income by decile; ii) Winners and losers (rarely used) iii) AROP (gap); iv) Gini.	Several sub-groups: i) Age groups ii) Type of Household iii) Educational level (rarely used) iv) Regional level v) Gender	-	Measures that can be simulated in a reliable way	Pooled and some measures are examined independently
FR	Survey (LFS, HBS) and admin data (tax, social security and benefit)	National model (Saphir)	Living standard by decile	-	-	Measures that are deemed relevant in terms of public finance (based on their relative economic importance)	Pooled of the main measures and some measures are examined independently
IE	Survey (LFS, IE-SILC, HBS) and admin tax data	National model (Switch) developed by ESRI	Mean disposable income by quintile and decile	Type of household	-	Measures that can be captured by the microsimulation model	Pooled

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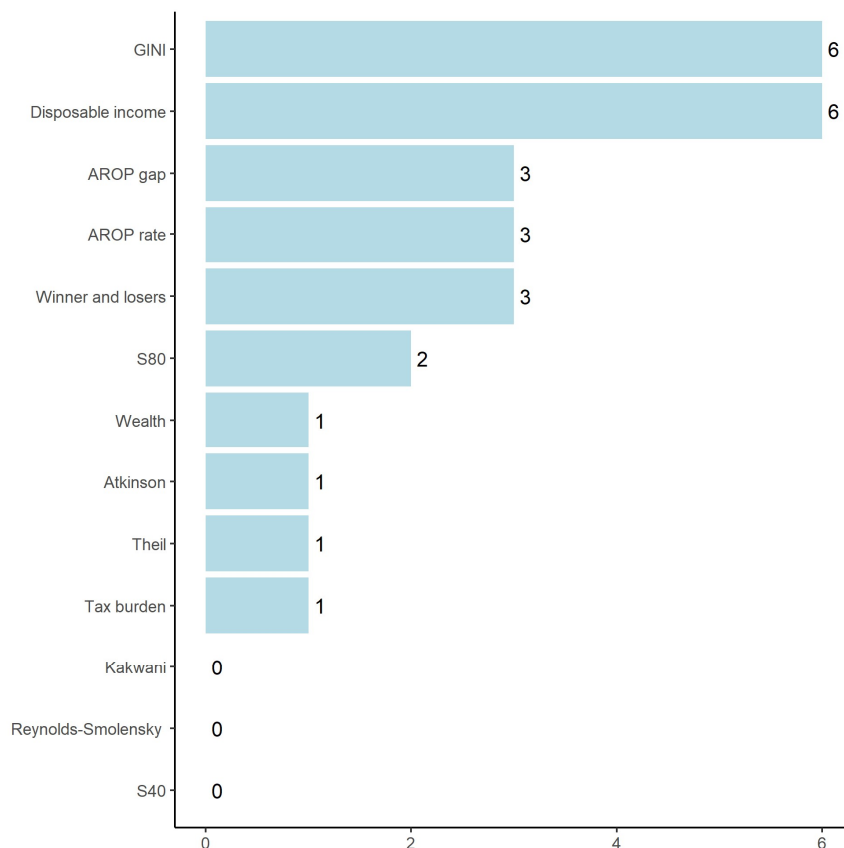
Table 3.3 – (continue)

MS	Data used(*)	DIA model	Indicators used	Subgroups decomposition	EUROMOD adds-on (if EUROMOD used as DIA model)	Policy selection criteria	Measures analysed jointly (pooled) or separately
LT	LT-SILC	EUROMOD	Wide range of indicators: i) Mean disposable income by decile; ii) Winners and losers iii) AROP (rate); iv) Gini. v) S80/S20	Several sub-groups: i) Age groups; ii) Type of household; iii) Rural vs urban	Adds-on used: i) HHoT; ii) METR; iii) Policy effects tools; iv) Summary statistics	-	Some measures are examined independently
LV	Admin (tax and social security) data	X-Tax model	i) Mean disposable income ii) Gini	-	-	Measures that can be simulated in a reliable way	The measures to certain policy areas are pooled and some measures are examined independently
MT	Admin tax data	EUROMOD and ad hoc models (STEM and SEMM) developed by Cambridge Econometrics	Gini	-	-	Two criteria: i) relevance from a distributional perspective; ii) importance of the measure (a cost of at least 5 million).	Some measures are examined independently
NL	LFS and admin data	National model (MIMOSI)	Wide range of indicators: i) Median disposable income by quintiles ii) Average tax burden by quintiles iii) Winners and losers across quintiles	Age Household type Employment type	-	Almost everything is included	Pooled

(*) LFS, SILC and HBS stand respectively for: Labour Force Survey; Statistics on Income and Living Conditions and Household Budget Survey Data.

It is also useful to explore how frequently certain indicators were used in DIA across Euro Area Member States in their DBPs (Figure 3.6). First of all, the mean disposable income by income group and the Gini coefficient are the most frequently used indicators for DIA in DBPs (six countries out of nine). Three countries used the at-risk-of-poverty (AROP) rate, the relative median at-risk-of-poverty gap and performed a “winners and losers” analysis⁵² from the implemented policy across different income groups. Two countries considered the income quintile share ratio (S80), while Theil index, Atkinson indices and wealth inequality indicators were used by only one country.

Figure 3.6 –Types of DIA analysis in DBP over the period 2018-2020. Euro Area Member States with at least one DIA occurrence in one of the DPB over the period 2018-2020 (fiscal years) (N=9)



Note: The analysis includes only Estonia, Finland, France, Greece, Ireland, Latvia, Lithuania, Malta and the Netherlands, as they are the only Euro Area Member States that performed at least one DIA occurrence in their DPB in 2018-2020. Respondents are allowed to choose multiple answers.

In Finland, Greece and Ireland, DIA is usually conducted near the adoption of the budget, while Malta and Latvia start the DIA analysis earlier and thus they have a longer period to conduct DIA. The difference between the two approaches is mirrored in the size of the staff, which is very small in Latvia and Malta. Moreover, it should be noted that Malta and Latvia performed DIA in the DBP only once over the period 2018-2020 (in regard to fiscal year 2018) for specific measures and this fact could also explain the aforementioned differences

⁵² Meaning an analysis of who and how many are those who gain or lose from the implemented policy as opposed to the situation without the policy.

(Table. 3.4). Lithuania and France share a similar approach: DIA is carried out throughout the year when it is requested by the policymaker.

A special note is required for the Netherlands, where DIA is conducted before, during and after the budget decision-making process. DIA is performed before the approval of the budget to predict the policies' effects, but also during and after the implementation of the budget to monitor the policies' implementation and to assess their actual distributional effects. A peculiar case is also Estonia, where DIA is conducted at two stages. Firstly, when the state budget strategy is negotiated between the political parties and, secondly, during the legislative process.

In the nine Euro Area Member States considered (those with at least one DIA occurrence in one of the DBPs over the period 2018-2020 (fiscal years)), DIA is conducted mainly by economists working within the Ministry of Finance and, for the Netherlands, also in close collaboration with the Ministry of Social Affairs and Employment. It is important to note that in all these Euro Area Member States, the staff in charge of DIA has participated in a specific training course, which in half of the cases has been supplied by the EUROMOD network. In Ireland, the training is provided by the Economic and Social Research Institute which provides the model used by the Irish officers. In Latvia, officers are also requested to learn DIA through self-studying and from the experience with the OECD Task Force. Finally, Finland, France and the Netherlands represent the case in which only on-the-job training is provided, maybe because the new officers can count on colleagues with long-standing experience in DIA.

Table 3.4 – Characteristics of DIA use in DBPs for the years 2018-2020: timing and human resources, for Euro Area Member States with at least one DIA occurrence in one of the DBPs over the period 2018-2020 (fiscal years)

MS	Timing/stage of the budget process at which DIA is conducted	Needed man-days for conducting the DIA	Size of staff conducting the DIA	DIA staff- field of study	DIA staff - familiarity with DIA	Responsible institution
EE	At two stages: i) when state budget is negotiated ii) during the legislative process	It depends on the type of budgetary measure	1 or 2	Economist	Staff is part of the national EUROMOD team	Fiscal Policy Department
EL	DIA is conducted near the end (two weeks before the submission of the DBP)	About 40 man-days	3 or 4	Economists	Staff is part of the national EUROMOD team	Microeconomic Policy and Microsimulations of the Council of Economic Advisors
FI	DIA is conducted at the stage in which the DBP is almost finished	5 man-days	3 or 4	Economists	On-the-job training	The Structural unit within the Budget unit
FR	DIA is conducted at a different time of the year	Two persons working full-time	1 or 2	Economists	On-the-job training	The Treasury
IE	DIA is conducted toward the end of the budget preparation process	About 12 man-days	5 or more	Economists, tax specialists and accountants	Training provided by ESRI	Economics and Tax divisions
LT	DIA is performed on demand	2 to 4 man-days	3 or 4	Economists and experts in social policy	Training provided by EUROMOD network, on-the-job training and university courses	Strategic Decisions Support and International Cooperation group

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Table 3.4 – (continue)

MS	Timing/stage of the budget process at which DIA is conducted	Needed man-days for conducting the DIA	Size of staff conducting the DIA	DIA staff- field of study	DIA staff - familiarity with DIA	Responsible institution
LV	DIA is conducted during the legislative process	It depends on the number of proposed reforms and/or policy initiatives	1 or 2	Economists	Training provided by EUROMOD network, on-the-job training and by the collaboration with the OECD task force	Tax Analysis Department
MT	DIA is conducted once the measure is clearly defined (i.e., it has been considered as definitive by the policy maker)	One person working full-time over the whole year	1 or 2	Economists	Training provided by EUROMOD (dedicated courses, conference, etc.) and on-the-job training	Economic Policy Department
NL	DIA is conducted before, during and after the budget decision making	6 people working full-time over the whole year	5 or more	Economists and a physicist	On-the-job training	The Directorate for General Economic and Financial Affairs in close liaison with the Directorate for Labour Market and Social-Economic Affairs

Notes: The category "Size of staff conducting the DIA" was classified as taking either one of the following values: "1 or 2", "3 or 4", "5 or more".

3.1.2. Mapping of DIA use outside DBPs

The goal of this section is to map the use of DIA outside DBPs (for all Member States) because (Euro Area) Member States can also include DIA in other national documents. Firstly, the section explores the DIA occurrences within the two main documents drafted by all the MS within the European Semester (i.e., the Stability or Convergence Programme and the National Reform Programme) and within various types of budget-related documents at the national level (National Growth Strategy, progress towards EU2020 indicators, progress in implementing Country-Specific recommendations, national document introducing expenditure and revenue measures and documents with an ex-ante or ex-post evaluation of budgetary measures) for the fiscal years 2019 and 2020. These results are compared to DIA occurrences in DBPs (in the same fiscal years) to identify for which types of documents DIA is most frequently performed. After this general overview, the DIA occurrences outside DBPs are explored in more detail: on the one hand, by considering which types of analyses and indicators are performed and used in documents outside DBPs and, on the other hand, by comparing them to those used in DBPs. The final point of this section explores if Independent Fiscal Institutions (IFI) performed or commented on DIA in or outside DBPs.

Table 3.5 – DIA occurrences in the Stability or Convergence Programme and the National Reform Programme, EU Member States (fiscal years 2019-2020)

MS	SCP 2019	SCP 2020	NRP 2019	NRP 2020
AT	0	0	0	0
BE	0	0	1	0
BG	0	0	0	0
CY	0	0	0	0
CZ	0	0	0	0
DK	0	0	0	0
DE	0	0	0	0
EE	0	0	0	0
EL	0	0	0	0
ES	0	0	0	0
FI	0	0	0	0
FR	0	0	0	0
HR	1	0	1	1
HU	0	0	0	0
IE	0	0	0	0
IT	0	0	0	1
LT	0	0	0	0
LU	0	0	0	0
LV	0	0	0	0
MT	0	0	1	1
NL	0	0	0	0
PL	0	0	0	0
PT	0	0	1	1
RO	0	0	0	0
SE	0	0	0	0
SI	0	0	0	0
SK	0	0	0	0

The first analyses of this section are carried out through a selective review of the Stability or Convergence Programme (SCP) and the National Reform Programme (NRP) documents. As already mentioned above regarding the methodology, the selective review was conducted using a text-mining algorithm that was applied⁵³ to the SCP and NRP of the fiscal years 2019-2020 period for the EU Member States for which these documents were available in English, French, German, Italian or Spanish (cf. more details in the description of the methodology above). The selective review was not carried out for countries with documents only available in other languages. Information for these countries came directly from the interviews.

When it was conducted, the selective review was enriched with information coming from the interviews that aim to confirm the results of the review and to supply additional information about the use of DIA in the national budget process.

From the analysis of the aforementioned documents (Table 3.5), a negligible presence of DIA outside DBPs emerges. As regards Stability or Convergence Programmes, Croatia is the only country that included at least one DIA occurrence in the Convergence Programme (in 2019 but not in 2020), while the other European Member States did not include any DIA occurrences in the Stability or Convergence Programmes in 2019 or 2020. In particular, Croatian interviewees mentioned that a specific DIA is not included in the document, although DIA results were used to implement an overall fiscal impact analysis. Similarly, very few DIA occurrences were found in the National Reform Programmes across all MS. More precisely, Belgium included a DIA occurrence in 2019, Italy included one in 2020, while Malta included at least one DIA occurrence in both years. The DIA occurrences included in the Maltese National Reform Programme are the same as those present in the respective DBPs; Belgium and Italy included DIA occurrences in these documents, although no DIA exercises emerged in their DBPs. Portuguese and Croatian National Reform Programmes are only available in the national languages, but from the interviews, it emerged that DIA was performed in at least one of the two analysed years.

Besides considering the use of DIA in DPB and in the documents covered in Table 3.5, detailed information was also collected from the interviews on the use of DIA for several other types of budget-related documents (documents at the national level). This concerned the use of DIA for the following types of budget-related documents at the national level: National Growth Strategy, progress towards EU2020 indicators, progress in implementing country-Specific recommendations, national document introducing expenditure and revenue measures and documents with an ex-ante or ex-post evaluation of budgetary measures. The insights presented below on DIA occurrences in these other types of documents only came from the interviews.

Table 3.6 summarises for each MS whether at least one DIA analysis was performed at the national level (i.e., outside DBPs, SCP and NRP) for each of the seven aforementioned other types of national budget-related documents. In addition, this table distinguishes if the performed DIA analysis(es) are themselves included in the document or if only its results are commented in it (with no presence of this/these performed DIA analysis/es in the document but only an inclusion of comments on its results), with both inclusions equally considered as a DIA occurrence in this table⁵⁴. From this table, a strong heterogeneity among the MS emerges: Belgium, Cyprus, Luxemburg and Romania did not perform any DIA here. Bulgaria, the Czech Republic, Germany, Italy, the Netherlands, Portugal and Slovakia had at least one DIA occurrence in no more than two of the types of budget-related documents considered. Austria, Denmark, France, Latvia, Malta, Sweden and Slovenia had

⁵³ The systematic review was not carried out for countries with documents only available in the national language. Information for these countries came directly from interviews.

⁵⁴ In the tables on these types of budget-related documents at the national level: a DIA occurrence doesn't necessarily mean that the performed DIA analysis is itself included in the document, as it can also mean that only comments on the results of this performed DIA analysis are included in the document. This differs from a DIA occurrence, as considered for DBPs, SCP and NRP, which automatically means that the performed DIA analysis (and not only comments on the results of this performed DIA analysis) is included in the document.

at least one DIA occurrence in at least five of these types of documents. (Table A4 in the Appendix collects the links to the budget-related documents at the national level in which there is at least one DIA occurrence outside DBPs for each interviewed country).

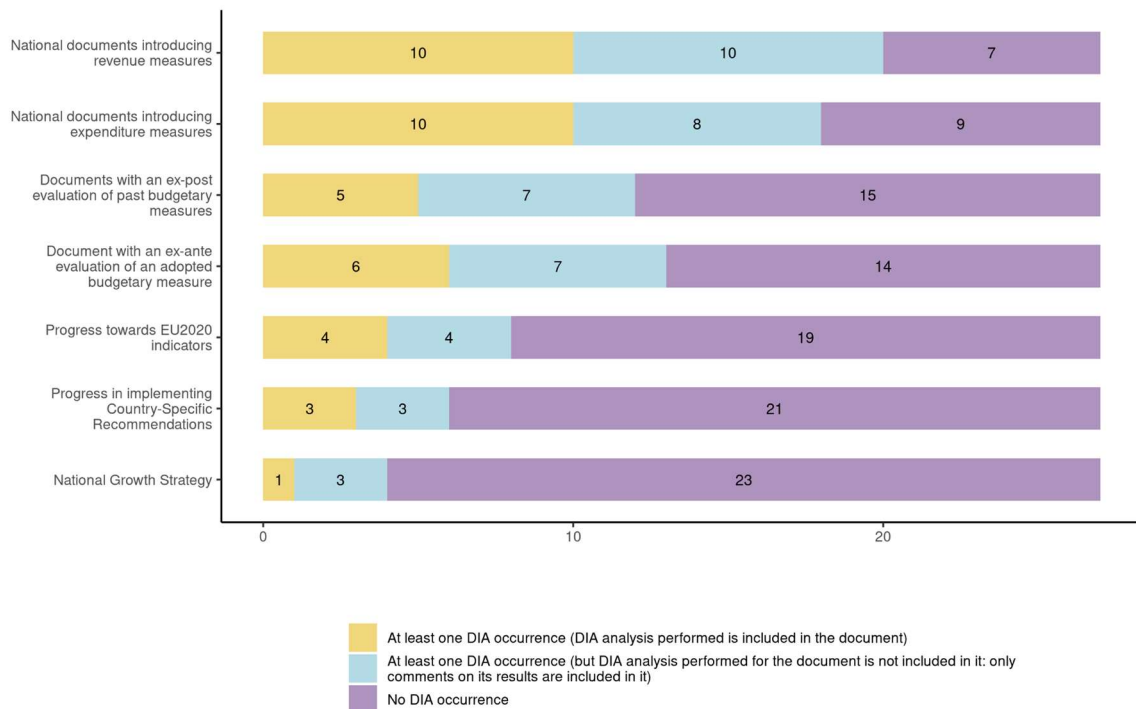
Table 3.6 – DIA presence (at least one DIA occurrence) outside DBPs, SCP and NRP, for seven different kinds of budget-related documents at national level (fiscal years 2019-2020)

MS	National Growth Strategy	Progress towards EU2020 indicators	Progress in implementing country-Specific recommendations	National document introducing expenditure measures	National document introducing revenue measures	Document with an ex-ante evaluation of an adopted budgetary measure	Document with an ex-post evaluation of past adopted budgetary measures
AT							
BE							
BG							
CY							
CZ							
DK							
DE							
EE							
EL							
ES							
FI							
FR							
HR							
HU							
IE							
IT							
LT							
LU							
LV							
MT							
NL							
PL							
PT							
RO							
SE							
SI							
SK							

Legend:

	No DIA occurrence.
	At least one DIA occurrence (some details of the DIA analysis are included in the document).
	At least one DIA occurrence (DIA analysis commented but without presenting details of the analysis).

Figure 3.7 – Number of EU Member States with at least one DIA occurrence outside DBPs, SCP and NRP, for seven different kinds of documents (fiscal years 2019-2020). MS are counted only once per category (N=27)



Aggregating information from the previous table, Figure 3.7 shows how many Member States had at least one DIA occurrence⁵⁵ for each of the seven types of budget-related documents at the national level considered. More than half of the MS declared to have had at least one DIA occurrence in national documents that introduce either revenue (20 out of 27) or expenditure (18 out of 27) measures. About half of MS had at least one DIA occurrence in national documents with an ex-ante (13 out of 27) and an ex-post (12 out of 27) evaluation of an adopted budgetary measure. Having at least one DIA occurrence is less frequent in progress towards EU2020 indicators⁵⁶ (8 out of 27) and in progress in implementing country-specific recommendations (6 out of 27) documents. Finally, only four countries (Austria, Denmark, Slovenia and Sweden) declared to have had at least one DIA occurrence in the National Growth Strategy document.

Table 3.7 summarises the information discussed throughout this section regarding the use of DIA in the EU Member States. More precisely, it recaps for each Member State whether there was at least one DIA occurrence in DBPs in the period 2019-2020 (if in the Euro Area), in the Stability and Convergence Programme and/or in the National Reform Programme and (in at least one) of the seven types of budget-related documents at the national level considered in table 3.6. It is useful here to remember that for DBPs, SCP and NRP, a DIA occurrence automatically means that some details of the DIA analysis (and not only comments on the results of a DIA analysis) were included in the documents. However, for the other types of national budget-related documents considered, it was not possible to verify if a DIA occurrence also included details of the analysis performed. The interviews consider only the last two fiscal years (2019-2020); therefore, the table allows us to understand which Member States performed DIA in the last two considered years. Almost all EU Member States had at least one DIA occurrence in the last two fiscal years; only Cyprus, Romania and Luxembourg did not perform any DIA. The seven MS (Estonia,

⁵⁵ Here as well, a DIA occurrence can refer to the inclusion of the DIA analysis(es) itself in the document or to only the inclusion of comments on the results of this/these DIA analysis/es.

⁵⁶ In the European Semester, the European Commission requires MS to publish macroeconomic forecasts and constantly assesses progress towards the European 2020 targets.

Greece, Finland, France, Ireland, Lithuania, the Netherlands) that had at least one DIA occurrence in 2019 and/or 2020 DBPs did not perform any DIA for their Stability Programme, while, among the non-Euro Area Member States, only Croatia had a DIA occurrence in the Convergence Programme.

Table 3.7 – DIA occurrences (at least one) in DBPs in the Stability and/or Convergence Programme and in the National Reform Programme and other documents at the national level for the European Member States over the period 2019-2020 (fiscal years)

MS	At least one DIA occurrence in DBPs (in 2019 and/or 2020)	At least one DIA occurrence in SCP and/or NRP (in 2019 and/or 2020)	At least one DIA occurrence in docs at national level ⁵⁷ (i.e., outside DBP/SCP/NRP) (in 2019 and/or 2020)
AT			
BE			
BG	n.a.		
CY			
CZ	n.a.		
DK	n.a.		
DE			
EE			
EL			
ES			
FI			
FR			
HR	n.a.		
HU	n.a.		
IE			
IT			
LT			
LU			
LV			
MT			
NL			
PL	n.a.		
PT			
RO	n.a.		
SE	n.a.		
SI			
SK			
Total	7	4	24

Notes: Cells with a blue background indicate that DIA was not performed, cells with a yellow background indicate that there was at least one DIA occurrence, "n.a." means not applicable.

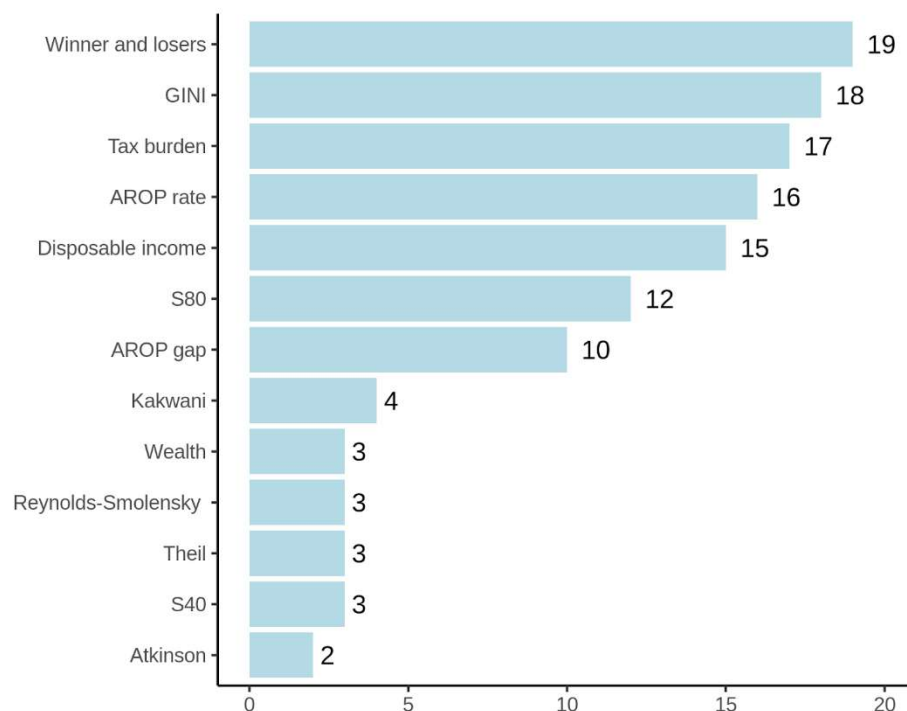
The interviews also allowed the identification of the types of indicators used in the DIA analyses performed by the Member States outside DBPs (i.e., performed for the Stability and/or Convergence Programme and National Reform Programme, as well as for the seven types of budget-related documents at the national level considered) (Figure 3.8). Based on the frequency of their use, it is possible to distinguish which indicators were used by the majority of MS (winner and losers across different income groups, Gini coefficient, average tax burden by income group, at-risk-of-poverty rate and mean disposable income by income group), which ones were used by about half the MS (total share of income of the bottom 80% in the income distribution, S80, and at-risk-of-poverty gap) and which ones were used by only a few MS (Kakwani index, wealth inequality indicators, Reynolds-Smolensky index,

⁵⁷ See documents in table 3.6.

Theil index, total share of income of the bottom 40% in the income distribution and Atkinson index).

Comparing DIA indicators used in DPB (Figure 3.6) and outside DBPs⁵⁸ (Figure 3.8) can give information about the similarity or diversity of DIA use between these various types of documents. Nevertheless, this comparison is not easy because of the low presence of DIA occurrences in the last two fiscal years of DBPs and because interviews indicated that the MS usually include in the DBP only a subset of the DIA carried out in the budgeting process (i.e., performed outside DPB). It emerged that mean disposable income by income group, winners and losers across different income groups, at-risk-of-poverty (AROP) rate, relative median at-risk-of-poverty gap and the Gini coefficient are the most frequent DIA indicators used both in and outside DBPs.

Figure 3.8 – Types of indicators used for DIA analysis outside DBPs over the period 2019-2020. European Member States (N=23)



Note: Cyprus, Romania and Luxembourg do not perform any DIA outside DBPs. For Bulgaria, information is missing.

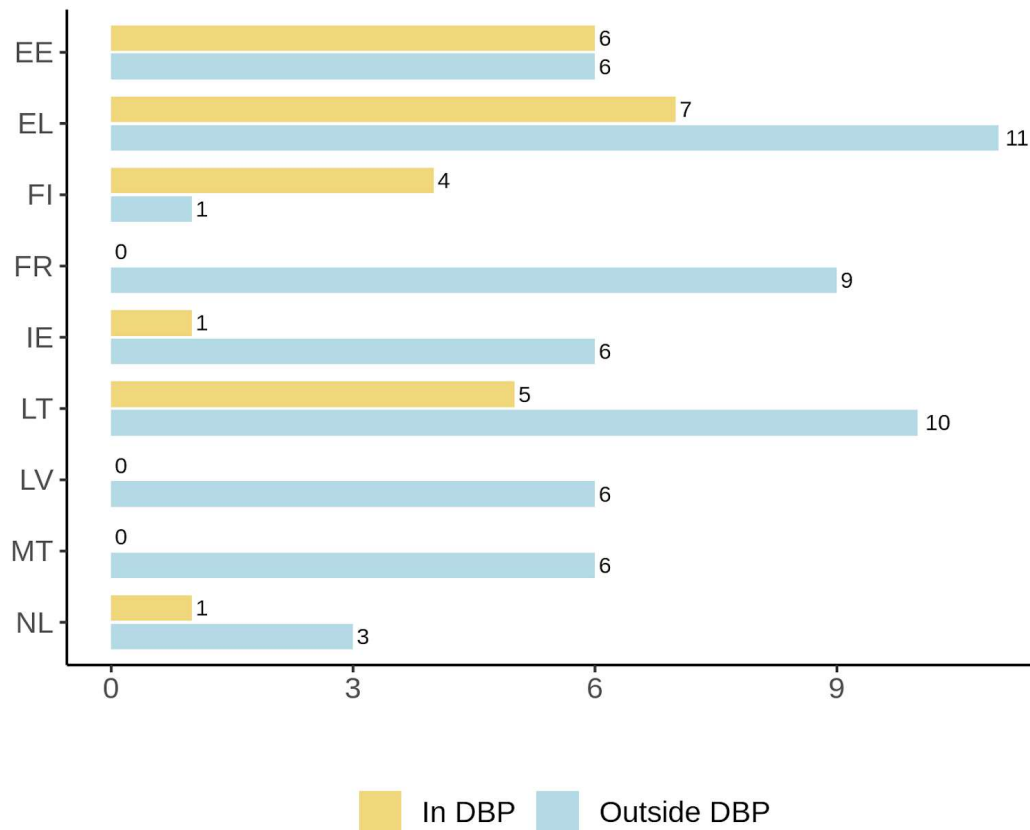
Besides comparing the types of DIA indicators used both in and outside DBPs, it is also interesting to compare the number of those different indicators⁵⁹ used by each Euro Area Member State in and outside its DBPs. Figure 3.9 shows this comparison for the fiscal year 2020. It appears that, overall, the Euro Area Member State (considering only the Euro Area Member States with at least one DIA occurrence in 2020 in and/or outside their DBPs in 2020) used a larger number of different DIA indicators outside their DBPs than in their DBPs, with Finland being the only exception. This result is not completely unexpected as the DBPs are mainly centred on macro issues, with possibly less consideration for distributional concerns than in other types of budget-related documents. These results are

⁵⁸ i.e., used either for the Stability and Convergence Programme, for the National Reform Programme or for (at least one of) the seven other types of budget-related documents at the national level considered in table 3.6.

⁵⁹ The indicators considered in the questionnaire used for the interviews are: mean disposable income, average tax burden, winners and losers, AROP, AROPE, Gini, S80/S20, S40, Theil index, Atkinson index, Reynolds-Smolensky index, Kakwani index, wealth groups.

consistent with the results shown in table 3.7 where, overall across the Euro Area Member States⁶⁰, it appears that DIA was more frequently performed outside the DBPs than in the DBPs in the fiscal years 2019-2020.

Figure 3.9 – Number of different types of DIA indicators used in the DBPs and outside the DBPs⁶¹ in 2020 (fiscal year), for those Euro Area Member States with at least one DIA occurrence in 2020 (fiscal year) in their DBPs and/or outside their DBPs (N=9)



Note: Latvia and Malta did not implement any DIA in the DBP 2020.

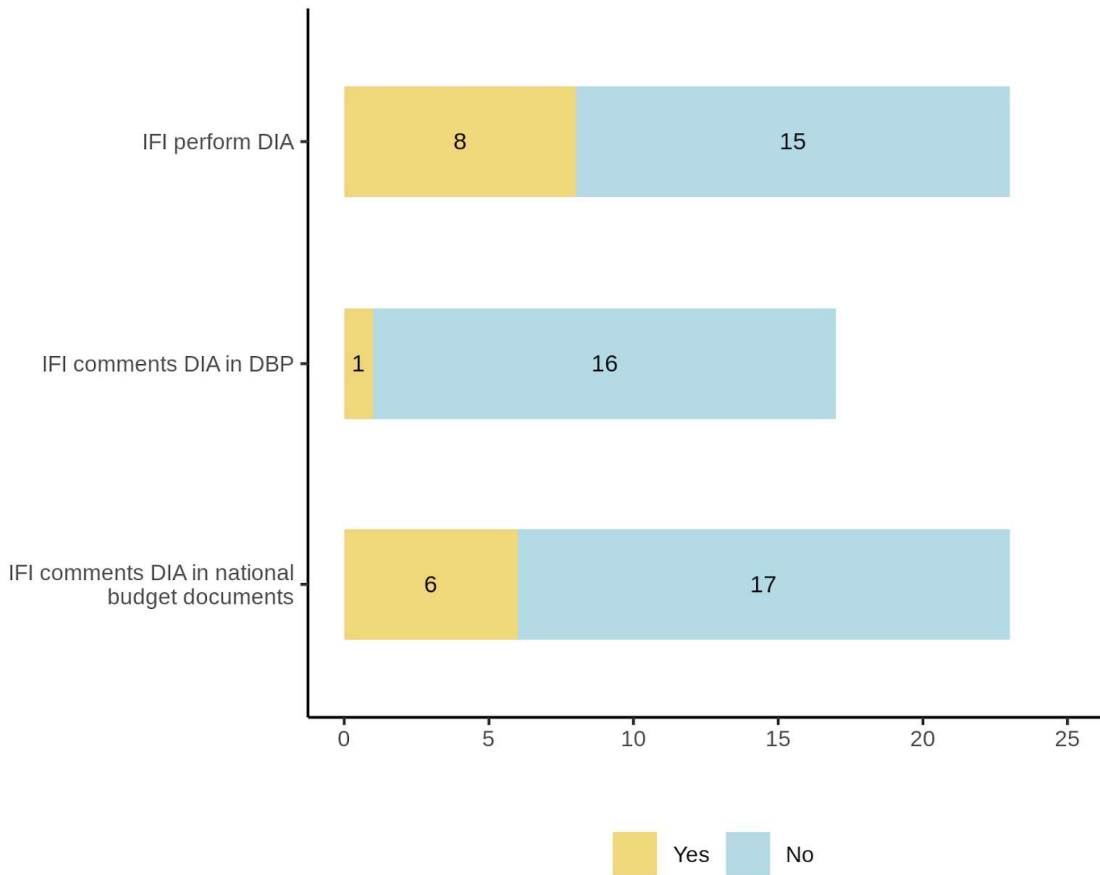
Finally, thanks to the interviews, it was also possible to identify whether the Member States (Euro Area and non-Euro Area Member States) performed distributional analysis within the Ministry or in collaboration with non-governmental institutions during the national budget preparation process in the last two fiscal years (2019 and 2020). Concerning non-governmental institutions, the interviews also allowed the collecting of information on Independent Fiscal Institutions⁶² (IFI) which, in some Member States, either performed the DIA occurrences or noted DIA results in and outside DBPs. In eight Member States (Austria, Belgium, the Czech Republic, Denmark, the Netherlands, Italy, Slovakia, and Sweden), these IFI published DIA analysis; only in the Netherlands did the IFI provide comments on the DIA occurrence that is included in DBP; in five MS (Austria, Denmark, Spain, Italy and the Netherlands), the IFI provided comments to the DIA occurrences which are included in the national budget documents (Figure 3.10).

⁶⁰ Considering only Euro Area Member States in this table.

⁶¹ In SCP/NRP and/or in one of the seven types of budget-related documents considered in table 3.6.

⁶² These institutions are defined as non-partisan public bodies. For the list of Independent Fiscal Institutes see page 34 of document: https://ec.europa.eu/info/sites/info/files/dp_067_en.pdf.

Figure 3.10 – DIA occurrences performed by Independent Fiscal Institutions (IFI) and DIA results in and outside DBPs commented by IFI, European Member States(*) (N=23)



(*) The analysis does not include Cyprus, Romania and Luxembourg since no DIA is carried out in these MS (for the years 2019/2020). For Poland, the information is missing. The chart row “IFI comments DIA in DBP” considers only Euro Area MS.

To recap, from mapping the use of DIA outside DBPs, it emerges that almost all MS, with some exceptions (Belgium, Croatia, Italy, Malta and Portugal), had no DIA occurrence in the two main documents (besides DPB) drafted for the European Semester (i.e., the Stability or Convergence Programme and the National Reform Programme). On the contrary, almost all MS (except Belgium, Cyprus, Luxemburg and Romania) had at least one DIA occurrence (DIA analysis included or at least DIA results commented on) in the seven types of national budget-related documents at the national level considered. The presence of DIA outside DBPs varies among MS and is the most common in national budget-related documents that introduce either revenue or expenditure measures. It also emerges that some indicators (winner and losers across different income groups, Gini coefficient, average tax burden by income group, at-risk-of-poverty rate and mean disposable income by income group) are used more than others in DIA outside DBPs. Finally, in a few MS, Independent Fiscal Institutions published documents performing DIA (8) or commenting DIA results from other national budget documents (5), while in only one country (the Netherlands), IFI commented on the DIA results included in the DBPs.

3.2. Identifying obstacles to DIA use in DPB and assessing similarities between Euro Area Member States' respective DIA approaches

This section aims to identify and highlight what may prevent Euro Area Member States from using DIA more in DPB, as well as to assess the degree of similarity between their respective approaches when using DIA (also building on the findings of the previous section). The data used for this section comes from the aforementioned interviews of the ministerial officers working on DIA in the Euro Area Member States.

3.2.1. Identification of obstacles that prevent more use of DIA in DPB

As mentioned above and as confirmed by the interviews of all the Euro Area Member States, Estonia, Finland, France, Greece, Ireland, Latvia, Lithuania, the Netherlands and Malta had at least one DIA occurrence in at least one of their annual DBPs over the period 2018-2020 (fiscal years), but only the Netherlands, Ireland, and Greece⁶³ did so in a systematic way every year. Almost all the other Euro Area Member States performed DIA in either SCP/NRP and/or other types of documents related to their national budget. The only exceptions are Cyprus and Luxembourg, which did not perform any DIA at all over the period 2018-2020 (fiscal years).

Table 3.8 – Pre-defined possible issues mentioned to the interviewed persons to identify the obstacles that prevent the use of DIA in the DBP

a. Internal functioning
Lack of political will
No specific request for DIA by hierarchy during the DBP preparation
Complexity of the approval process (e.g., inefficient process, lack of time) for having DIA analysis included or DIA results used in DBP
Keeping the DBP a short and sufficiently simple document or other (e.g., choice to focus on fiscal stability considerations)
b. Guidance by the European Commission
Unclear directions (instructions) from the European Commission (e.g., it is not clear what kind of DIA is required and how binding is a DIA inclusion in the DBP)
Lack of a template for DIA from the European Commission
c. Staff and timing
Limitations in personnel (meaning that there are people with technical capacity in the organisation but they have no time to perform this task)
Lack of time because the schedule/timing for preparing DBP is too short or because it is impractical regarding the preparation of the national budget (e.g., DBP needs to be ready too soon)
d. Methodology, tools and results
DIA results not deemed of sufficient quality or insufficiently conclusive to be included/mentioned in DBP (whereas they may, however, have been included/mentioned in national budget preparation documents)

In this subsection, the analysis focuses on the main issues that prevent the inclusion of DIA in DBP and the factors that could help to expand the use of DIA in the Euro Area Member States. To better understand the obstacles faced by the various countries in carrying out

⁶³ Greece was requested to draft the DBP only in 2019 and 2020.

DIA analysis, it is useful to restrict the analysis to Euro Area MS which do not have a systematic (or any) DIA. The analysis excludes Greece⁶⁴ Ireland and the Netherlands since they always performed DIA for the DBP every year over the period 2018-2020 (fiscal years). Finland, France, Lithuania are also excluded from this analysis as the interviews didn't provide any insight on this matter. To identify the main obstacles that prevent the inclusion of DIA in DPB, a set of (pre-defined) possible issues (detailed in Table 3.8) was discussed during the interviews, which was complemented by other issues mentioned by the interviewees during these interviews.

The results from the interviews on the identification of the main obstacles to the use of DIA in DBP are presented in Figure 3.11 (for each of the (pre-defined) possible issues mentioned in Table 3.8, the interviewees were asked to indicate if they consider it (choosing between yes/no/uncertain) as an obstacle to the use of DIA in DPB). From Figure 3.11, it emerges that there could be four main obstacles to the inclusion of DIA in the DBP. They are all related to the internal functioning of the ministries in charge of implementing DIA and drafting the DBP. In particular, the most critical point is the lack of time to perform and include DIA in the DBP. Moreover, the respondents in the interviews stressed the complexity of the approval process for having DIA included in the DBP and that they faced a limitation in personnel (i.e., there are people with technical capacity in the organisation but they have no time to perform DIA). At the same time, there is no specific request for DIA during the DBP preparation coming from the ministerial hierarchy.⁶⁵ The issue of the lack of time also emerges from the qualitative part of the interview, in which the respondents highlight that the measures to be included in the DBP are disclosed to the officers (in charge of performing the DIA) very late (in the budget adoption calendar) due to the length of the negotiation process at the political level. In particular, officers of Italy, Malta, Slovenia and Slovakia suggest that DIA should be performed in documents other than the DBPs to solve this issue. For example, Italy and Malta suggest that DIA might be requested within the National Reform Programme.

The same suggestion also comes from Latvia, whose officers believe that it would be more convenient to include DIA in a separate document. Regarding the time issue, it could be interesting to stress the solution adopted in Ireland (although not easily exportable): to deal with time constraints, the government committed to approving the budget package before the beginning of October, providing experts enough time to perform a DIA analysis before the 15th October deadline for the submission of the DBP.

In addition to the aforementioned four main obstacles, Figure 3.11 also shows that, according to about half of the respondents, the lack of political will is a relevant issue that prevents the inclusion of DIA in the DBP. Furthermore, it also shows that, for about half of the respondents, obstacles also relate to unclear directions from the EC regarding how to bind DIA inclusion in the DBP and the need to keep the DBP short and simple, while the lack of a common template (that would be provided for presenting DIA results in DBP) and the quality of the DIA results are only minor issues according to the respondents.

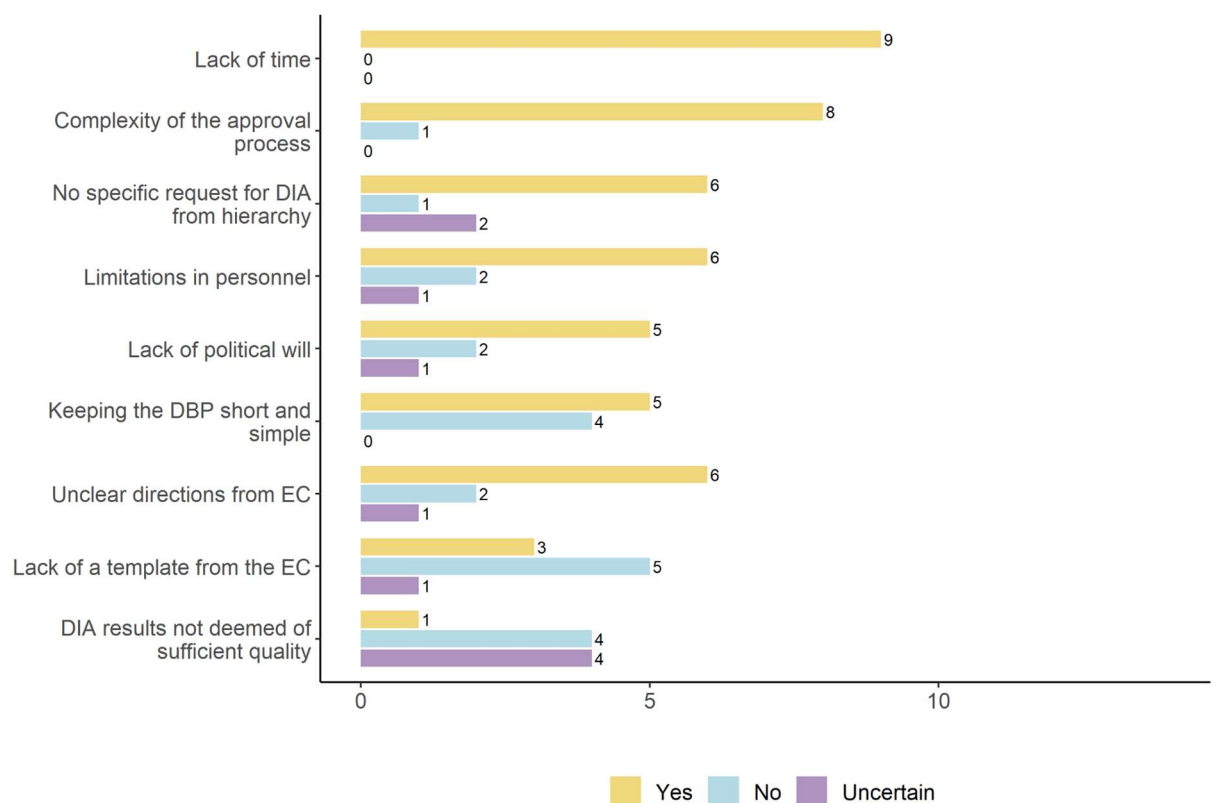
The last point emerging from the interviews regarding the obstacles to more DIA use in DBPs deserves specific attention. It relates to the request in EU Regulation 473/2013, since Article 6(3)(d) foresees the inclusion of DIA in the DBP. From the analyses presented in this report, it emerges that there is no common view about the usefulness of this Article across the Euro Area Member States. For some Member States (e.g., Malta, Slovakia and Greece) this regulatory framework has the merit of stressing the importance of DIA, while for three other Member States, it is not very useful. More precisely, Italy, Latvia and Slovenia consider the inclusion of DIA in DBP only as a recommendation which they prefer to ignore,

⁶⁴ Except in 2018 for EL (no DBP).

⁶⁵ The absence of a specific request from the ministerial hierarchy partially overlaps with the obstacle concerning the lack of political will. The main difference is that in the first case, the lack of interest towards DIA comes from the administrative staff, while the second one is more related to political decisions in general.

for instance, because of competing priorities (Italy and Latvia). It should also be noted that six⁶⁶ out of nine of the Euro Area Member States that had at least one DIA occurrence at least once in the DBP over the period 2018-2020 (fiscal years) affirm that they would have included a DIA in their DBP, even in the absence of Article 6(3)(d). This result could be a sign of the intrinsic value given to DIA in the policymaking process in those Member States. To conclude, it is interesting to note that the interviewed officer of a Member State mentioned that the EC assessment of the DBPs, as well the related discussion about the DBPs after their submission, do not even contain a reference to DIA and that it could be seen as a sign of limited importance given to DIA by the EC itself.

Figure 3.11 – Main obstacles that prevent the use of DIA in the DBP. Euro Area Member States(*) without at least one DIA occurrence in any of their DBPs over the period 2018-2020 (fiscal years) (N=10)



(*) The analysis does not include Euro Area MS including at least one DIA occurrence in at least one of their DBPs in the period 2018-2020 (Estonia, Finland, France, Greece, Ireland, Latvia, Lithuania, the Netherlands, Malta). The sum of bars does not equal 10, because some answers were not provided.

3.2.2. Identification of factors that could help to increase the use of DIA in the Euro Area Member States

The interviews also served to collect useful information for identifying enabling factors that could help to increase the use of DIA – both in DBPs and also outside DBPs (in the national budgeting process) – in the Euro Area Member States. To understand what these factors could be, a set of 15 (pre-defined) enabling factors (detailed in Table 3.9) was developed. For each of these 15 (pre-defined) factors, the interviewees were asked to indicate their degree of agreement (strongly disagree, disagree, undecided, agree, strongly agree) as regards the factors’ relevance for increasing the use of DIA in and outside DBPs in their Member State (excluding Cyprus and Luxembourg that did not perform any DIA), with the results shown in Figure 3.12. In addition to the degree of agreement, interviewees were

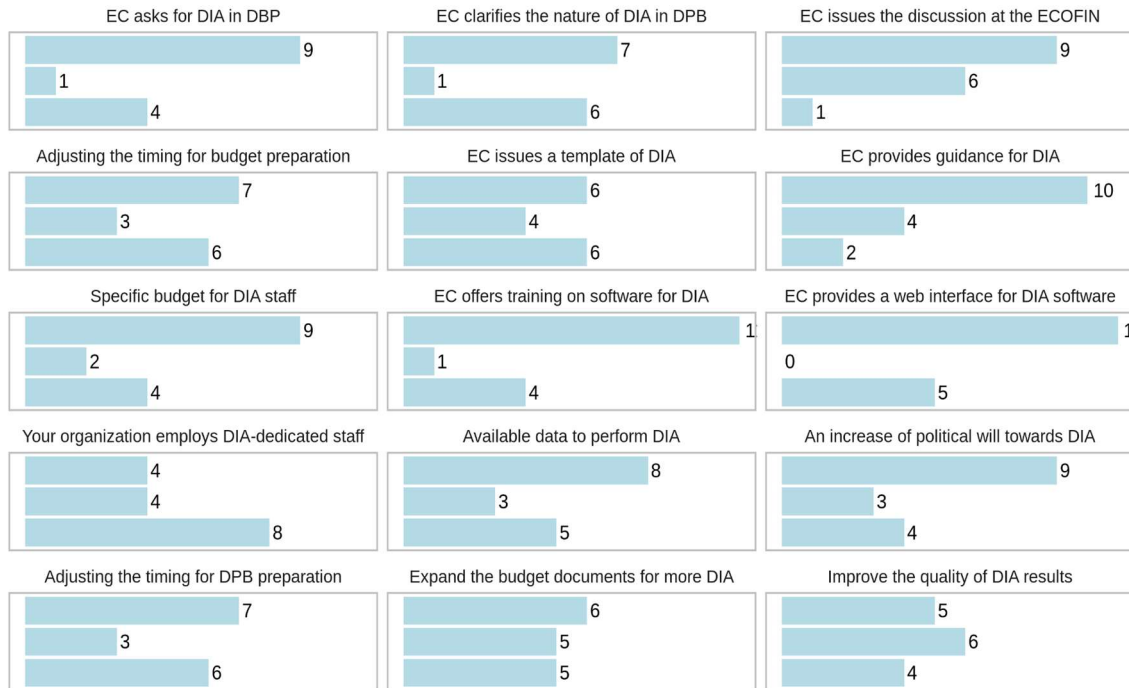
⁶⁶ Namely, Finland, France, Ireland, Latvia, Malta, and the Netherlands.

also asked to rank the top three most important factors that they believe would help to most increase the use of DIA in and outside DBPs (Figure 3.13).

Table 3.9 – Pre-defined factors that could help to increase the use of DIA in the budgeting process

1. European Commission asks for DIA to be included in DBPs (e.g., by including an opinion on DIA absence in its comments on DBPs)
2. European Commission clarifies the nature, extent and scope of DIA to be included in DBPs (e.g., by including an opinion on DIA being insufficiently detailed in its comments on DBPs)
3. European Commission issues a communication or a discussion at the ECOFIN to raise the awareness of the Ministers of Finance on the lack of DIA in DBPs.
4. Available time and timing for DBPs' preparation is adjusted to have enough time to perform DIA
5. European Commission issues a specific DIA template that needs to be completed in DBPs.
6. European Commission provides guidance on methodology for conducting DIA and on how to interpret DIA results presented in DBPs.
7. The ministry in which you are employed receives a specific budget (from national funding) and/or the possibility to hire enough specialised staff for performing DIA (or for externalising it to consultants/ academics /other)
8. European Commission offers training on relevant software and training courses for the staff of ministries on how to perform DIA
9. European Commission provides a web interface for easier access to DIA-dedicated software
10. The ministry in which you are employed employs DIA-dedicated staff
11. More reliable/ detailed/ timely data are available to perform DIA
12. An increase of political will towards DIA analysis from within the ministry in which you are employed
13. An adjustment in the schedule/timing of the budgeting process to allow for (more) DIA to be conducted for the whole budget preparation (not only for the DBP)
14. Willingness to increase the size of the budget preparation documents to have space for (more) DIA
15. Improve the quality of additional DIA results (that are currently deemed of insufficient quality to be included in budget preparation documents)

Figure 3.12 - Factors that could help to increase the use of DIA in the budgeting process. Euro Area Member States(*) (N=17)



Upper bars = sum of answers that are either “strongly agree” or “agree”, middle bars = sum of answers that are “undecided”, lower bars = sum of answers that are either “strongly disagree” or “disagree”. The sum of bars does not always equal N (17) because of missing answers.

(*) Cyprus and Luxembourg are excluded since no DIA is performed.

As can be seen in Figure 3.12 and Figure 3.13,⁶⁷ the main enabling factors that emerge from the interviews support the idea of direct action from the EC in terms of methodological guidance for conducting DIA by offering specific training on DIA and by providing a web interface to access DIA-dedicated software. These requests come mostly from Euro Area Member States without a long and autonomous tradition of DIA.

There are some enabling factors, involving both organisational and political issues (Figure 3.12), that show some polarised results since the number of officials agreeing is slightly lower than those who are undecided or in disagreement. In fact, from an organisational point of view, a certain number of interviewed officers pointed out that the availability of data and an adjustment in the timing of the budget process would surely help in expanding the DIA use. It is interesting to note that, at the same time, other officers disagree on adjusting the timing to include DIA in the DBP. They also stressed that an increase in the political will at the national level, together with a specific budget (i.e., receiving additional funds), would encourage more production and inclusion of DIA. It is also worth mentioning that for some officers, a direct request from the EC to include DIA in DBPs would be helpful.

Only a limited number of MS value the idea of having a DIA template included in the DBP. This is not in contradiction to the wide-ranging request for more guidance from the EC. MS are asking for guidance on how to implement DIA but would like to remain autonomous so they can decide how to present their results without being forced to use a predetermined common template that might not suit their specific needs.

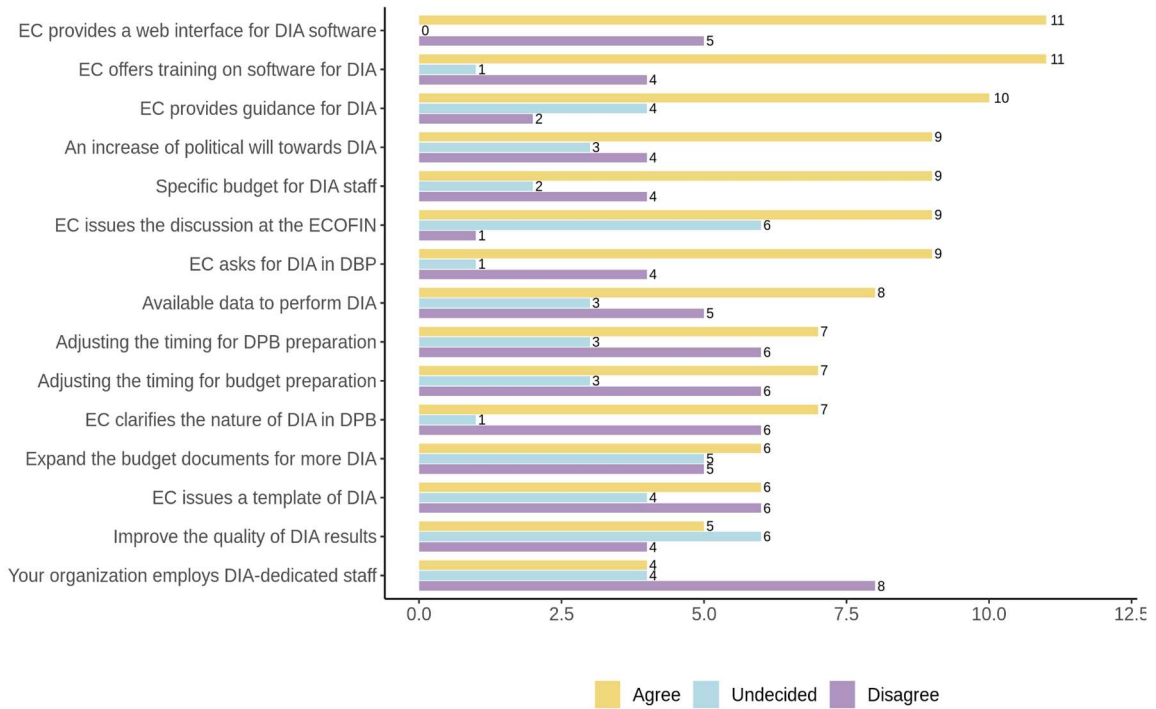
It is also interesting to stress that some factors are, overall, considered less important to help to increase DIA use (Figure 3.12 and Figure 3.13). For example, compared to the

⁶⁷ The discussion of the results is mainly based on Figures 3.12 and 3.13, since it reflects the view of more respondents than Figure 3.14.

aforementioned main enabling factors, a lower number of responding interviewees consider that the EC should clarify the nature, extent and scope of the DIA to be included in the DBP.⁶⁸

Figure 3.13 – Factors that could help to increase the use of DIA in the budgeting process. Euro Area Member States(*) (N=17)

(same results as in Figure 3.12 but presented differently)



Note: “Strongly disagree” and “Disagree” from one side and “Strongly agree” and “Agree” from the other side are considered jointly under the labels “Disagree” and “Agree”. The sum of bars does not always equal N (17), because of missing answers. (*) Cyprus and Luxembourg are excluded since no DIA is performed.

In addition, a majority⁶⁹ of the respondents is against employing DIA-dedicated staff (Figure 3.12 and Figure 3.13). At first glance, the opposition to dedicated staff for DIA could appear quite irrational and in contradiction to the agreement of having a specific budget to perform DIA. However, the officers interviewed explained that the qualification of the staff is not the main issue for performing DIA and that the staff employed in their ministries have to be qualified to carry out a wide range of tasks, thus making it inefficient to employ officers only for DIA. Interestingly, Ireland and Germany opted to outsource most of their DIA activities to independent research centres, which, however, rely heavily on public funding to support their activities.

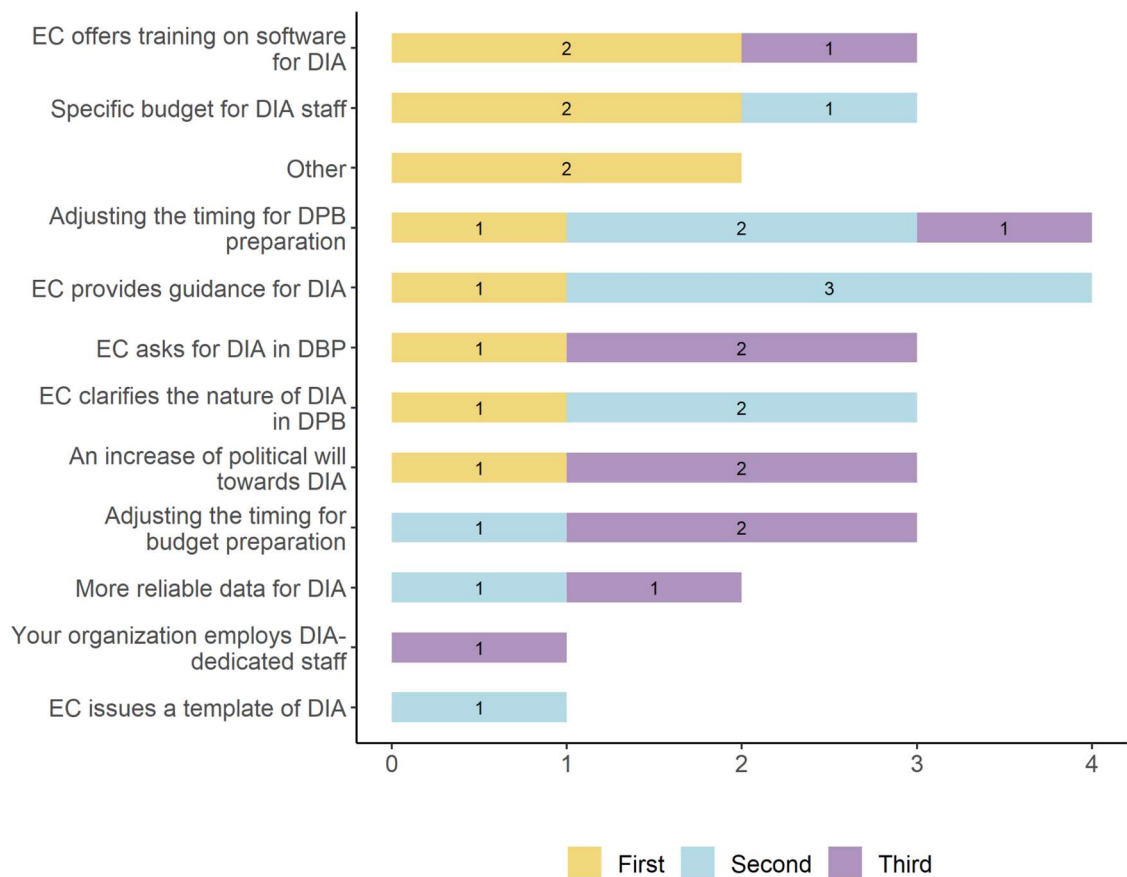
There are also a few factors where a large number of interviewees stated that they were undecided, such as the willingness to expand the budget preparation documents to have space for more DIA analysis, as well as the quality improvement of additional DIA results that are not currently deemed to be of sufficient quality to be considered in the budgeting process. It is also important to mention that the factor regarding a direct action of the EC at the ECOFIN (e.g., issuing a communication or a discussion to raise the awareness of the Ministers of Finance on DIA) receives, at the same time, wide support but also a high level of indecision from the Member States (Figure 3.12 and Figure 3.13).

⁶⁸ It has to be stressed that this does not mean that these factors are not important, since a non-negligible share of MS agree with this question. This simply means that they are less important than the ones mentioned above.

⁶⁹ Not taking into account here the “undecided” answers.

In addition to indicating above whether they were in agreement or disagreement with the aforementioned 15 (pre-defined) enabling factors, the interviewees were also asked to define which of these factors were in their opinion the first, second and third most useful factors (top three factors) for increasing the use of DIA in and outside DBP. The results of this ranking can be seen in Figure 3.14 and Table 3.10⁷⁰. They suggest more training on software for DIA and a specific budget for DIA staff.

Figure 3.14 – Ranking of the factors that could help to increase the use of DIA in the budgeting process. Euro Area Member States (N=11)



Note: The following MS are excluded since they did not provide a ranking: Germany, Greece, France, Lithuania, Latvia and the Netherlands (because they do not agree with any of the factors). Cyprus and Luxembourg are excluded since no DIA is performed. Not all of the factors presented in Figure 3.12 are presented in the chart, since some of them were never ranked as first, second or third.

⁷⁰ It should be noted that two Member States (Malta and Spain) answered “other” as their top three factors (i.e., top factors are not amongst the aforementioned 15 factors). More precisely, Spain suggested raising awareness of EUROMOD as a top factor, while Malta recommended carrying out DIA before the DBP (e.g., in documents other than the National Reform Programme).

Table 3.10 – Ranking of the factors that could help to increase the use of DIA in the DBP or the budgeting process. Euro Area Member States (N=11)

	Ranked as first	Ranked as second	Ranked as third	Total of ranked as first	Total of ranked as first, second or third
Specific budget for DIA staff at the national level	FI; PT	IT		2	3
EC offers training on software for DIA	AT; IE		SI	2	3
EC provides guidance for DIA	SK	AT; IE; SI		1	4
Adjusting the timing for DBP preparation	IT	ES; FI	PT	1	4
EC clarifies the nature of DIA in DBP	SI	BE, PT		2	3
Increase of political will towards DIA at the national level	EE		AT, BE	1	3
Adjusting the timing for budget preparation		MT	FI; SK	0	3
More reliable data for DIA		SK	IT	0	2
EC issues a template of DIA		EE		0	1
Your organisation employs DIA-dedicated staff			MT	0	1
EC asks for DIA in DBP	BE		EE; ES	1	3
Other	ES; MT			2	2

Note: The following MS are excluded since they do not provide a ranking (because they do not agree with any of the factors): Germany, Greece, France, Lithuania, Latvia and the Netherlands. Cyprus and Luxembourg are excluded since no DIA is performed.

3.2.3. Assessment of the degree of similarity between the respective DIA approaches of Euro Area Member States

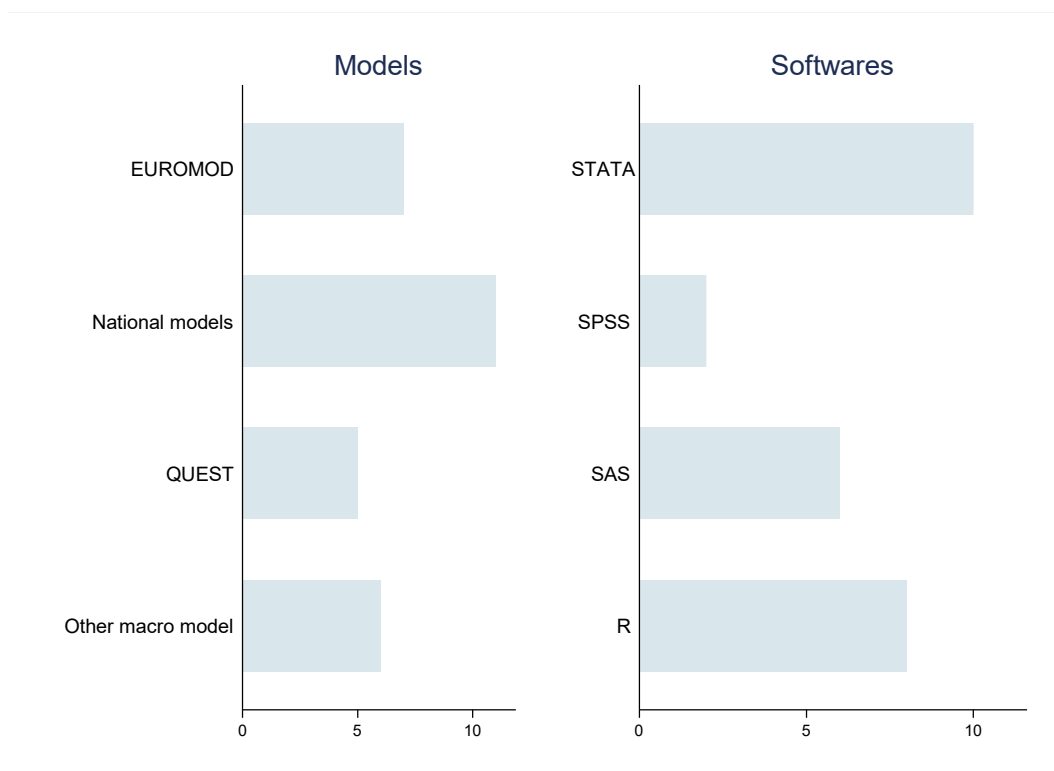
This assessment builds on the findings presented above in “Describing the characteristics of the use of DIA by Euro Area Member States in their DBPs in the period 2018-2020”. However, while the above description of the characteristics only considered 9 Euro Area Member States (i.e., those with at least one DIA occurrence in at least one of their DPB in the period 2018-2020 (fiscal years)), this assessment considers 17 Euro Area Member States (i.e., those with at least one DIA occurrence in or outside their DPB in the period 2018-2020 (fiscal years). Cyprus and Luxembourg are not included, since no DIA was conducted by these Member States for any fiscal year in regard to the period 2018-2020⁷¹ as mentioned above). Furthermore, this assessment considers the respective approaches when performing DIA regardless of whether DIA is used in and/or outside DBPs. This assessment is based on some of the key dimensions of DIA use listed in Tables 3.3 and 3.4.

⁷¹ At least in the types of documents considered in this study.

The first of these dimensions concerns the staff employed to perform the DIA analysis. DIA is usually performed within the Ministry of Finance by a medium-sized team: in four countries, the DIA team is made up of 3-4 people and in three countries it consists of more than five people, but DIA is only part of their tasks. Only Malta and the Netherlands have personnel working full time on DIA. The choice of not having a huge dedicated team is compensated for by the use of external consultants by four countries (i.e., Slovenia, Germany, Ireland and Latvia). In Germany and Ireland, the DIA is carried out in close cooperation with external research institutes: the Economic and Social Research Institute (ESRI) in Ireland and the Fraunhofer Institute for Applied Information Technology in Germany.

Some similarities between countries also emerge regarding the training of the staff in charge of conducting DIA (i.e., how this staff learnt to perform DIA). Italy, Germany, the Netherlands, Slovakia and Greece provide on-the-job training to people that have been previously selected based on their academic qualifications. In Latvia, Lithuania and Malta, on-the-job training is complemented by participating in courses organised by the EUROMOD network. In Ireland, the training for the microsimulation model is provided by ESRI, while in Slovenia and Portugal there is no specific training, but the officers in charge of performing DIA learnt it at the university.

Figure 3.15 – Microsimulation models (EUROMOD, National, other), macroeconomic models (QUEST, other), statistical software (STATA, SPSS, SAS, R) used to perform DIA. Euro Area Member States(*) with at least one DIA occurrence over the period 2018-2020 (fiscal years) (N=17)



Note: respondents are allowed to choose multiple answers. The national models mentioned in the chart are micro-simulation models.

(*) Cyprus and Luxembourg are excluded since no DIA is performed in these MS.

As is apparent from Figure 3.15, within the microsimulation models used to perform DIA, the national models prove to be the most frequently used followed by EUROMOD,

sometimes complemented by QUEST.⁷² Figure 3.15 shows that only seven Euro Area MS use EUROMOD, while the other Euro Area MS rely on *ad hoc* models developed at the national level. This aspect does not facilitate the comparison of the DIA results across Euro Area MS, since only EUROMOD is designed to allow this kind of comparison. To be more specific, the Euro Area MS using EUROMOD are Belgium, Estonia, Greece, Lithuania, Malta, Slovakia and Slovenia. Slovenia is the only Euro Area MS that declares it uses both EUROMOD and a national model. Some Euro Area MS (Spain, Ireland, Luxembourg and Latvia) are willing to use EUROMOD if training is provided to them on it.

Regarding the statistical software used to carry out the analyses, STATA seems to be the most frequently used. Often, more than one type of software is used. In this figure, models and software have to be considered as two different dimensions that cannot be jointly considered. The model is the microsimulation model used to perform DIA, while the statistical software refers to the software used to prepare the data that are used to feed the model.

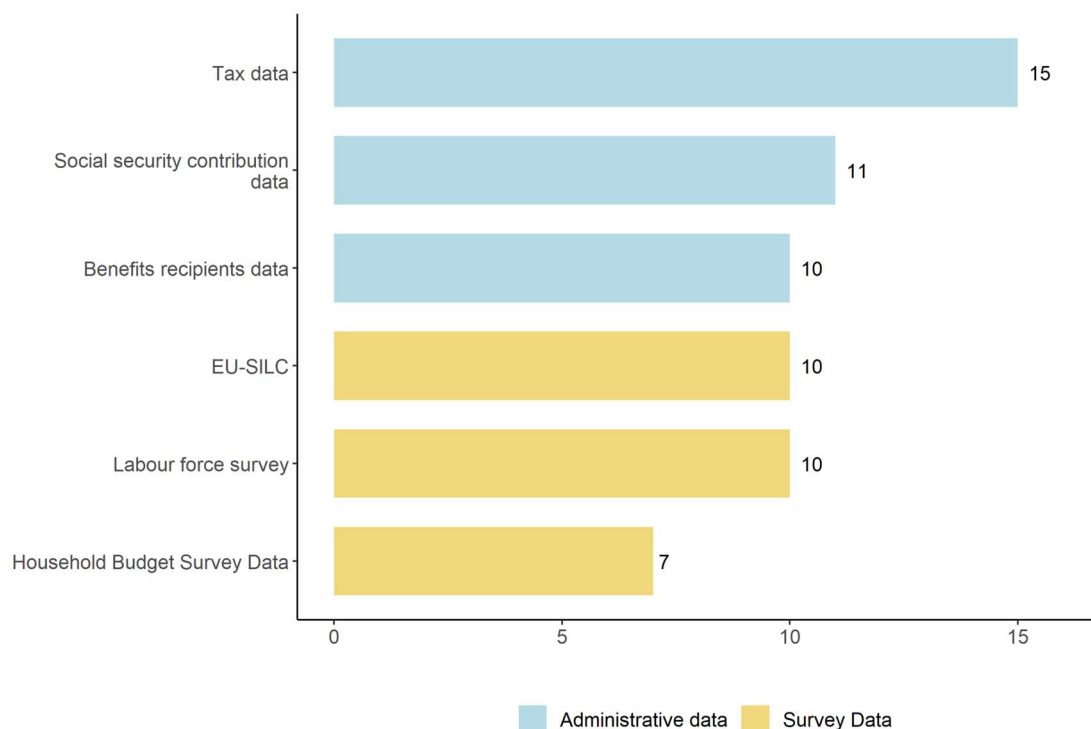
Another relevant dimension to assess the degree of similarity between the respective approaches when performing DIA regards the data used to perform DIA. A first commonality is that most of the Euro Area Member States use both surveys and administrative data - except for Austria and Lithuania which rely solely on EU-SILC survey data - with DIA performed by merging survey and administrative data⁷³. Figure 3.16 shows the various types of data sources used for performing DIA in Euro Area Member States. Tax data, followed by data from EU-SILC, the Labour Force Survey and social security data are the most frequently used data sources for DIA. The data for DIA are usually provided without difficulties upon specific request and the procedures can differ between survey and administrative data. Survey data are provided by Eurostat or by National Statistical Institutes, while administrative data is requested from the owners within the public administration. Regarding the timeliness of the data, administrative data tends to be more up-to-date than survey data. More precisely, the administrative data on taxes and taxable income could be available with a time lag of one year only and data on transfers with an even shorter time lag, while survey data for DIA (e.g., EU-SILC) is often available with larger delay.

Another relevant aspect concerning the data dimension regards the quality of the data used. In the interviews, all the considered Euro Area MS declared that they were fully aware of the limitations (e.g., the timing, the lack of some variables, etc.) of the data used. Furthermore, some MS expressed that they would like to have more detailed and timely information to be able to carry out a more systematic and thorough DIA. For example, Austria, Greece and Lithuania pointed out that, because of its time lag, the data available for DIA would not be informative enough due to the current pandemic crisis. To overcome this problem, Lithuania, which relies only on survey data, is working in collaboration with the JRC and the OECD on a project aimed at adjusting the microsimulation model to run on administrative data. Additionally, France and Finland complained about the lack of variables in available data that would enable DIA to be carried out for more policies. More precisely, in France, the issue is that income data are only available on yearly income, while monthly information would be useful for performing DIA on some specific social benefits. In Finland, the survey data on consumption lacks variables about the consumption of alcohol and tobacco.

⁷² QUEST is the macroeconomic model that the Directorate General for Economic and Financial Affairs uses for macroeconomic policy analysis and research. See https://ec.europa.eu/info/business-economy-euro/economic-and-fiscal-policy-coordination/economic-research/macro-economic-models_en for a more in depth explanation.

⁷³ Also except for IT.

Figure 3.16 – Data used for producing DIA analysis. Euro Area Member States(*) (N=17)



Note: respondents are allowed to choose multiple answers.

(*) Cyprus and Luxembourg are excluded since no DIA is performed in these MS.

The next relevant dimension to consider concerns the types of analysis included in the DIA. Figure 3.17 (top left chart) shows that there is a wide range of indicators used by Euro Area Member States (considering DIA use in and outside their DPB), but the most frequently used are those related to an analysis on income inequality (Gini index), poverty (AROP rate and gap) and by income group (mean disposable income, average tax burden, winners and losers). Progressivity and wealth indicators are much less frequently used. These results are substantially coherent with those presented in Figures 3.6⁷⁴ and 3.8 which look at the indicators used respectively in and outside the DBP. The results also show that the indicators used by Euro Area Member States are usually calculated across different sub-groups (Figure 3.17, top right chart), mainly by types of household, age and type of employment or occupation (i.e., employees and self-employed). It has to be stressed that in five Euro Area Member States (Austria, Ireland, Finland, Germany and the Netherlands), DIA is done also according to gender.

The Euro Area Member States typically perform DIA at different stages in the policy process (Figure 3.17, bottom left chart)⁷⁵. It appears that the majority of Euro Area Member States (14 countries) conduct a DIA before the budget approval, which doesn't preclude some of them from also conducting a DIA later on. Indeed, there are 6 (not shown in the chart) of them which also conduct a DIA before the implementation of the policy but after the budget approval (in total, as shown in the chart, there are 7 Member States conducting a DIA before implementation). It also appears that 10 out of the 17 considered Euro Area Member States conduct a DIA after the implementation of the policy (i.e., ex-post evaluation). In this respect, there are 8 Euro Area Member States in which DIA is typically performed both ex-ante

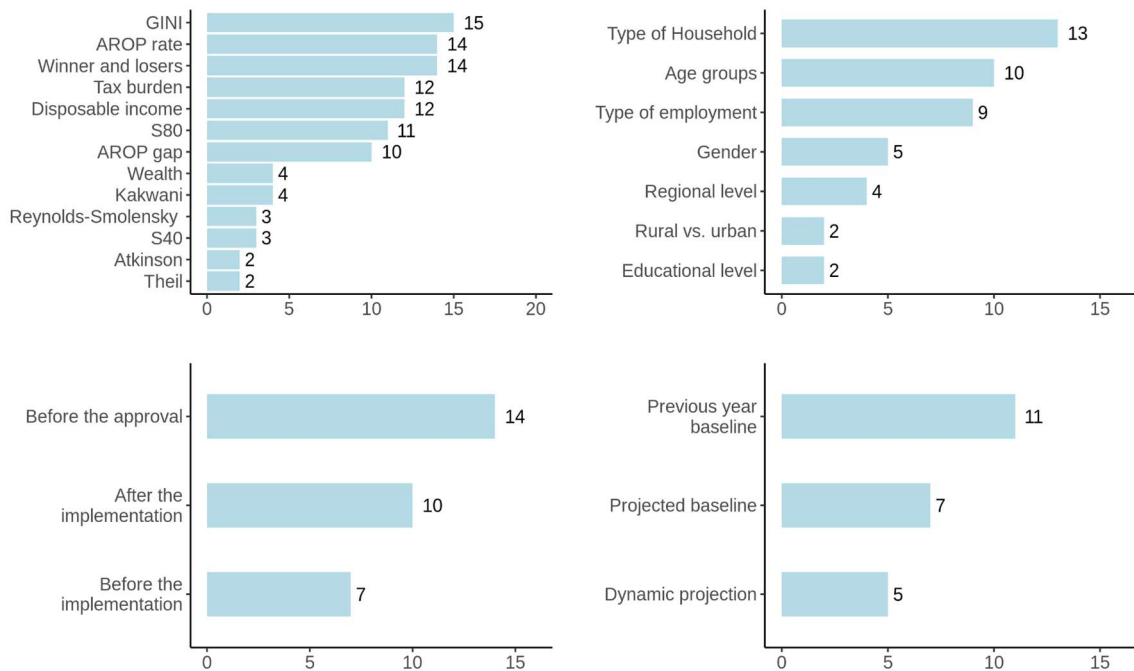
⁷⁴ Which also covered Euro Area Member States, but only considering DIA use in DPB.

⁷⁵ DIA can be done either before a policy is approved (i.e., before approval) or (once adopted) before it is implemented (i.e., before implementation), by simulating and predicting its distributional impact through microsimulation models (= ex-ante DIA), or after the policy is implemented (ex-post) to evaluate its actual performance and impact.

(before the budget’s approval and/or the implementation of the policy) and ex-post (in Ireland, Italy, Malta, Latvia, the Netherlands, Germany, France, Belgium).

Another finding is that there is some variability among Euro Area Member States in the type of the counterfactual used in the DIA⁷⁶ (Figure 3.17, bottom right chart). About half of them rely primarily on the previous year’s status quo as the baseline scenario (11 countries). Using a projected baseline scenario for today (nowcasting⁷⁷) or a dynamic projection for the future (forecasting) is less common (5 and 7 countries respectively). Nevertheless, it is interesting to note that about one third of countries use more than one baseline scenario when conducting DIA.

Figure 3.17 – Types of indicators and sub-groups’ decomposition used in the DIA and various aspects of DIA methodology (stage at which DIA is performed and baseline used). Euro Area Member States(*) (N=17)



Note: respondents are allowed to choose multiple answers. The top-left chart differs from those presented in previous subsections (Figures 3.6 and 3.8) for the number of MS considered and for the type of documents considered.

(*) Cyprus and Luxembourg are excluded since no DIA is performed in these MS.

The last relevant dimension to consider is the importance of DIA in the policymaking process. The officers interviewed pointed out that DIA is taken into account in the policymaking process in most of the Euro Area Member States considered (12 out of 17), although, as discussed before, DIA is often not included in the DBP because policymakers do not push for it. In more detail, it has to be noted that in Latvia and Portugal, the interest in DIA is limited to specific policies. In Portugal, DIA is considered only for policies aimed at modifying income distribution, while in Latvia, DIA is considered by the policymakers when, in a situation of scarce resources, they have to decide which measure to prioritise. Greece is a peculiar case as it is obliged to submit a DIA analysis as part of its public finance recovery programme and due to the post-programme surveillance. It seems that the

⁷⁶ When conducting DIA, the counterfactual is the baseline scenario (i.e., the scenario in which there is no implementation) that is being compared for determining distributional impacts.

⁷⁷ The term nowcasting is a contraction of “now” and “forecasting”; it refers to the sets of techniques devised to make short-term forecasts. Thus, nowcasting means predicting the present. The basic principle is the exploitation of the available information in order to obtain an ‘early estimate’ (i.e., a projected scenario for today) before the official figure of macroeconomic data become available.

obligatory nature of DIA favoured raising awareness of DIA among policymakers there. Also emerging from the answers of Euro Area Member States is that DIA has strong visibility in the public debate in only 6 MS. The distributional implications of the policies are discussed by the media (in this way entering the public debate) only in Austria, Finland, France, Spain, Germany and Ireland.

From the findings reported above, it emerges that there is wide heterogeneity in the respective approaches of Euro Area Member States when performing DIA (considering DIA use in and outside their DPB) with regard to the various dimensions considered above. Nevertheless, Euro Area Member States (and also the non-Euro Area Member States) can be clustered into 3 main groups regarding their intensity of DIA use, as detailed in the next section.

In conclusion, this subsection showed which are the main obstacles for Euro Area Member States to the use of DIA in the DBP and what is the degree of similarity in their respective DIA approaches (considering DIA use in and outside their DPB). Concerning the obstacles, the lack of time and the complexity of the approval process emerged as the main factors that could impede the inclusion of DIA in the DBP. The Euro Area MS also affirm that a direct action from the EC could help to increase the use of DIA. More precisely, EC could provide a web interface for DIA software, offer specific training or provide guidance for implementing DIA. It has to be stressed that the interviewees highlight that an increase in the political will towards DIA can also be a relevant factor that could expand the use of DIA. The analysis also highlights a set of similarities in the DIA use between the Euro Area MS. More precisely, the teams in charge of DIA are usually made up of economists working within the Ministry of Finance and they tend to use mainly national microsimulation models fed with administrative data.

3.3. Clusters of EU Member States according to their approaches to DIA

In this subsection, the aim is to identify clusters of countries – considering all EU Member States - according to an index reflecting their intensity of DIA use in recent fiscal years⁷⁸. The index counts how many documents in the budgeting process between 2018 and 2020 (fiscal years) had at least one DIA occurrence or for which at least one DIA was performed even if not included in the document). This index covers DIA use in the following types of budgeting documents⁷⁹:

- DBP.
- SCP.
- Final national budget submitted to national parliament.
- Supporting documents to the final national budget submitted to national parliament.
- Other types of budget related documents at national level (including NRP).⁸⁰

For the DBP, it looks separately at three fiscal years (2018, 2019, 2020); for the Stability/Convergence Programme, the final national budgets and the supporting documents to final national budgets, it looks separately at the last two fiscal years (2019

⁷⁸ This index is based on information collected in the interviews (namely, questions B1 to B10).

⁷⁹ These documents were also analysed in Section 3.1.2, Table 3.6 and Figure 3.7.

⁸⁰ The documents considered are: NRP, National Growth Strategy, progress towards EU2020 indicators, progress in implementing country-specific recommendations, national documents introducing expenditure measures before their adoption, national documents introducing revenue measures before their adoption, document with an ex-ante evaluation of an adopted budgetary measure before its implementation, documents with an ex-post evaluation of past budgetary measures after their implementation, other documents.

and 2020), while for the other documents, it considers the overall period 2019-2020 (fiscal years).

In addition to providing detailed information on the documents containing DIA, the interviews also provided detailed information on the extent to which Member States had carried out DIA for budget documents at national level (even if the related DIA that were conducted were however sometimes not included in them).

In figure 3.18, all EU Member States are represented according to their intensity of DIA use (i.e., the sum of documents for which there is at least one DIA occurrence over the period 2018-2020 (fiscal years)). The highest score on this index across the EU MS (i.e., the maximum height of the bars in Figure 3.18) is 11. The average intensity of DIA use over the EU MS (i.e., the average number of documents for which a DIA has been made) is about 5.

The light blue bars represent (in line with the findings in Table 3.2) the number of DBPs with at least one DIA occurrence over the period 2018-2020 (considering each fiscal year separately), so it only applies to Euro Area MS. The purple bars represent the number of budget-related documents with at least one DIA occurrence. The yellow bars represent the number of other documents at national level for which at least one DIA has been performed⁸¹ but without being formally included⁸² in these documents.

The clustering based on the number of documents with DIA enables us to distinguish 3 groups of Member States (27 MS)⁸³:

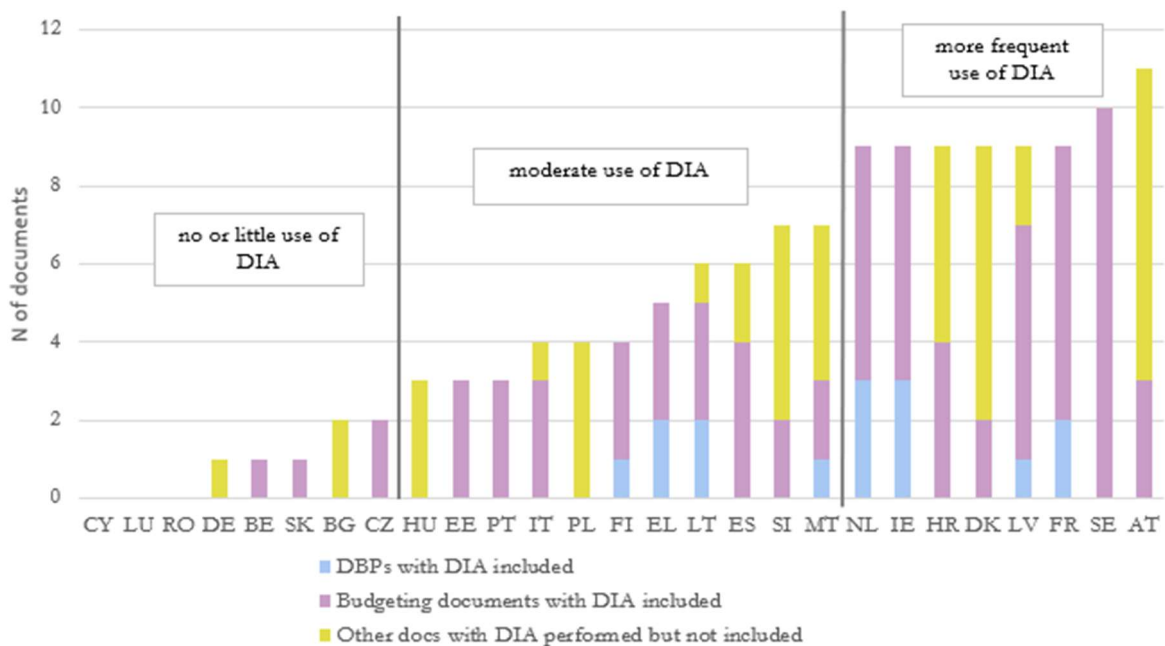
- MS with no or very little use of DIA: CY, LU, RO, DE, BE, SK, BG, CZ
- MS with moderate use of DIA: HU, EE, PT, IT, PL, FI, EL, LT, ES, SI, MT
- MS with more frequent use of DIA: NL, IE, HR, DK, LV, FR, SE, AT

Figure 3.18 – Clustering of MS according to intensity of DIA use

⁸¹ See above for the period considered.

⁸² The sum of the purple bar and the yellow bar in Figure 3.18 differs from the findings presented in Table 3.7 for three reasons. Firstly, because for each MS, Figure 3.18 counts the number of documents with at least one DIA over the period 2018-2020 (fiscal years), whereas Table 3.7 only shows for each MS if DIA was performed at least once in that period. Secondly, because the aforementioned index reflected in Figure 3.18 also covers some types of budgeting documents that are not covered in Table 3.7 (see bulleted list in the main text). Thirdly, unlike Table 3.7, Figure 3.18 considers all uses of DIAs performed for the budgeting process, regardless of whether their results were included in the final documents. Thus, Figure 3.18, provides a broader picture of the intensity of DIA use.

⁸³ The 25th and the 75th percentiles have been used as cutoffs, i.e., countries in the bottom group have two or less documents with DIA while countries in the upper group have nine or more documents with DIA.



It is worth noting that Austria, Denmark, Croatia and Latvia belong to the group of countries that make frequent use of DIA only when considering all the distributional analyses carried out within the ministry/organisation during the process of preparing the national budget, regardless of whether they (these DIA) later appeared in specific documents⁸⁴. If one were to consider only what has been published, the countries that use DIA most intensively are Sweden, the Netherlands, Ireland and France.

The group of countries with moderate DIA use is larger as it includes 11 countries. However, Hungary, Poland and Slovenia only appear in this group thanks to DIA that were not published in the official documents.

In what follows, the intensity of DIA use (as measured by the number of documents with at least one DIA included or performed in the periods mentioned above) is compared with two dimensions that relate to a Member State's level of expertise in DIA / to its technical level in DIA, namely:

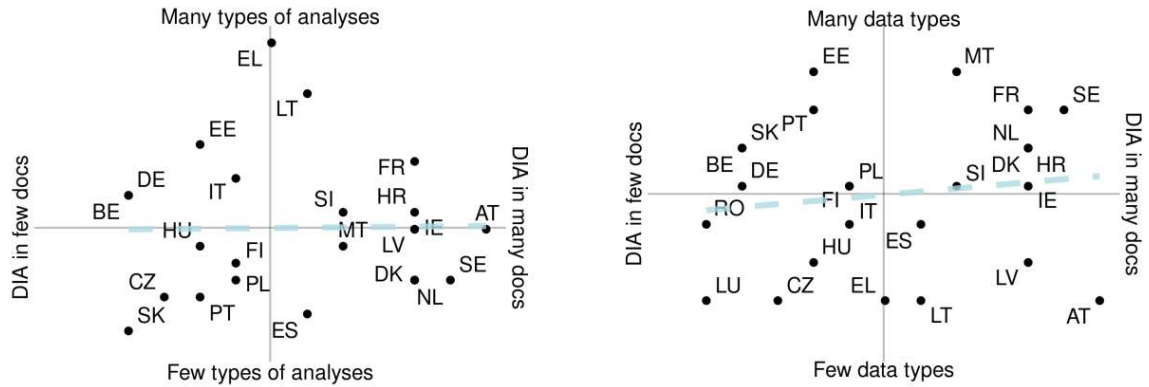
- The number of different types of indicators used in the DIA analysis, measured by an index that counts the number of indicators used in DBP, SCP and other documents.
- The number of data sources used for the DIA analysis, measured by an index that counts the number of datasets used to carry out the DIA analysis.

The resulting two-dimensional classificatory space (Figure 3.19) provides useful complementary insights into the comparative analysis of Member States regarding their approaches to DIA.

The first scatter plot (Figure 3.19, left panel) shows that having DIA in (or performing it for) several documents does not go hand in hand with the number of indicators ("types of analysis") used. The same applies to the second scatter plot (Figure 3.19, right panel). Also in this case, no relationship is found between the intensity of DIA use and the number of data sources used for DIA analysis. It should be noted that some MS like France, Croatia and (marginally) Slovenia tend to do DIA quite frequently and use a number of indicators and data sources higher than the average (i.e., they belong to the second quadrant in both panels of Figure 3.19).

⁸⁴ Otherwise, they would end up in the group with moderate use or, in the case of Denmark, in the group with little or no use of DIA.

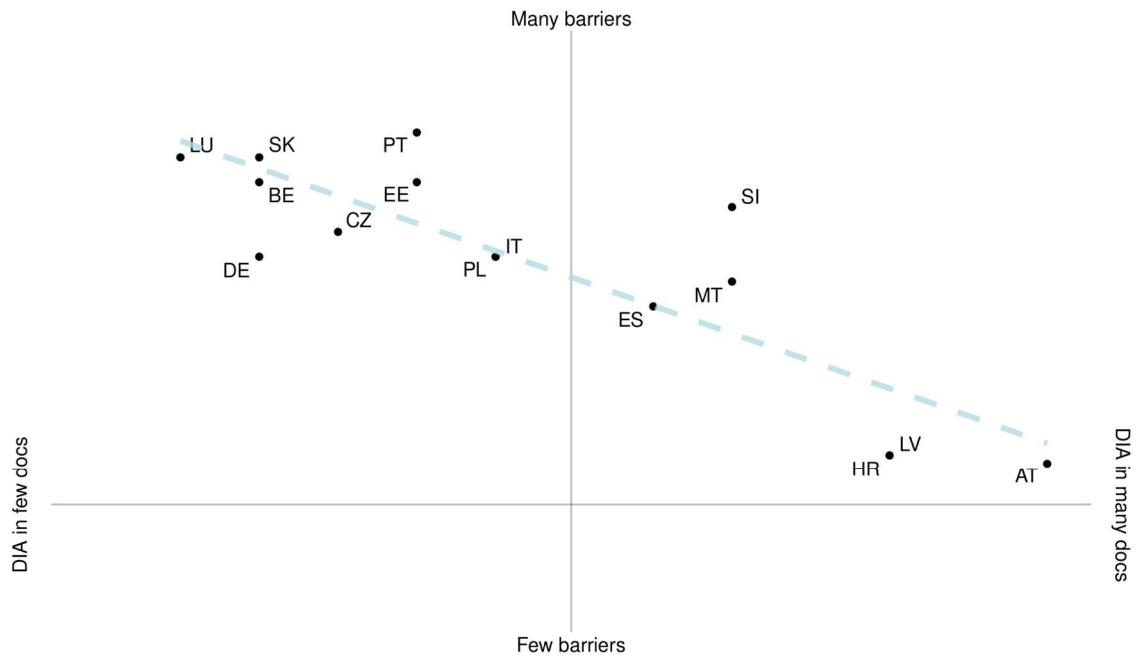
Figure 3.19 – Relationship between the intensity of DIA use and the level of DIA expertise (approached by the number of different types of analysis (i.e., indicators) used and data sources used)



Note: “DIA in few/many docs” also takes into account DIA analyses performed for the budgeting process but which were not included in any document.

Besides this joint analysis of the intensity of DIA use and the level of DIA expertise, it is also useful to consider if a possible relationship can be observed between the intensity of DIA use and the number of barriers (obstacles) that a MS may face in implementing DIA⁸⁵(Figure 3.20). This picture is limited to those MS that do not include DIA systematically in the DBP (for Euro Area MS) or that do not include DIA in official documents (for non-Euro Area MS). As shown by the scatter plot below, there is a negative (and expected) correlation between these two aspects: a more intensive use of DIAs tends to be associated with a lower number of barriers to using DIA.

Figure 3.20 – Relationship between the intensity of DIA use and barriers to DIA use



⁸⁵ The index is based on the sum of reasons that impede the inclusion of DIA based on the items presented in Table 3.8.

Note: "DIA in few/many docs" also takes into account DIA analyses performed for the budgeting process but which were not included in any document.

Finally, Figure 3.21 shows the relationship between the intensity of DIA use and the degree to which Member States would be more⁸⁶ or less⁸⁷ comfortable with expanding DIA use in DBP/budgeting process⁸⁸. It is interesting to note that this relationship is negative: a higher frequency of DIA use tends to be associated with less willingness to expand DIA use. This suggests that some MS (i.e., those in the fourth⁸⁹ quadrant of the figure (France, Denmark, the Netherlands and Sweden)) with a higher intensity of DIA use would be less prone to believing that further actions from the EC or national governments could help them to further expand their DIA use. On the other hand, several of the Member States with a lower intensity of DIA use would instead be more prone to believing that receiving help and advice on DIA would help them to expand their DIA use (and would be willing to receive them). Furthermore, amongst Member States with a lower intensity of DIA use, Germany is a peculiar case, being the only MS in the third (i.e., bottom-left) quadrant. This exception could be explained by the fact that the documents drafted at federal level are aggregations of what has been done at Länder level. This implies that the central government cannot impose a specific analysis on the Länder government.

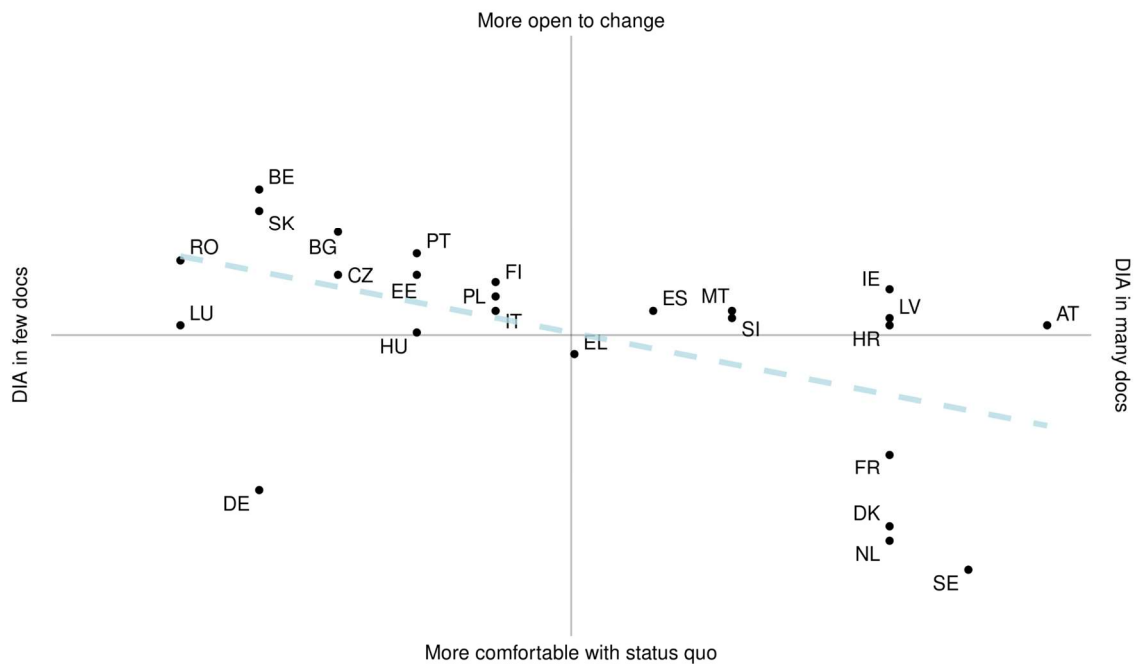
⁸⁶ i.e., more open to change regarding intensity of DIA use.

⁸⁷ i.e., more comfortable with the status quo regarding intensity of DIA use.

⁸⁸ The index on the y-axis represents the level of agreement of interviewees with the 15 items (pre-defined factors) that could help to increase the use of DIA in the budgeting process (see Table 3.9, where these factors are representing as many developments that could help to introduce or stimulate the use of DIA in the budgeting process).

⁸⁹ Bottom-right quadrant.

Figure 3.21 – Relationship between the intensity of DIA use and the degree to which Member States would be more or less comfortable with implementing a set of proposals for expanding their use of DIA in the DPB or the budgeting process



Note: “DIA in few/many docs” also takes into account DIA analyses performed for the budgeting process but which were not included in any document.

4. Suggestions for helping Member States to increase their use of DIA and EU Common Framework

Building on the insights gained throughout the multiple analyses presented in this study – on the use of DIA and the characteristics of this use in Member States –, several suggestions can be made for helping Member States to increase their use of DIA. These suggestions are presented below. Also building on these insights, we present an EU Common Framework (described in full in Section 4.3 below), which is a flexible set of suggestions regarding the production and presentation of DIA analysis.

4.1. Literature Review

To set the scene for the suggestions that follow in this part of the study, it is first necessary to provide a brief literature review of DIA analysis techniques, focusing on the state-of-the-art methodologies regarding statistical measures, tools and data. This is to demonstrate that the suggestions that follow are grounded in scientific best practices.

Regarding statistical measures, the Gini Index is the most widely known summary measure for income inequality and is used by many Member States in their budgeting process documents. Alternative measures such as the Atkinson Index or Theil Index (or other general entropy measure) do not display some of the known weaknesses of the Gini Index, such as being more sensitive to changes in the middle of the income distribution than to changes at the top or bottom (see Atkinson, 1970; Cowell, 2011), but are seldom used. One intuitive measure of income inequality is the income quintile ratio (the income share of the

richest 20 % divided by that of the poorest 20 %), which is also straightforward to calculate and interpret. There are various progressivity indicators, such as the Reynolds-Smolensky Index (Reynolds and Smolensky, 1977) and the Kakwani Index (Kakwani, 1977). The most common at-risk-of-poverty (AROP) indicator is defined using a threshold set as 60 % of the median equivalised⁹⁰ disposable income after social transfers.⁹¹

Regarding the tools used to conduct DIA, the foremost tool to estimate the impact of budgetary reform on households is the microsimulation model (Bourguignon and Spadaro, 2006). As noted in previous sections, the EUROMOD microsimulation model is available for all EU Member States (Sutherland and Figari, 2013), while many countries use their own national models (for example, Azzolini et al., 2017, counted 15 different static tax-benefit models for Italy).

Many policies cause important macroeconomic feedback effects, which cannot be captured by static models (which is the case for the vast majority of micro-simulation models). One option is to use macroeconomic models that allow for some degree of heterogeneity in terms of household or labour types. For example, Roeger et al. (2019) use a dynamic stochastic general equilibrium (DSGE) model with different labour skill types. Arnberg et al. (2018) use an overlapping generation (OLG) model, which distinguishes households by the age of household heads. Many computable general equilibrium (CGE) models account for considerable disaggregation by household types (Dixon and Jorgensen, 2013, provide many examples). Furthermore, each of these types of macroeconomic model can be linked to a microsimulation model, such as Barrios et al. (2019) (link to a DSGE model), d'Andria et al. (2019) (link to an overlapping generation model) and Bourguignon et al. (2010) (overview of linking microsimulation models to CGE models).

Regarding data sources used, microsimulation models are built around microdata. Most commonly, these are survey data. For example, EUROMOD is based on the EU Statistics on Income and Living Conditions (EU-SILC).⁹² Numerous microsimulation models have been built around national microdata, such as the German Socio-Economic Panel (SOEP; see, for example, Bonin et al., 2015). Beyond survey data, tax administrative data give more details regarding tax filers but do not encompass people who do not file tax returns. Therefore, to simulate data for the whole population, combining the administrative and survey data is the best option. Examples of this method include the microsimulation model that was produced for Greece between 2017 and 2020 with the collaboration of the European Commission and the TAXIPP model for France.⁹³

Lastly, it is necessary to highlight examples of user-friendly interfaces for both microsimulation and macroeconomic models. The models described above are, to varying degrees, tools for specialists. This is a barrier to adoption for many potential users. User-friendly interfaces allow non-specialists to utilise some of the model's features in a relatively simple manner. An early example of this was the FLEMOSI project, which provided an interface with the MEFISTO microsimulation model (www.flemosi.be). An interface that runs for all EU Member States is the EUROMOD-JRC Interface, which is maintained by the European Commission. An example from the United States is the Open Source Policy Center (www.ospc.org), which provides a reasonably accessible suite of simulation models which are free to the public, including both microsimulation and macroeconomic models.

⁹⁰ Equivalised means that the household income is adjusted in a standard way to account for the size of the household. This is usually calculated using the OECD methodology to calculate the adult-equivalent size of the household: 1st adult = 1, each subsequent adult = 0.5, child > 14 years = 0.5, child < 14 years = 0.3. See here for further details: <http://www.oecd.org/economy/growth/OECD-Note-EquivalenceScales.pdf>.

⁹¹ See here for the definition and related materials: https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Glossary:At-risk-of-poverty_rate.

⁹² Details available here: <https://ec.europa.eu/eurostat/web/income-and-living-conditions>.

⁹³ Details available here: <https://www.ipp.eu/en/publication/the-taxipp-microsimulation-model-version-1-1/>

4.2. Suggestions for helping Member States to increase their use of DIA

The suggestions presented here are in two categories: suggestions for the European Commission and suggestions for the Member States (the Member States are grouped according to the clusters discussed in Section 3.3). These suggestions are designed to help expanding and improving Member States' use of DIA in official documents, including (for Euro Area Member States) in DPB. As mentioned above, all of these suggestions stem from the multiple analysis carried out for this study, as presented in Section 3.

4.2.1. Suggestions for the European Commission

The European Commission is uniquely placed to promote DIA across the Member States. The European Commission can and does assist through the production of DIA tools and the provision of DIA training (as detailed below). There is also an important role to play in sharing good practices for DIA and raising awareness of it across the EU.

The suggestions—of which several relate to the EU Common Framework described in more details in Section 4.3 below – concern the following important aspects regarding the use of DIA: tools for DIA, training and workshops on DIA and guidance and raising awareness about DIA.

For each of these aspects, an indication is provided regarding the various degrees of interest of the Member States for the suggestions it covers.

Tools for DIA

The European Commission offers an excellent tool for performing DIA analysis: the EUROMOD microsimulation model (which is regularly updated). This is of particular importance to those countries that do not have their own microsimulation models. Maintaining EUROMOD as a tool for Member States is a valuable task that is best carried out at EU level, and which could facilitate the comparison of DIA results across the Member States.

The accessibility of EUROMOD has recently been significantly expanded by making the EUROMOD-JRC Interface (which is an interface developed by JRC to perform DIA analysis in EUROMOD easily) openly available. The advantages of having this interface include the speed at which results can be obtained and the fact that users do not need to be microsimulation experts to use it. This is important since issues regarding timing and available expertise have been noted as barriers to using DIA more in many countries. Such an interface is also important to have as it can stimulate the use of DIA in those Member States that currently have no or little DIA use. This is because once national experts and policymakers become accustomed to using and interpreting DIA results, there is usually more demand from them for DIA analysis.⁹⁴

Therefore, the Commission should continue to have the EUROMOD model and the EUROMOD-JRC Interface⁹⁵ in place (continuing their regular updates and maintenance). It is further suggested that the European Commission enrich the standard DIA outputs from the EUROMOD model and the EUROMOD-JRC Interface by adding to them results on the following indicators: S80/S50, S50/S20 and S40, which are considered as standard DIA indicators in certain EU documentation as well as in the suggested Framework below.

⁹⁴ This may even lead those Member States to allocate more resources to train internal staff in microsimulation modelling and to seek advice from external microsimulation on performing DIA.

⁹⁵ Based on the interviews, the following countries either strongly agree or agree with the enabling factor for increasing the use of DIA "EC provides a web interface for easier access to DIA-dedicated software": Austria, Belgium, Bulgaria, the Czech Republic, Estonia, Greece, Spain, Croatia, Hungary, Ireland, Latvia, Malta, Portugal, Romania, Slovakia, Slovenia (16 countries).

Specifically, these indicators could be added as standard output to the statistics presenter plug-in in EUROMOD and to the Interface output.

Trainings and workshops

The European Commission already organises regular training events on EUROMOD (through JRC-Seville). These include beginner courses and training on new features. There is also an annual EUROMOD Conference organised by the EUROMOD Network. Considering that a large number of Member States are already using EUROMOD and that some others are interested in starting using it, it is suggested that the European Commission raises more the awareness about these events (including by promoting them to a wider audience), which could already have a positive impact on increasing DIA use in Member States.

More broadly than training on EUROMOD alone, it is suggested that the European Commission offers training on various other aspects of DIA,⁹⁶ which would (among other aspects) cover data sources and tools outlined in the EU Common Framework (see Section 4.3 below). As an alternative or as a complement to this, it is also suggested that the Commission organise workshops on DIA for DIA practitioners, where best practices and new ideas on how to conduct DIA could be presented and exchanged. The key participants would be DIA staff from the Member States, but possibly also policy-focused experts from international organisations and academia. Whether provided as training sessions or as workshops, such events would aim to raise the production and the quality of DIA analysis. The focus would be largely on technical issues, such as discussions on models and data⁹⁷ used for DIA, but there could also be room to discuss organisational issues concerning real experiences of trying to embed DIA in the budget preparation process.

DIA inclusion in official documents, guidance and awareness raising

As already mentioned, DIA should normally be included in DBPs⁹⁸, but many Euro Area Member States had no DIA occurrences in their DPB (at least since the DPB for the fiscal year 2015). However, those Euro Area Member States are not receiving any feedback on this from the European Commission. If DIA is to become a normal aspect of the DBP, the European Commission should point out when DIA is absent or insufficiently covered in its feedback on the DPBs.⁹⁹ Besides commenting on the simple absence of DIA, the European Commission could also suggest in its feedback on DPB the inclusion of additional DIA results (including, for instance, DIA results for important budgetary measures if they are not yet covered by a DIA or DIA results for additional indicators and breakdowns) and methodological details in the DPB, where relevant.

The Commission should also have the same approach for certain other types of official documents related to the European Semester, for which having DIA systematically included could be important. For instance, this could include the National Reform Programmes

⁹⁶ Based on the interviews, the following countries either strongly agree or agree with the enabling factor for increasing the use of DIA "European Commission offers training on relevant software and training courses for the staff of ministries on how to perform a DIA": Austria, Belgium, Bulgaria, Greece, Spain, Croatia, Ireland, Italy, Latvia, Malta, Poland, Portugal, Romania, Slovakia, Slovenia (15 countries).

⁹⁷ Eight Member States indicated some issues with data availability in the interviews. Such training or workshops could, for instance, help them to exploit existing data sources for performing DIA analysis.

⁹⁸ The legislation for the DBP states: "... where possible, indications on the expected distributional impact of the main expenditure and revenue measures." Article 6(3d) of Regulation (EU) No 473/2013.

⁹⁹ Based on the interviews, the following countries either strongly agree or agree with the enabling factor for increasing the use of DIA "EC asks for DIA to be included in DPB": Belgium, Bulgaria, Cyprus, the Czech Republic, Estonia, Spain, Finland, Ireland, Italy, Luxembourg, Latvia, Portugal, Romania, Slovakia (14 countries).

(NRPs), which has the advantage of concerning all Member States (unlike the DBPs, which are only for Euro Area Member States).^{100 101}

Several suggestions can also be made on providing guidance to Member States on how to perform DIA.^{102 103 104} These suggestions are detailed in the proposals (presented in sub-Section 4.3) regarding the features of a possible EU Common Framework for DIA. These suggestions take into account that some Member States may be more interested than others in receiving guidance on how to conduct DIA.

Several suggestions can also be made on raising Member States' awareness about DIA, to which the Commission has already recently contributed by stressing the importance of DIA in the European Pillar of Social Rights Action Plan. To continue in this respect, it is suggested that the Commission raises awareness about DIA at the Economic and Financial Affairs Council (ECOFIN), as this would help to ensure that distributional concerns (measured via DIA) are fully integrated within economic and taxation policies.¹⁰⁵ In addition, a possible EU Framework on DIA would be the obvious opportunity, amongst others, to raise awareness about DIA.

4.2.2. Suggestions for the Member States

In this section, we present suggestions for expanding or improving the use of DIA for those Member States that wish to do so. The suggestions are presented by groups of Member States (Member States are grouped by their current intensity of DIA use). There are three groups of Member States considered here: those with “no or little use of DIA”, those with “moderate use of DIA” and those with “more frequent use of DIA” (the group compositions have been explained in more detail in Section 3.3). The suggestions concern various aspects of the conduct and use of DIA and aim to minimise the burden on Member States.

Group: no or little use of DIA

Group description

Member States: Belgium, Bulgaria, Cyprus, the Czech Republic, Germany, Luxembourg, Romania, Slovakia (8 countries).

This group is defined as those that use DIA in relatively few official documents (and/or more generally for the budgeting process) or those that are not performing any DIA at all. Indeed, no Member State in this group is, for instance using DIA in the DBP or Stability / Convergence Programme documents. For those that are performing some DIA, there is

¹⁰⁰ As mentioned already, some Member States have already included DIA analysis in at least one of their NRP in recent years.

¹⁰¹ The guidelines for the National Reform Programmes invite Member States to report on poverty and social inclusion (European Commission, 2015).

¹⁰² Based on the interviews, the following countries either strongly agree or agree with the enabling factor for increasing the use of DIA: “EC clarifies the nature, extent and scope of DIA to be included in DPB (agree / strongly agree)”: Belgium, Bulgaria, Cyprus, the Czech Republic, Estonia, Greece, Spain, Finland, Poland, Portugal, Romania, Slovakia (12 countries).

¹⁰³ Based on the interviews, the following countries either strongly agree or agree with the enabling factor for increasing the use of DIA: “EC issues a specific DIA template that needs to be completed in DPB (agree / strongly agree)”: Belgium, Bulgaria, Cyprus, the Czech Republic, Estonia, Greece, Latvia, Poland, Portugal, Slovakia (10 countries).

¹⁰⁴ Based on the interviews, the following countries either strongly agree or agree with the enabling factor for increasing the use of DIA: “EC provides guidance on methodology for conducting DIA and on how to interpret DIA results (agree / strongly agree)”: Austria, Belgium, Bulgaria, Cyprus, the Czech Republic, Estonia, Hungary, Ireland, Italy, Latvia, Malta, Poland, Portugal, Romania, Slovakia, Slovenia (16 countries).

¹⁰⁵ Based on the interviews, the following countries either strongly agree or agree with the enabling factor for increasing the use of DIA “EC issues a communication or a discussion at the ECOFIN to raise the awareness of the Ministers of Finance on the issue”: Belgium, Bulgaria, Cyprus, the Czech Republic, Estonia, Greece, Spain, Finland, Croatia, Italy, Latvia, Malta, Romania, Slovakia (14 countries)

some diversity of practice, with some of them engaging in only basic DIA, while some have advanced level DIA practices.

Within this group, Belgium, the Czech Republic, Germany, Romania,¹⁰⁶ and Slovakia are using a microsimulation model (either EUROMOD or a national model). Two countries – Belgium and Slovakia – are performing some DIA using macroeconomic models (though as noted, these models usually allow only limited DIA analysis).

Regarding the use of data for DIA, Belgium, the Czech Republic, Romania and Slovakia are using EU-SILC data. Belgium also uses a household budget survey and Slovakia a labour force survey. Administrative data are being used by Belgium, the Czech Republic, Germany, Romania and Slovakia.

Suggestions

Whilst noting the diverse situations within this group, the general suggestions are to consider performing DIA according to at least the basic level of the suggested EU Common Framework for DIA and to include the DIA results in a broader range of official documents. The full details of this suggested EU Common Framework for the use of DIA are given in Section 4.3., in which further suggestions can be found. What follows is an outline of the key suggestions for expanding and improving DIA tailored to this group of countries.

DIA tools

For those Member States (or teams within the Member States) less familiar with using DIA, it is suggested that they begin with using the EUROMOD-JRC Interface.¹⁰⁷ This interface (and the EUROMOD model behind it) already provides good quality DIA analysis in return for a fairly small effort (an example of DIA performed using the EUROMOD-JRC Interface is provided in Section 4.3.1.) Even in those Member States that are more familiar with using DIA, the Interface is designed to be accessible to persons without microsimulation expertise and can thus help to expand the group of experts within an institution that can produce DIA analysis.

For those Member States (or teams within the Member States) that are more familiar with DIA but that are not yet using a microsimulation model, training a small number of staff members either in EUROMOD or in a national microsimulation model is suggested. If this is not possible, the institution could consider using external experts, perhaps from academia. A full microsimulation model such as Euromod broadens the types of simulations that can be analysed beyond the options available in a simple Interface like the one mentioned above (an example of DIA performed using a full microsimulation model is provided in Section 4.3.2.)

For those Member States (or teams within the Member States) that are already using microsimulation models, it is suggested that they consider whether some more advanced modelling techniques would be appropriate. These might include linking a microsimulation model to a labour market model or a macroeconomic model.¹⁰⁸

DIA data

The data for DIA need to be of good quality. Generally, such data are produced and validated by a national statistics authority or by Eurostat. Member States should ensure that the data they are using are of good quality. If there are doubts in this regard, the Member States will need to check the data documentation and perhaps also interact directly with the data-producing authority. If there are difficulties regarding the timeliness of data, it is

¹⁰⁶ Though Romania reports that it has access to the EUROMOD model, it also reports that DIA is not being performed for official documents (see Figure 3.18).

¹⁰⁷ Available here: <https://euromod-web.jrc.ec.europa.eu/euromod-jrc-interface>

¹⁰⁸ See Section 4.3.2. "EU Common Framework: Advanced level" for further details and suggestions.

recommended that the Member States directly interact with the data-producing authority to understand the situation and to determine jointly whether solutions can be found.

DIA quality

All Member States (or teams within the Member States) in this group, whether currently using microsimulation models or not, should give strong importance to the quality of the DIA analysis. To ensure that DIA is of a sufficient quality, the experts performing it need to be given sufficient time and resources. They could also attend (additional) trainings and workshops on DIA, where they could exchange best practices and ideas with other practitioners engaged in DIA analysis. Additionally, to ensure the quality of DIA, the validation of the model used is important. Some models are validated by a central institution, such as the EUROMOD developer team, but in general, the teams in charge of DIA in Member States should be testing the output of their model to ensure that it is operating as desired.¹⁰⁹

DIA inclusion in documents

All Member States in this group perform little, if any, DIA. Therefore, it is suggested that they all give consideration to performing more DIA analysis for the budgeting process and that they see whether and how these DIA analyses could be included in (more) official documents, with priority given to the most relevant ones (including in the DPB for Euro Area Member States). This may involve some thought about the timing of DIA production, which several Member States highlighted as a constraint.

The Member States (or teams within the Member States) in this group could also give consideration to raising awareness about DIA among different audiences, including policymakers and persons deciding if DIA should be performed and/or included in specific, official budget-related documents. This could help to increase the appetite for DIA as already mentioned. Awareness could be raised, for instance, by detailing what could be the advantages of DIA. These include, especially, DIA providing ex-ante a clear picture of who would benefit or not (regarding disposable income) from a specific measure (or group of measures). Such advantage is, for instance, essential for avoiding adopting measures that may cause a strong social reaction, because of the adverse distributional impacts on disposable income they would have, or at least for showing the need to strongly modify their design to avoid such impacts. Likewise, DIA could also be very useful for identifying the need to mitigate a measure's adverse distributional impacts on certain population groups (e.g. on certain parts of the income distribution). DIA could also be very useful for communication purposes and for increasing the public acceptance of a measure (or group of measures), for instance by showing that – contrary to what one may think – this measure would not have negative distributional impacts. DIA could also enable, ex-post, to better assess the distributional impacts of an implemented measure, which could be useful for improving the design of measures of a similar nature that are still to be considered for the budget.

Further details on how DIA results could be presented in official documents are provided in Section 4.3.3 “EU Common Framework: Presentation of results”.

Group: moderate use of DIA

Group description

Countries: Estonia, Greece, Spain, Finland, Hungary, Italy, Lithuania, Malta, Poland, Portugal, Slovenia (11 countries).

¹⁰⁹ For example, a model could be tested using a dummy dataset for which the correct model output could be calculated separately in a spreadsheet. The spreadsheet output could then be compared with the model output to check whether it is performing as desired.

This group is defined as those that use DIA in a moderate number of official documents. Greece, Finland, Estonia and Lithuania are using DIA analysis in the Draft Budgetary Plans (DBPs), and Lithuania is also using DIA in the Stability Programme documents. All are using at least some DIA in other official documents, though there is considerable diversity regarding the nature of DIA use across members of this group (as detailed in Section 3.3 above).

All the Member States in this group are aware of EUROMOD, and five of them – Greece, Malta, Slovenia, Lithuania and Estonia – use EUROMOD for DIA analysis. Five other countries – Italy, Spain, Finland, Hungary and Poland – use alternative national models for DIA.

Regarding the data used for DIA, all the Member States in this group use some kind of survey data (using one or more of the following sources: Income and Living Conditions Survey, Labour Force Survey and Household Budget Survey) and nine of them – Malta, Slovenia, Estonia, Italy, Spain, Finland, Hungary, Portugal and Poland – also use administrative data.

Suggestions

As regards to the suggested EU Common Framework, most of the Member States in this group are already fulfilling many of the suggestions for the basic level and, in many cases, some of the suggestions for the advanced level, too. Keeping in mind the diverse DIA practices within this group, the following is an outline of the key suggestions for Member States seeking to expand and improve their use of DIA. Further suggestions can be found in Section 4.3 “EU Common Framework”.

DIA tools

Nearly all Member States in this group already use microsimulation models (either EUROMOD or national models). Nevertheless, they could also consider using the EUROMOD-JRC Interface (on top of their own models), which – as already mentioned for the previous group – readily provides good quality DIA analysis, which could be useful to increase the volume and/or speed of DIA production, especially for those types of DIA not requiring a full micro-simulation model. In addition, the EUROMOD-JRC interface is accessible to persons without microsimulation expertise, which could be handy to further build DIA capabilities and expand DIA production capacity in Member States.

For the one Member State in this group not yet using a full microsimulation model, training a small number of staff members either in EUROMOD or a national microsimulation model is suggested. Another possibility would be to externalise this analysis, perhaps to academics. A full microsimulation model allows a wider range of policy simulations than the Interface alone.

For most Member States in this group that are already using microsimulation models, it is suggested that they consider whether some more advanced modelling techniques would be appropriate. These might include linking a microsimulation model to a labour market model or a macroeconomic model¹¹⁰ (an example of DIA performed using a linked microsimulation and macroeconomic model is provided in Section 4.4.3.)

DIA data

As mentioned already for the previous group, the data for DIA need to be of good quality. Generally, such data are produced and validated by a national statistics authority or by Eurostat. Member States should ensure that the data they are using are of good quality. If there are doubts in this regard, the Member States will need to check the data documentation and perhaps also interact directly with the data-producing authority. If there are difficulties regarding the timeliness of data, it is recommended that the Member States

¹¹⁰ See Section 4.3.2. “EU Common Framework: Advanced level” for further details and suggestions.

interact directly with the data-producing authority to understand the situation and to determine jointly whether solutions can be found.

As mentioned above, the Member States in this group all use some kind of survey data and most use administrative data as well. They need to ensure that the data are of good quality and that a validation procedure is being carried out, whether by a multinational authority, such as Eurostat, a national statistics authority, or the national tax authority. Regarding the timeliness of DIA data, for those Member States where this is an issue, direct interaction with the data-producing authority is suggested to determine how this could be improved.

DIA quality

All Member States (or teams within the Member States) in this group should ensure that their DIA analyses are of good quality. Many countries in this group will have well-established teams of DIA experts, and if this is not the case, these could be established. As mentioned for the previous group, the experts need to be given sufficient time and resources to perform DIA and could also attend (additional) training and workshops on DIA. These teams also need to engage in testing the model's output to ensure it is operating as desired (though with those models that are validated centrally, such as by the EUROMOD developer team, some of this burden is already taken care of).

In addition, Member States in this group could also give consideration to enlarging the scope of measures for which they perform DIA (this is mainly for the Member States in this group that are not already performing joint DIA analysis covering several or all of the measures in their budget). This may require the use of additional data sources or further developments of the microsimulation model used for DIA (including possibly linking it to another model, as suggested under "DIA Tools" above). In addition, some of the Member States in this group could also consider using a larger number of indicators and/or breakdowns, where relevant, to enrich their DIA results.

DIA inclusion in documents

Member States in this group have a moderate intensity of DIA use relative to others in the EU. Some Member States in this group are not including in official documents the DIA analyses they performed. Therefore, it is suggested that they all give consideration to performing more DIA analyses for the budgeting process and that they consider whether and how these DIA analyses could be included in more official documents, prioritising the most relevant ones (including in the DPB for Euro Area Member States).

As also mentioned for the previous group, the Member States (or teams within the Member States) in this group could also consider raising the awareness about DIA among different audiences, including policymakers and persons deciding if DIA should be performed and/or included in official budget-related documents.

Further details on how DIA results could be presented in official documents are provided in Section 4.3.3 "EU Common Framework: Presentation of results".

Group: More frequent use of DIA

Group description

Countries: Austria, Denmark, France, Ireland, Croatia, Latvia, the Netherlands, Sweden (8 countries)

This group is defined as those that use DIA more frequently. Ireland, the Netherlands and France are using DIA analysis in the Draft Budgetary Plans (DBPs), and Croatia is also using DIA in the Convergence Programme documents. All are performing DIA for other official documents and are presenting a variety of DIA statistics.

All members of this group are aware of EUROMOD, but only Croatia uses it for DIA. All members of the group (including Croatia) have their own national models for conducting DIA analysis.

Regarding the use of data for DIA, seven countries – Austria, Denmark, France, Ireland, Croatia, the Netherlands and Sweden – use some kind of survey data (using one or more of the following sources: Income and Living Conditions Survey, Labour Force Survey and household Budget Survey) and seven countries – Denmark, France, Ireland, Croatia, Latvia, the Netherlands and Sweden – (also) use administrative data.

Suggestions

In general, the Member States in this group are already fulfilling the basic level of the suggested EU Common Framework for DIA and, in many cases, parts of its advanced level. Therefore, it is suggested that the countries in this group consider expanding and improving their use of DIA with the suggested advanced modelling techniques and that they continue to ensure the quality of their DIA analyses. The following is an outline of the key suggestions for Member States seeking to expand and improve their use of DIA. Further suggestions can be found in the EU Common Framework in Section 4.3.

DIA tools

All members of this group already use their own national microsimulation model and already have a team of microsimulation experts in place to run it. Some of these teams are already using advanced modelling techniques, such as linking the microsimulation model to a labour supply model or a macroeconomic model. For those teams that are not yet doing so, it is suggested that they consider introducing such techniques to further improve the quality of their DIA analyses, although this may require more time and resources to produce them and maintain the underlying model (an example of DIA using a linked microsimulation and macroeconomic model is provided in Section 4.4.3.).

DIA data

As noted above, the Member States in this group mostly use both survey data and administrative data. As already mentioned for the previous group, Member States in this group need to ensure that the data are of good quality and that a validation procedure is being carried out, whether by a multinational authority, such as Eurostat, a national statistics authority, or the national tax authority. If the timeliness of DIA data is an issue, direct interaction with the data-producing authority is suggested to determine how this could be improved.

DIA quality

It is important to mention that all Member States in this group generally already have established teams of experts with sufficient time and resources to produce DIA analyses of good quality (although, as said previously, some of these Member States could further improve the quality of their DIA analyses by linking their microsimulation model to another model such as a macroeconomic model). These experts may well already have access to training and workshops on DIA, which help them to maintain and improve their skills. They will also generally already be involved in model testing and validation, to ensure that the models used for DIA are operating as desired. Nevertheless, there are some suggestions that could be useful for these Member States to further improve the quality of their DIA analyses.

For instance, as mentioned for the previous group, some of the Member States in this group could give consideration to enlarging the scope of measures for which they perform DIA (this is mainly for the Member States in this group that are not already performing joint DIA analyses covering several or all of the measures in their budget) and, more generally, give consideration to perform joint DIA analyses. This would help to further improve the quality of their DIA analyses by giving a more comprehensive view on the overall distributional impacts of policy proposals, reflecting the cumulative distributional impacts of the sum of – and taking also into account the interactions between them - at least all of the significant

measures in their budget.¹¹¹ In addition, some of the Member States in this group could also give consideration to using a larger number of indicators and/or breakdowns, where relevant, to enrich their DIA results^{112 113}.

DIA inclusion in documents

Member States in this group use DIA in a relatively large number of documents (compared with others in the EU). They could still consider whether including DIA analyses in more official documents would be useful, but in general, their more frequent use of DIA enables them to raise awareness about DIA to a wide range of audiences.

Further details on how DIA results could be presented in official documents are provided in in Section 4.3.3 “EU Common Framework: Presentation of results”.

4.2.3. Conclusion

In conclusion, there are many ways through which Member States could consider expanding and improving their use of DIA in official documents. To help them to achieve this, several practical suggestions have been made, which concern both the Commission and the Member States. These suggestions have been based on the understanding of the current situation of DIA use in Member States and on their views about it (reported in Section 3).

The European Commission already makes a major contribution by providing tools for DIA, which are available to all Member States. Further promoting the use of these tools to the many Member States that do use them or that would be interested in using them for DIA analyses would be a key task, as would be the organisation of (additional) training sessions and of workshops on DIA for Member States. There are also important ways in which the European Commission could raise Member States’ awareness about DIA use, especially through its comments on some of their official documents.

Member States currently use DIA to different extents and with different tools and data. Depending on their current practices, various suggestions have been made to help them expand and improve their DIA use. These suggestions relate to the tools and data they use for performing DIA, as well as to giving importance to the quality of DIA analyses and to the inclusion of DIA in official documents.

4.3. EU Common Framework for the use of DIA in official documents

This section presents what could be the suggested features of a non-binding EU Common Framework for DIA, which foremost objective would be to help all interested Member States to increase their use of DIA (in official documents) and to ensure that their DIA analyses are of good quality, as well as, to the extent possible, to enhance comparability of DIA results across Member States. Based on sets of suggested good practices regarding DIA production and presentation in official documents, this Framework would serve as a useful guide for those Member States interested in expanding and improving their DIA use.

¹¹¹ This could be useful, for instance, if a given income group does not seem to be amongst the most impacted groups – when considering the distributional impacts of each measure individually – but would be amongst the most impacted groups when cumulating the distributional impacts of these measures.

¹¹² As well, DIA results could also be enriched by performing DIA for several possible scenarios (where relevant) regarding the degree (extent) and/or speed implementation of a given measure. Besides, DIA for a given measure could also be performed for various durations..

¹¹³ As well, consideration may also be given to trying to also take into account, in DIA, the distributional impacts of measures relating to social transfers in kind, if feasible and if relevant.

The Framework takes into account the diversity in the frequency of DIA use and in how it is performed across the Member States, noting that some Member States already have an established DIA tradition while others don't. It also considers the importance of making suggestions that entail only reasonable efforts and limited additional burden for Member States (with two different levels of DIA practices suggested).

The Framework is composed of two levels: basic and advanced (with each of these levels targeting different Member States depending on their frequency of DIA use). The basic level includes practical suggestions ("basic good practices") for DIA that can be met with a lower level of effort and that are necessary for, among other aspects, performing DIA of sufficient quality. The advanced level includes the suggestions from the basic level and adds to them suggestions regarding more sophisticated "best" practices for further improving DIA analyses. These level-specific suggestions concern the DIA tools and data, as well as the quality of the DIA analyses. Besides these suggestions, several other suggestions are made, which apply indistinctly to both levels. They concern the presentation of DIA results in official documents (for instance, both levels suggest that Euro Area Member States include DIA in the DPB to fulfil the related legislation), as well as how to select the measures for which it would be relevant to perform DIA.

The suggestions in the Framework are mainly, but not exclusively, derived from the suggestions made, in section 4.2, to the three groups of Member States (based on their intensity of DIA use) for increasing their use of DIA and improving its quality. The differences are that the Framework groups these suggestions into two easily communicable sets of proposals and that it provides complementary practical details to the suggestions made above regarding various dimensions.

It is important to mention, as further detailed below, that many Member States are already implementing some of the good or best practices for DIA outlined in the basic or advanced level. The EU Common Framework may also encourage Member States to compare their DIA practices and to learn from each other. The details of the EU Common Framework are provided below. First, descriptions of the suggested (specific) features for the basic level are provided, followed by those for the advanced level. This is followed by a description of the suggested features that are common to both levels. A summary table is provided for reference with an overview of the suggestions for both levels on the various dimensions they cover. A brief validation of the Framework is conducted based on its suggested common practices. This is carried out for three examples of DIA (based on hypothetical reforms) and is reported in Section 4.4.

4.3.1. EU Common Framework: Basic level

The basic level of the Framework is aimed at Member States in the "no or little use of DIA" group and somewhat towards some of the Member States in the "moderate use of DIA" group.¹¹⁴ Some Member States, especially in the latter group, are, to a large extent, already producing DIA in line with the common practices suggested at this level, though most of them can still find useful suggestions here that could help them to expand or improve their use of DIA.

The basic level is a collection of suggestions to expand the use of DIA and to ensure it is of good, or at least sufficient, quality, mainly in the Member States that have no or little use of DIA. The purpose of the basic level is to promote basic good practices for DIA.

DIA Tools – basic good practices

¹¹⁴ The three country groups ("no or little use of DIA", "moderate use of DIA" and "more frequent use of DIA") are defined in detail in Section 3.3 and used to categorise suggestions in Section 4.2.

The suggested model to use for performing DIA is a microsimulation model.¹¹⁵ These models are the basic tool for quantitative DIA analysis and are also established as such in the academic literature.¹¹⁶ A tax-benefit microsimulation model allows for extensive analysis of reforms of personal income tax, social insurance contributions and (in-cash) social transfers.

The microsimulation model that is already available to all Member States is EUROMOD, which has several useful features. It relies on high-quality survey data, EU-SILC, which is produced and validated by Eurostat.¹¹⁷ It is kept up to date by the central EUROMOD team based at JRC-Seville in conjunction with national experts in every Member State. Each version of the model is validated before release. This validation is further confirmed by the extensive research activity conducted using the model. Furthermore, technical help on EUROMOD is readily available, for instance, through regularly organised trainings or through the EUROMOD Network experts. EUROMOD can therefore be considered a reliable tool to perform DIA and it is suggested that those Member States with no or very little DIA tradition make use of it for their DIA analyses.

As mentioned above, DIA can be performed in EUROMOD by using the full EUROMOD model or the EUROMOD-JRC Interface. To ensure the quality of DIA analysis if using the full model, a sufficient level of staff training is needed.¹¹⁸ Initial training can be arranged with the central EUROMOD team. If using the Interface, little training is required, so that a general economist with no DIA expertise would be more than capable of running this tool and interpreting the results.

Alternatively, Member States may have their own nationally produced microsimulation model. In such case, some internal procedures are required regarding various aspects that include model development, model validation and training of new experts.

DIA Data – basic good practices

As already noted, the EUROMOD model is based on EU-SILC data, which is validated by Eurostat before its release. Those countries that have their national microsimulation models based on national survey data need to have methods in place to ensure that their data are of sufficient quality and timeliness and that they include an adequate level of details on the income and living conditions of individuals and households.

The data used for the model should be as up to date as possible. There is inevitably a time lag between the conduct of the survey and when the collected data are available. A common solution to this is to use uprating factors to adjust the data to subsequent years, as done in EUROMOD for example.

DIA quality – basic good practices

One advantage of using tools such as EUROMOD and the EUROMOD-JRC Interface is that the validation is conducted centrally by the EUROMOD team. A EUROMOD Country Report is produced for each country, which is regularly updated.¹¹⁹ Each report includes details about the validation exercises undertaken for that country in EUROMOD. In turn, the

¹¹⁵ DIA may also be conducted without a microsimulation model on a more aggregated level. This could be performed with macroeconomic models, some of which do incorporate some household disaggregation. These models present some advantages and disadvantages compared to microsimulation models. Countries that have such a macroeconomic model running may wish to utilise it in this way. Nevertheless, the general suggestion is to use microsimulation models.

¹¹⁶ Some quantitative DIA can be conducted with descriptive data, but it is difficult to analyse policy reforms seriously without some kind of simulation model.

¹¹⁷ Details on the methodology employed in the production of the EU-SILC data are available here: [https://ec.europa.eu/eurostat/statistics-explained/index.php?title=EU_statistics_on_income_and_living_conditions_\(EU-SILC\)_methodology](https://ec.europa.eu/eurostat/statistics-explained/index.php?title=EU_statistics_on_income_and_living_conditions_(EU-SILC)_methodology).

¹¹⁸ Fully trained expert users may have years of experience.

¹¹⁹ Country Reports are available here: <https://euromod-web.jrc.ec.europa.eu/resources/country-reports/latest>

regularly updated EUROMOD-JRC Interface is also validated centrally, which principally concerns confirming that the Interface produces the same results as the full EUROMOD model.

For those Member States using national microsimulation models, putting systems in place (if not already done) to test that the model is functioning as intended is suggested. This is typically carried out by first testing each function of the model separately, confirming that the function calculations are being done correctly, and then by checking the (whole) microsimulation model results against macro-aggregates.¹²⁰

Once the model is validated, ensuring DIA of good (or at least sufficient) quality is principally about using the model correctly and interpreting the results accurately. When using a simple tool, such as the EUROMOD-JRC Interface, this is fairly straightforward, certainly for an economist. Nevertheless, some knowledge of the workings of the tax system is needed to set up meaningful simulations, and some knowledge of statistics is needed to fully interpret the results. As mentioned above, when using a full microsimulation model, whether EUROMOD or a national model, a higher level of expertise is required.

4.3.2. EU Common Framework: Advanced level

The advanced level of the Framework is aimed at most of the Member States in the “moderate use of DIA” group and at those in the “more frequent use of DIA” group.¹²¹ Some Member States in both groups are already producing DIA in line with the common practices suggested at this level, though most will still find useful suggestions here that could help them to expand or improve their use of DIA.

The advanced level is a collection of suggestions to further improve the quality of DIA in the Member States that already have a certain intensity of DIA use. The purpose of the advanced level is to promote best practices. As outlined in the literature review, the two main challenges for advanced DIA analyses are improving the quality and content of the data and improving the estimates to account for behavioural responses and economic feedback.

DIA Tools and Data – best practices

Microsimulation extensions 1: Consumption taxes

As noted for the basic level, standard microsimulation models focus on direct personal taxes and (in-cash) social benefits. The other major category of household taxation is consumption taxes (mostly value-added tax and excise). Data on consumption patterns require a household budget survey, which is usually collected separately from the income and living conditions surveys such as EU-SILC. For this reason, incorporating consumption taxes into a microsimulation model becomes technically challenging as the data sets need to be merged using a matching procedure. Nevertheless, the distributional impacts of reforms to consumption taxes can be large, and therefore, it is suggested at this level to extend the DIA model and data to account for them. This would enlarge the scope of measures for which DIA can be performed and improve the quality of the DIA analyses.

Microsimulation extensions 2: Administrative data

Administrative data can be incorporated into a microsimulation approach. Administrative data give precise information on current taxpayers. (In practice, analysis is often carried out using synthetic data to protect taxpayer anonymity.) This allows accurate estimates of the distributional impacts of measures within this group of individuals. A limitation of the approach, if used in isolation, is that one has no information on non-filers. Therefore, a best

¹²⁰ Further discussion of this can be found in the EUROMOD Country Reports, which present this type of analysis.

¹²¹ The three country groups (“no or little use of DIA”, “moderate use of DIA” and “more frequent use of DIA”) are defined in detail in Section 3.3 and used to categorise suggestions in Section 4.2.

practice would be to match the administrative data to the survey data (which includes the non-filers), and that this merged data is incorporated into the microsimulation model. This would enable to conduct analyses across the entire population while also benefitting from the details of the administrative data.

Behavioural responses and macroeconomic considerations

Taxes and (in-cash) social benefits can impact citizens' behaviour and change the macroeconomic environment. Incorporating such behavioural responses and macroeconomic feedback requires additional modelling techniques. When considering changes to direct income taxes, for instance, the most important feedback is through the labour market. Therefore, a suggested best practice is to link the microsimulation DIA model with a labour supply response model in order to estimate the changes in wages and employment levels. An alternative would be link it to a macroeconomic model. Depending on the macroeconomic model used in conjunction with the microsimulation model, this may include a labour supply response as a behavioural response. It would certainly consider macroeconomic feedback, which, in turn, may lead to changes in the interest rate and consequent changes in savings behaviour. It may lead to changes in aggregate demand, perhaps with consequences for employment levels. The exact behavioural responses and macroeconomic feedback will depend on the models employed, but in general, there are many economic consequences of fiscal policy reform that can only be properly accounted for using additional modelling techniques.

Corporate taxation

Ideally, at this level of the suggested EU Common Framework, Member States should also be able to perform DIA analyses on corporate tax reforms, which are understood to have significant distributional impacts: ultimately, somebody must pay for all taxes, however, in the case of corporate tax, who pays (i.e., the incidence of the tax) may not be so clear. When a tax is imposed on corporations, the tax might get paid by shareholders (through lower capital value and lower dividends), but it could also be effectively paid by workers in the corporate sector through lower wages. There is no consensus among academics or practitioners about the correct split between shareholders and workers. In the United States, DIA analysis on corporate tax is conducted by government bodies, which could serve as an inspiration for EU practitioners. To our knowledge, quantitative DIA analysis of corporate tax reform is not conducted by EU governments, though academic studies do exist. A full discussion of the issue is included in the Appendix to Section 4: Appendix 2.

Timeliness of data

As noted for the basic level, the data used for the DIA model should be as up to date as possible, given that there is an inevitable time lag between the data collection and the data being made available. Here as well, the use of uprating factors as in EUROMOD is suggested as a possible solution.

DIA quality – best practices

To ensure good quality of DIA analyses, the data and tools need to be subject to a rigorous validation process. Data should typically be validated either by a multinational organisation, such as Eurostat, or by the national statistics authority. Validation of national models needs to be carefully incorporated into the model design and maintenance. The suggested practices here are, in general, the same across both the basic and advanced levels.

However, at the advanced level, the models used are often even more challenging to build and maintain. The Member States that successfully do this tend to have solid structures to ensure the quality of DIA production. For the others, it is suggested that they maintain a team of experts for the DIA model and that they ensure the continuity of their DIA expertise. This team would need to be given adequate time and resources (such as training resources) to have a reliable DIA model in place and to perform DIA following the advanced standard described in this level of the Framework.

4.3.3. EU Common Framework: presentation of results

The suggestions described below are common to both the basic level and the advanced level of the suggested EU Common Framework and concern the presentation of the results (i.e., outputs) of DIA analyses in official documents. DIA results should be presented in such a way as to highlight the key areas of interest of each Member State regarding distributional impacts. The following is a suggested set of DIA outputs, which would provide a good overview of the distributional impacts of a policy reform (or group of reforms). The suggested DIA outputs are grouped by: (A) impact by income quantile; (B) inequality measures; (C) poverty measures. After the suggested presentation outlined below, some possible additional statistics to include as well in the presentation of DIA results are also discussed.

A. Impact by Income Quantile

There are various methods through which one can analyse population quantiles. The suggestion here is to use mean equivalised disposable income for each of the income quantiles considered. Disposable income means income after direct taxes have been paid and (in-cash) social benefits have been received, and equivalised means that the household income is adjusted depending on the household composition.¹²² Here, it is important – when interpreting the DIA results – to not only look at the respective monetary impacts from a comparative perspective between the income quantiles (is the considered measure regressive, neutral or progressive), but to look also at the sign and the extent of these respective monetary impacts (in amount and relatively) for each of these income quantiles, foremost for the lower ones¹²³. This is important as even a limited decrease (in amount) in annual disposable income could strongly impact the purchasing power of some households.

¹²² This is usually calculated using the OECD methodology to calculate the adult-equivalent size of the household: 1st adult = 1, each subsequent adult = 0.5, each child over 14 years old = 0.5, each child under 14 years old = 0.3. See here for further details: <http://www.oecd.org/economy/growth/OECD-Note-EquivalenceScales.pdf>.

¹²³ Indeed, a measure can be progressive with still significant negative impacts for the lowest income deciles (e.g. even if a measure caused a relative drop in disposable income that would “increase” (get increasingly negative) along the income distribution (i.e. progressive measure), the first income decile (despite it has the lowest relative income drop) would still be significantly adversely impacted by such measure if this drop represented a substantial share of its annual disposable income or a substantial amount.)

Table 4.1 – Mean annual equivalised disposable income (in national currency) by income decile*Proposed presentation design*

Decile	Baseline	Reform	Difference	% Difference
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
All				

Source: Authors' suggestion.

B. Inequality Measures

Of the various inequality measures available, the following are particularly recommended to use for DIA output: (i) the Gini index, which is the most widely used inequality measure; (ii) the income quintile share ratio (share of income going to the richest 20 % compared to the poorest 20 %) and its decomposition into the S80/S50 and S50/S20; (iii) the S40 (income share of the bottom 40%). Other indicators like the inter-decile ratio (the income of the 50th percentile compared to the 10th percentile) may also be used. Together, these give a decent overview of the state and change in inequality due to the reform.

Table 4.2 – Inequality measures*Proposed presentation design*

Inequality measure	Baseline	Reform	Difference	% difference
Gini				
S80/S20				
S80/S50				
S50/S20				
S40 income share				
Inter-decile ratio = D5/D1				

Source: Authors' suggestion.

C. Poverty measures

As regards monetary poverty, using the AROP rate and the relative median at-risk-of-poverty gap are suggested. The at-risk-of-poverty (AROP) rate – also referred to as Foster-Greer-Thorbecke zero or FGT(0)¹²⁴ – is most commonly calculated as the share of persons with an annual equivalised disposable income below 60 % of the median equivalised annual disposable income. The relative median at-risk-of-poverty (AROP) gap measures how far below the poverty line the median person in poverty is.¹²⁵

Table 4.3 – At-risk-of-poverty (AROP) rate and gap, based on equivalised disposable income*Proposed presentation design*

Inequality measure	Baseline	Reform	Difference	% difference
AROP rate				
AROP gap				

Source: Authors' suggestion.

Additional information and statistics

¹²⁴ The Foster-Greer-Thorbecke are a suite of poverty measures ranging from poverty counts, FGT(0) and the poverty gap index, FGT(1), to measures which put additional weight on the depth of poverty (Foster et al., 1984).

¹²⁵ A similar alternative poverty gap measure is the (average) at-risk-of-poverty gap – also referred to as Foster-Greer-Thorbecke one or FGT(1) – that measures how far below the poverty line the average person in poverty is .

There may also be other relevant DIA outputs that can be presented in a useful way, depending on the national situation and available data. These could be produced under the basic or advanced level of the suggested EU Common Framework. The following is a non-exhaustive list of alternative statistics that could be considered:

- Anchored AROP: This is the at-risk-of-poverty statistics, but “anchored” to the AROP threshold of a particular year. This indicator allows one to make a distinction between the impact of a changing median income and the changes in the incomes of poor households.
- AROP rate based on sub-sections of the population, such as breakdowns by age, work status, level of education, the degree of urbanisation¹²⁶ or household type. In all cases, these rates compare with the AROP threshold for the whole national population.

Lastly, it should be noted that some of these options may require additional data beyond what is used in the standard microsimulation model. In this case, such additional data would may be combined with microsimulation data using a matching technique.

4.3.4. EU Common Framework: Choice of measures

The suggestions described below are common to both the basic level and the advanced level of the Framework and concern how to choose the measures (reforms) for which it would be most relevant to have a DIA. Analysing and prioritising measures that have potentially significant distributional impacts is suggested. The following two selection criteria can be applied to any single measure or to a combination of measures. These two selection criteria are non-cumulative since it is suggested to conduct DIA for a measure(s) that would fulfil only one of them.

The first of the selection criteria concerns those measures that have a large budgetary impact: it is suggested to conduct DIA for those measures with a budgetary impact greater than 0.1 % of GDP. Beyond measures with a large budgetary impact, it is also suggested that DIA should be performed for those measures that have the potential to redistribute more than 0.1 % of GDP in disposable income between different population groups (even though those measures may have a net overall budgetary impact of less than 0.1 % of GDP). The population groups to consider here are whichever groups are most relevant for the policy at hand. This will often refer to income deciles, but could equally refer to different age groups, urban-rural groups, wealth quantiles or indeed other categorisations.

Normally, the focus should first be on new policies. However, there may be good reasons to also think across multiple years. In particular, one should also consider for DIA an incremental policy that would be implemented slowly over a number of years and that may not have a very large impact in any one year, but that cumulatively might have substantial DIA impacts. A further suggestion is to have occasional DIA reviews of the entire tax and benefit system. This would involve calculating, for example, inequality statistics on original income and comparing these to disposable income (after direct taxes and benefits) to understand the inequality impact of the entire system.

4.3.5. Conclusions

The possible EU Common Framework for DIA in official documents (e.g., in DPB for Euro Area Member States) offers a practical set of suggestions to help Member States, seeking guidance on DIA, to increase their use of DIA (in official documents) and to improve its quality. As described above, these suggestions are grouped in two levels – basic and advanced levels – reflecting good and best practices for DIA. They concern various

¹²⁶ Some countries feature a particularly strong rural-urban divide and so may wish to track poverty rates according to rural-urban criteria.

important dimensions of DIA, such as the tools and data used, the quality and presentation of DIA results, as well as the choice of measures on which to perform DIA. These suggestions are summarised in the table below.

Summary Table: Possible EU Common Framework for distributional impact assessment in official documents

The following is provided for ease of reference only. Full explanations of the suggestions are provided in the text above.

Table 4.4 – EU Common Framework for DIA in the DBP

Summary

Dimension of framework	BASIC level	ADVANCED level
Tools	Microsimulation model or interface for a microsimulation model	'Microsimulation + Labour-supply' model 'Microsimulation + Macro-economic' model
Tools – quality / validation	EUROMOD is centrally validated; National models require validation	EUROMOD is centrally validated; National models require validation
Tools – quality of production	Need to ensure staff experts are trained (except for Interface)	Need to ensure staff experts are trained and to have a team to maintain advanced tools (advanced tools can take time to produce)
Data	Survey data	Survey data + administrative data Survey data + household budget survey data
DIA outputs (common to both levels)	Impact by income quantiles Poverty and inequality summary measures	Impact by income quantiles Poverty and inequality summary measures
Choice of reforms (common to both levels)	> 0.1% GDP or redistribution of > 0.1% GDP	> 0.1% GDP or redistribution of > 0.1% GDP

Source: Authors' suggestion.

4.4. Brief validation of the possible EU Common Framework for the use of DIA in official documents¹²⁷

This section gives three examples of DIA simulations that concern hypothetical measures run for the purpose of this study. They illustrate how the possible EU Common Framework for the use of DIA (described in Section 4.3) could be put into practice. All three examples have been discussed with key national experts to ensure the relevance of the policies considered, which are more illustrations rather than specific policy proposals. They were also chosen with a view to illustrate the use of the following specific DIA tools: the EUROMOD-JRC Interface, the full EUROMOD model and the linked microsimulation and macroeconomic model. As noted, the Framework is intended to be flexible, and as such, the following DIA simulations should be taken as examples, rather than rigid ways of performing DIA and of presenting DIA results. The three DIA simulations (of hypothetical measures) run are:

- Romania: personal income tax reform to introduce more progressivity
- Cyprus: low pension benefit and guaranteed minimum income
- Italy: reduction in personal income tax

The reforms in Romania and Cyprus are analysed using a static microsimulation model and are presented as illustrations of the basic level of the Framework. In particular, they both use EUROMOD, though in the first simulation the EUROMOD-JRC Interface is used, whereas in the second the full EUROMOD model is used for analysing a more complex set of reforms. The analysis of Italy includes a microsimulation model interacting with a macroeconomic model and is presented as an illustration of the advanced level of the Framework.

4.4.1. Basic level of the EU Common Framework for DIA: Example 1: Romania - Personal income tax reform to introduce more progressivity

Reform description

The current personal income tax (PIT) system in Romania is a flat rate of 10 %. There is some progressivity in the system because various allowances are deducted from the tax base before taxable income is determined. The main allowances are employment allowances (dependent on employment status) and family-dependent allowances (dependent on household composition). Furthermore, social insurance contributions are not included in taxable income for PIT.

The proposed reform introduces a budget-neutral tax reform to benefit minimum wage workers. Precisely, it is as follows:

- Introduce a 5% tax rate bracket (instead of 10% flat rate), so that the average minimum wage worker will stay within this bracket.
- Introduce a 20% tax rate bracket on higher earners (instead of 10% flat rate), so that the overall reform is budget neutral.

To give context to the following simulation, the annual income in lei (the local currency) for those recording positive labour income is given in Table 4.5.

¹²⁷ Disclaimer: the simulations run in this Section are intended to be explanatory regarding the EU Common Framework. With respect to the simulations, any views expressed are purely those of the authors and may not under any circumstances be regarded as stating an official position of any affiliated institution.

Table 4.5 – Labour income percentile among all positive earners (weighted)

Percentile	Labour income per year
10 th	3,393
25 th	23,302
50 th (median)	33,319
75 th	48,282
90 th	65,096

Source: Authors' suggestion.

Define the 5% bracket:

1. Minimum wage = 2,230 lei per month¹²⁸
2. Average allowance in this group = 1,090 lei per month (this consists of employment allowance, family-dependent allowance and social insurance contributions)
3. Average taxable income in this group $(2,230 - 1,090) = 1,140$ lei per month = 13,680 per year

Define the 20% bracket:

1. Trial and error using the EUROMOD static microsimulation model gives a threshold for taxable income of 29,300 lei per year¹²⁹ and above, to balance the cost of the tax reduction generated above.

The PIT reform is summarised in Table 4.6.

Table 4.6 – Personal income tax (PIT) reform

Summary

Tax bracket (taxable income per year in lei)	Baseline rate	Reform rate
Up to 13,640	10%	5%
13,640 – 29,300	10%	10%
Above 29,300	10%	20%

Source: Authors' suggestions.

¹²⁸ Approximately 450 euros per month.

¹²⁹ Approximately 5,950 euros per year (of taxable income).

Tools used

The analysis uses the EUROMOD-JRC Interface, using the Romanian EUROMOD model for the fiscal year 2020.¹³⁰

Distributional impact assessment

The EUROMOD-JRC Interface produces various analyses by decile, including the mean annual equivalised disposable income shown in Table 4.7. The progressive PIT reform benefits the first eight deciles, with the middle deciles benefitting the most in percentage terms. The ninth decile loses out only slightly, while the top decile faces a 3.0% loss.

Table 4.7 – Mean annual equivalised disposable income by decile

Progressive PIT Reform for Romania – using EUROMOD-JRC Interface

Decile	Baseline	Reform	Difference (reform less baseline)	% Difference between reform and baseline
1	4,519	4,530	11	0.2
2	9,248	9,345	97	1.0
3	12,531	12,708	177	1.4
4	15,633	15,859	226	1.4
5	18,984	19,281	297	1.6
6	22,468	22,804	336	1.5
7	26,493	26,792	299	1.1
8	31,205	31,395	190	0.6
9	37,707	37,661	-46	-0.1
10	56,311	54,644	-1667	-3.0
All	23,504	23,496	-8	0.0

Source: EUROMOD calculations by authors.

The EUROMOD-JRC Interface also produces various inequality measures, as shown in Table 4.8. Inequality falls when based on several measures such as the Gini index or the Income quintile share ratio. Nevertheless, the inter-decile ratio (D5/D1) rises, emphasising that the reform benefits those in the middle of the income distribution more than those in the bottom decile.

¹³⁰ The EUROMOD-JRC Interface can be accessed here: <https://euromod-web.jrc.ec.europa.eu/euromod-jrc-interface>. Registration is required.

Table 4.8 – Inequalities measures for equivalised disposable income
Progressive PIT Reform for Romania – Using EUROMOD-JCR Interface

Inequality measure	Baseline	Reform	Difference (reform less baseline)
Gini Index	0.3426	0.3358	-0.0068
Income quintile share ratio = S80/S20	6.8049	6.6292	-0.1757
Income quintile share ratio = S80/S50	2.2268	2.1933	-0.0748
Income quintile share ratio = S50/S20	3.0110	3.0332	0.0222
Bottom 40% income share = S40	0.1784	0.1806	0.0022
Inter-decile ratio = D5/D1	2.9982	3.0484	0.0502

Source: EUROMOD calculations by authors.

The EUROMOD-JRC Interface also produces at-risk-of-poverty (AROP) measures. The most commonly used is the number of households below 60 % of the median equivalised annual disposable income – also referred to as Foster-Greer-Thorbecke zero or FGT(0) – which is shown in Table 4.9. It shows that the PIT reform would reduce the at-risk-of-poverty households from 25.0% to 24.2%. Table 4 also illustrates the impact of the PIT reform on the poverty gap¹³¹. Similarly, EUROMOD predicts a reduction in the poverty gap from 9.2% to 9.1%.

Table 4.9 – At-risk-of-poverty (AROP) rate and gap, based on equivalised disposable income

Progressive PIT Reform for Romania – using EUROMOD-JRC Interface

Inequality measure	Baseline	Reform	Difference (reform less baseline)
AROP rate (in % of total pop)	25.0	24.2	-0.8
AROP gap (in % of AROP threshold)	9.2	9.1	-0.1

Source: EUROMOD calculations by authors.

Further considerations

¹³¹ The version of the poverty gap used in this example is based on the average and not the median of AROP households.

Validation of the tools: the EUROMOD-JRC Interface and EUROMOD are internally validated by JRC-Seville before their release.

Quality of the production: the intuitive interface produces high-quality results with only modest input from users.

Data: EUROMOD uses EU-SILC data, which are validated by Eurostat before release.

Choice of measure for DIA: the reform causes distributional shifts within different population groups of around 0.1 % of GDP in tax cuts and tax rises. In many cases, this could be confirmed by using the EUROMOD-JRC Interface to analyse only one aspect of the reform (either the tax cut for lower incomes or the tax rise for higher incomes).

Resources to produce DIA: producing results with the EUROMOD-JRC Interface requires only minimal training. Nevertheless, being able to interpret the results comprehensively requires some expertise.

4.4.2. Basic level of the EU Common Framework for DIA: Example 2: Cyprus - Guaranteed minimum income and low pension benefit reform

Current policies and their impact

The low pension benefit and the guaranteed minimum income (GMI) are programmes to supplement low-income households. Both are subject to means-tested thresholds. The reform considered in both cases would increase the threshold, making more individuals eligible for the benefit and eligible for higher benefits.

As explained in Nearchou and Stavrakis (2020):

“The guaranteed minimum income (GMI) scheme is a means-tested top-up non-contributory benefit targeting individuals or families with income (that is) not enough to cover their basic needs. Basic needs are defined on the basis of a minimum consumption basket”.

An important consideration for GMI eligibility is the amount of earned income. GMI benefits decrease as earned income rises according to the schedule in Table 4.10. The first 50 euros earned are 100% disregarded when considering eligibility. Beyond this, only a share of earned income is considered until 500 euros or more per month, when all earned income is considered. This benefit structure goes some way to encouraging those on low incomes to engage in work because the GMI is removed more slowly.

Table 4.10 – Guaranteed minimum income (GMI)

Working earnings disregard for working poor (other than those aged 18-28)

Monthly earnings in euros - Baseline	Retention rate
Up to 50	100%
51 – 200	40%
201 – 500	20%
501 and above	0%

Source: Authors' suggestion.

The low pension benefit targets pensioners with low incomes. As explained in Nearchou and Stavrakis (2020):

“The low pension benefit is a non-contributory benefit targeting families with incomes below the poverty limit. This specific benefit is a means-tested benefit provided to families with at least one person in the family receiving a pension. With the introduction of the GMI, a person may apply either for GMI or for the low pension benefit. The higher benefit is paid out in cases where a person is considered eligible for both benefits.”

Table 4.11 – Low pension benefit

Threshold for eligibility and amount

Income threshold per year - Baseline	The low pension benefit in euros per month
5,162	220
5,678	210
6,195	200
6,711	190
7,227	180
7,742	160
8,259	150
8,775	140
9,291	130
10,324	95

Source: Authors' suggestion.

A person may apply for either a low pension benefit or GMI. EUROMOD assumes that a person receives whichever of the two benefits is higher in their individual case.

To demonstrate the value provided by the programmes in terms of poverty and inequality reduction, we first simulate the consequences of removing them. This is done with the EUROMOD model for Cyprus for the fiscal year 2020.

Table 4.12 shows the impact by decile in percentage change, while table 4.13 shows the impact in absolute amounts. Both programmes are well targeted at the lower-income deciles. More precisely, without the GMI, the poorest decile would be 23.9 % worse off in mean equivalised disposable income. Without the low pension benefit, the mean equivalised disposable income in the poorest decile would be 6.5 % lower.

Table 4.14 shows how inequality would rise in the absence of these programmes. The Gini would rise by 0.0222 if both programmes were removed, and the S80/S20 would rise by 0.9695.

Table 4.12 – Impact of removing (i) GMI, (ii) low pension benefit, and (iii) both

Income change by decile (mean equivalised income) in %

	Baseline (€ / month)	Removal of GMI (% change)	Removal of low pension benefit (% change)	Removal of GMI & low pension benefit (% change)
<i>Decile 1</i>	608.28	-23.9%	-6.5%	-29.6%
<i>Decile 2</i>	784.11	-4.4%	-4.5%	-10.3%
<i>Decile 3</i>	913.19	-2.1%	-0.8%	-3.4%
<i>Decile 4</i>	1,073.40	-1.0%	-0.3%	-1.5%
<i>Decile 5</i>	1,242.69	-0.8%	-0.2%	-1.1%
<i>Decile 6</i>	1,412.84	-0.6%	-0.2%	-0.7%
<i>Decile 7</i>	1,590.35	-0.4%	-0.1%	-0.5%
<i>Decile 8</i>	1,850.86	-0.4%	0.0%	-0.6%
<i>Decile 9</i>	2,249.82	-0.2%	0.0%	-0.3%
<i>Decile 10</i>	3,669.70	-0.2%	0.0%	-0.2%
<i>All</i>	1,539.10	-1.7%	-0.6%	-2.4%

Source: EUROMOD calculations by authors.

Table 4.13 – Impact of removing (i) GMI, (ii) low pension benefit, and (iii) both
Income change by decile (mean equivalised income) in absolute terms

	Baseline (€ / month)	Removal of GMI (absolute change)	Removal of low pension benefit (absolute change)	Removal of GMI & low pension benefit (absolute change)
<i>Decile 1</i>	608.28	-145.54	-39.82	-179.76
<i>Decile 2</i>	784.11	-34.66	-35.19	-80.73
<i>Decile 3</i>	913.19	-19.37	-7.63	-30.92
<i>Decile 4</i>	1,073.40	-11.12	-3.24	-15.77
<i>Decile 5</i>	1,242.69	-9.85	-2.59	-13.20
<i>Decile 6</i>	1,412.84	-8.61	-2.97	-10.48
<i>Decile 7</i>	1,590.35	-6.18	-1.57	-7.67
<i>Decile 8</i>	1,850.86	-7.53	-0.56	-10.21
<i>Decile 9</i>	2,249.82	-5.11	-0.35	-5.94
<i>Decile 10</i>	3,669.70	-7.80	-0.68	-7.07
All	1,539.10	-25.88	-9.56	-36.49

Source: EUROMOD calculations by authors.

Table 4.14 – Impact of removing (i) GMI, (ii) low pension benefit, and (iii) both
Inequality measures

	Baseline	Removal of GMI (difference)	Removal of low pension benefit (difference)	Removal of GMI & low pension benefit (difference)
<i>Disposable income - Gini</i>	0.2937	0.0155	0.0060	0.0222
<i>Disposable income - S80/S20</i>	4.2466	0.6047	0.2368	0.9695
<i>Disposable income - S80/S50</i>	2.2291	0.0207	0.0083	0.0300
<i>Disposable income - S50/S20</i>	1.9072	0.5840	0.2285	0.9395
<i>Disposable income - S40</i>	0.2195	-0.0103	-0.0042	-0.0151

Source: EUROMOD calculations by authors.

The impact on poverty rates and on the poverty gap of the programmes is shown in Table 4.15. Without both programmes, the overall at-risk-of-poverty (AROP) rates would rise to 19.83% (from 15.56%) and the poverty gap to 23.04% (from 14.05%). The targeted impact of the low pension benefit is shown clearly when focusing on the at-risk-of-poverty rate among households with elderly people, which would rise to 31.56% of households (from 21.71%) without the low pension benefit.

Table 4.15 – Impact of removing (i) GMI, (ii) low pension benefit, and (iii) both
At-risk-of-poverty (AROP) rates

	Baseline	Removal of GMI	Removal of low pension benefit	Removal of GMI & low pension benefit
<i>AROP rate</i>	15.56%	17.88%	17.68%	19.83%
<i>AROP rate: elderly population</i>	21.71%	23.27%	31.56%	32.58%
<i>AROP gap</i>	14.05%	17.89%	17.41%	23.04%

Note: The AROP rate in the elderly population is the share of those aged 66 and over in households that fall below the at-risk-of-poverty line.

Source: EUROMOD calculations by authors.

Reform description

The reform considered in both cases would increase the thresholds, making more individuals eligible for the benefit and eligible for higher benefits.

In the case of the guaranteed minimum income (GMI), the removal of the benefit as earnings rise discourages additional work at the margin for low-income workers. This is currently included in the benefit system with the “working earnings disregard” amount. This amount is disregarded when calculating the GMI, and as a result, the GMI is reduced more slowly as earnings rise. The proposed policy reform increases the “working earnings disregard” thresholds, such that the GMI is removed more slowly as earnings rise. The exact reform proposal raises these thresholds as shown in Table 4.16, column B.

Table 4.16 – Working earnings disregard for working poor (*) (other than those aged 18-28)*Baseline and reform threshold*

Monthly earnings (above threshold) in euros – Baseline	Monthly earnings (above threshold) in euros - Reform	Retention rate
Up to 50	Up to 100	100%
51 – 200	101 – 400	40%
201 – 500	401 – 1000	20%
501 and above	1,001 and above	0%

(*) See text for explanation of “working earnings disregard”.

Source: Authors’ suggestions.

The current limit for entitlement to low pension benefit is 10,324 euros per year, which corresponds to 120% of the poverty line. In the reform proposal, this would be raised to 150% of the poverty line or 12,905 euros per year and all other thresholds would be raised by the same percentage. This is shown in Table 4.17.

Table 4.17 – Low pension benefit – Threshold for eligibility and amount*Baseline and reform*

Income threshold in euros per year – Baseline	Income threshold in euros per year – Reform	Low pension benefit in euros per month
5,162	6,453	220
5,678	7,098	210
6,195	7,744	200
6,711	8,389	190
7,227	9,034	180
7,742	9,678	160
8,259	10,324	150
8,775	10,969	140
9,291	11,614	130
10,324	12,905	95

Source: Authors’ suggestions.

Distributional impact assessment

The distributional impact of the reforms regarding income deciles is shown in Table 4.18 (in %) and table 4.19 (in absolute terms). The reforms are targeted at the low-income deciles. The GMI reform alone would raise the mean income among the poorest decile by 3.0%. The low pension benefit reform alone is less strictly targeted at the lowest incomes. For example, the 3rd decile would see mean incomes rise by 3.0% from the low pension benefit reform alone. The impact of this reform is overwhelmingly on the lower income deciles, though nonzero impacts are shown at higher income deciles due to the way in which the benefit is allocated.¹³²

Table 4.18 – Impact of reforms to (i) GMI, (ii) low pension benefit, and (iii) both
Income change by decile (mean equivalised income) in %

	Baseline (€ / month)	Threshold rise for GMI (% change)	Threshold rise for low pension benefit (% change)	Threshold rise for GMI & low pension benefit (% change)
<i>Decile 1</i>	608.28	3.0%	0.5%	3.5%
<i>Decile 2</i>	784.11	1.1%	1.9%	2.9%
<i>Decile 3</i>	913.19	0.8%	3.0%	3.8%
<i>Decile 4</i>	1,073.40	0.5%	0.8%	1.2%
<i>Decile 5</i>	1,242.69	0.1%	0.2%	0.3%
<i>Decile 6</i>	1,412.84	0.1%	0.1%	0.2%
<i>Decile 7</i>	1,590.35	0.0%	0.1%	0.2%
<i>Decile 8</i>	1,850.86	0.0%	0.0%	0.1%
<i>Decile 9</i>	2,249.82	0.0%	0.0%	0.1%
<i>Decile 10</i>	3,669.70	0.0%	0.0%	0.1%
<i>All</i>	1,539.10	0.3%	0.4%	0.7%

Source: EUROMOD calculations by authors.

¹³² For being eligible to the low pension benefit, there should be at least one pensioner in the household and the “tax unit” should have low income (equivalised). The tax unit is the claimant, his/her spouse and any dependent children. Note that this excludes other adults, who might form part of the household. This is different from the equivalised income deciles, where the entire household is considered. In a small number of cases, there are households with low-income pensioners living with higher income earners. For example, a low-income pensioner who moves in with his/her middle-income children would retain the benefit.

Table 4.19 – Impact of reforms to (i) GMI, (ii) low pension benefit, and (iii) both
Income change by decile (mean equivalised income) in absolute terms

	Baseline (€ / month)	Threshold rise for GMI (€ / month)	Threshold rise for low pension benefit (€ / month)	Threshold rise for GMI & low pension benefit (€ / month)
<i>Decile 1</i>	608.28	18.41	3.05	21.55
<i>Decile 2</i>	784.11	8.66	14.75	22.55
<i>Decile 3</i>	913.19	7.63	27.57	34.70
<i>Decile 4</i>	1,073.40	5.56	8.12	13.02
<i>Decile 5</i>	1,242.69	1.75	2.28	4.30
<i>Decile 6</i>	1,412.84	0.90	1.97	3.14
<i>Decile 7</i>	1,590.35	0.60	1.44	2.53
<i>Decile 8</i>	1,850.86	0.58	0.07	1.49
<i>Decile 9</i>	2,249.82	1.07	0.02	2.53
<i>Decile 10</i>	3,669.70	1.00	-0.78	4.91
All	1,539.10	4.62	5.93	10.54

Source: EUROMOD calculations by authors.

Both reforms reduce broad inequality measures and both the GMI and low-pension benefit reforms reduce the Gini by a similar amount in isolation (0.0025 and 0.0029). The S80/S20 would fall by 0.1269 if both reforms were implemented.

Table 4.20 – Impact of reforms to (i) GMI, (ii) low pension benefit, and (iii) both
Inequality measures

	Baseline	Threshold rise for GMI (difference)	Threshold rise for low pension benefit (difference)	Threshold rise for GMI & low pension benefit (difference)
<i>Disposable income - Gini</i>	0.2937	-0.0025	-0.0029	-0.0054
<i>Disposable income - S80/S20</i>	4.2466	-0.0749	-0.0705	-0.1269
<i>Disposable income - S80/S50</i>	2.2291	-0.0039	-0.0108	-0.0085
<i>Disposable income - S50/S20</i>	1.9072	-0.0709	-0.0597	-0.1185
<i>Disposable income - S40</i>	0.2195	0.0020	0.0026	0.0044

Source: EUROMOD calculations by authors.

At-risk-of-poverty (AROP) rates and the poverty gap would fall with the expanded programmes as shown in Table 4.21. The GMI reform alone would reduce the AROP rate to 14.91 % (from 15.56%) and the poverty gap to 12.89% (from 14.08%), and both reforms would reduce the AROP rate to 14.24% and the poverty gap to 13.22%. The low-pension benefit reform is targeted at households with pensioners and would reduce alone the AROP rate among these households from 21.71 % to 17.55 %.

Table 4.21 – Impact of reforms to (i) GMI, (ii) low pension benefit, and (iii) both
At-risk-of-poverty (AROP) rates and poverty gap

	Baseline	Threshold rise for GMI	Threshold rise for low pension benefit	Threshold rise for GMI & low pension benefit
<i>AROP rate (*)</i>	15.56%	14.91%	14.71%	14.24%
<i>AROP rate: elderly population</i>	21.71%	21.32%	17.55%	17.23%
<i>AROP gap</i>	14.08%	12.89%	14.37%	13.22%

(*) The AROP rate in the elderly population is the share of those aged 66 and over in households that fall below the at-risk-of-poverty line.

Source: EUROMOD calculations by authors.

The cost of the increases is shown in Table 4.22. Both reforms together would raise government expenditure on social transfers by 2.6 %, which amounts to 78 million euros or 0.38 % of GDP per year.

Table 4.22 – Impact of reforms to (i) GMI, (ii) low pension benefit, and (iii) both
Fiscal cost

	Baseline (millions of euros per year)	Threshold rise for GMI (% change)	Threshold rise for low pension benefit (% change)	Threshold rise for GMI & low pension benefit (% change)
<i>Government expenditure on social transfers</i>	3,011.0	1.0%	1.6%	2.6%

Source: EUROMOD calculations by authors.

Further considerations

Validation of the tools: the EUROMOD microsimulation model is internally validated by JRC-Seville before its release.

Quality of the production: implementing the reform in EUROMOD requires expertise with the model. The applications within EUROMOD allow for ready analysis of the main results of simulations.

Data: EUROMOD uses EU-SILC data, which are validated by Eurostat before release.

Main budget item: the reform exceeds 0.1 % of GDP in benefit increases.

Resources to produce DIA: production of these results requires a trained user of EUROMOD.

4.4.3. Advanced level of the EU Common Framework for DIA: Example 3: Italy - Reduction in personal income tax

Reform description

The reform is a reduction in personal income, implemented by raising the personal income tax (PIT) threshold by 1,000 euros. This means that the first €1,000 from the total annual taxable income of a person are not taxed in the reform while they are taxed at 23% in the baseline). The rest of the PIT remains unchanged, as shown in the table below.

Table 4.23 – Personal income tax brackets*Baseline and reform*

Tax bracket (taxable income in € per year)	Baseline rate	Reform rate
Up to 1,000	23%	0%
1,000 – 15,000	23%	23%
15,000 – 28,000	27%	27%
28,000 – 55,000	38%	38%
55,000 – 75,000	41%	41%
Above 75,000	43%	43%

Source: Authors' suggestions.

Tools used

The analysis uses the EUROMOD microsimulation model and the EDGE-M3 macroeconomic model. The reform can be split into three components: (i) the microsimulation; (ii) the tax function estimation (iii) the macroeconomic simulation, each of which are explained briefly here with details on the methodology available in Appendix 1.

The microsimulation model used is EUROMOD, from which one calculates the effective tax rates, both in the baseline and in the reform. The tax function estimation is then conducted on both sets of microsimulation output. This produces two tax functions, that relate to the baseline and to the reform, which are then run in the macroeconomic simulation. The advantage of the macroeconomic model is that it takes into account economy-wide effects and behavioural effects (especially with respect to labour supply decisions and savings decisions).

Distributional impact assessment

Starting with the EUROMOD results obtained from the static microsimulation, the results for disposable income by decile show that the largest relative changes in (mean) equivalised disposable income are in the middle deciles (Note that the changes in (mean) equivalised income in the table below take into account that many households contain multiple earners who may all benefit from some tax reduction due to this reform).

Table 4.24 – EUROMOD results – PIT reform (static microsimulation only)*Mean equivalised disposable income (euros per year)*

Decile	Baseline	Reform	Difference (reform less baseline)	% difference
1	7,971	7,993	22	0.28
2	14,222	14,320	98	0.69
3	18,798	18,962	164	0.87
4	21,200	21,419	219	1.04
5	24,255	24,504	249	1.03
6	28,624	28,915	291	1.02
7	32,645	32,968	323	0.99
8	37,744	38,097	353	0.93
9	45,399	45,782	383	0.84
10	75,050	75,437	387	0.52
All	31,033	31,285	252	0.81

Source: EUROMOD calculations by authors.

Regarding the inequality measures, the Gini index falls slightly and the S80/S20 rises slightly. Disaggregating this ratio, we see that the S80/S50 falls, while the S50/S20 rises, which implies that it is the middle of the distribution that is improving relative to the top or bottom. The share of income going to the poorest 40 % is unchanged.

Table 4.25 – EUROMOD results – PIT reform (static microsimulation only)*Inequality measures on disposable income*

	Baseline	Reform	Difference (reform less baseline)
Gini	0.3259	0.3256	0.000
S80 / S20	5.427	5.433	0.005
S80 / S50	2.278	2.269	-0.009
S50 / S20	2.383	2.394	0.011
S40	0.20330	0.20329	-0.00001

Source: EUROMOD calculations by authors.

Table 4.26 – Impact of PIT Reform(static microsimulation only)*At-risk-of-poverty (AROP) rates and poverty gap*

	Baseline	Reform	Difference (reform less baseline)
AROP rate	19.8%	19.5%	-0.3pp
AROP gap	6.3%	6.2%	-0.1pp

Source: EUROMOD calculations by authors.

Turning to the integrated micro-macro results using EUROMOD and EDGE-M3, the DIA output shows that disposable income rises for all deciles except the top decile. The increases range from 0.4 % for the second decile to 0.9 % for the fifth decile. The top decile experiences a small fall in disposable income of -0.1 %.

Table 4.27 – EDGE-M3 results – PIT reform*Mean equivalised disposable income (euros per year)(*)*

Decile	Baseline	Reform	Difference (reform less baseline)	% difference
1	6,484	6,528	44	0.68%
2	14,072	14,123	52	0.37%
3	18,481	18,550	70	0.38%
4	22,309	22,466	156	0.70%
5	27,580	27,820	239	0.87%
6	31,618	31,832	214	0.68%
7	34,746	34,985	240	0.69%
8	37,409	37,667	258	0.69%
9	44,704	44,973	268	0.60%
10	68,506	68,458	-48	-0.07%
All	30,591	30,740	149	0.49%

(*) The values in the baseline differ somewhat from the EUROMOD output because of the aggregates used in the macroeconomic model. The key result from the macroeconomic model is the percentage difference.

Source: EUROMOD calculations by authors.

The results are of similar size to those using EUROMOD alone. One difference is the somewhat higher gain among the bottom decile, which reflects the increase in labour supply in this group. Other deciles show a small fall in labour supply, which explains the smaller gains among some deciles.¹³³ The top decile shows a small fall in disposable income, which is due to the higher share of income they receive from capital income, as well as to the reform slightly negatively impacting the interest rate (small reduction in it) which lowers the return on assets.

The inequality measures first of all show a small reduction in the Gini index. The inter-quintile ratio, S80/S20, shows a fall of 0.4%. Decomposing this figure shows that the reduction is due to less inequality at the higher end of the distribution; the S80/S50 falls (the middle of the distribution improves relative to the top), while the S50/S20 rises slightly (the middle of the distribution improves relative to the bottom). The share of income going to the bottom 40 %, S40, rises slightly.

Table 4.28 – EDGE-M3 results – PIT reform

Inequality measures on disposable income ()*

	Baseline	Reform	Difference	% difference
Gini	0.249747	0.249353	0.000	-0.2%
S80 / S20	5.507517	5.482825	-0.025	-0.4%
S80 / S50	1.912397	1.899121	-0.013	-0.7%
S50 / S20	2.879902	2.887033	0.007	0.2%
S40	0.20054	0.20076	0.0002	0.1%

(*) The values in the baseline differ somewhat from the EUROMOD output because of the aggregates used in the macroeconomic model. The key result from the macroeconomic model is the percentage difference.

Source: EUROMOD calculations by authors.

The at-risk-of-poverty rate falls in this simulation. However, it falls by a smaller percentage than in the static EUROMOD analysis.

Table 4.29 – Impact of PIT Reform – EDGE-M3 results

At-risk-of-poverty (AROP) rate ()*

	Baseline	Reform	Difference	% difference
AROP rate	22.05%	21.94%	-0.11pp	-0.50%

(*) Differences in the EDGE-M3 and EUROMOD baselines are due to differences in the model agents and model behaviour. It is not possible to calculate the AROP gap in EDGE-M3 in a comparable way (see d’Andria et al., 2020, for more details).

Source: EDGE-M3 calculations by authors.

¹³³ The small reduction in labour supply (for some quantiles in much of their prime working age) is due to an income effect, where they choose a small increase in leisure (see Appendix to Section 4 for more details).

Further considerations

Validation of the tools: EUROMOD is internally validated by JRC-Seville before release. EDGE-M3 includes extensive testing modules to ensure that the model as a whole and the individual functions are performing as intended.

Quality of the production: Extensive training is required to be able to use the suggested suite of tools in this way.

Data: EUROMOD uses EU-SILC data, which are validated by Eurostat before release. The EDGE-M3 model uses a variety of reliable sources, with most data coming from Eurostat. Full details in d'Andria et al. (2020).

Main budget item: the reform foresees tax cuts for around 0.1 % of GDP.

Resources to produce DIA: models like EDGE-M3 require specialist teams that would need to keep them maintained over time.

4.4.4. Conclusions

In conclusion, using three examples of DIA on hypothetical reforms, this section has illustrated how the possible EU Common Framework for the use of DIA in official documents could be put into practice. These examples use progressively complex tools and the presentation of their DIA results follows the suggestions of the Framework. The first example concerns a personal income tax reform in Romania using the EUROMOD-JRC Interface and the second example concerns a GMI and low-income benefit reforms in Cyprus using the (full) EUROMOD microsimulation model. They serve as illustrations of the basic level of the Framework. The third example is a reduction in personal income tax in Italy using a microsimulation model linked to a macroeconomic model, which serves as an illustration of the advanced level of the Framework. This brief illustration exercise also demonstrates how DIA analyses can highlight the distributional impacts of hypothetical reforms and offer concretely useful information to policymakers.

4.5. Limitations of the study

This study has been conducted to provide high standards of robustness and soundness for its findings. However, there are some potential limitations for this study to take into account, such as:

- Many of the relevant documents related to the budgeting process in some Member States are either available only in the national language, only released internally or both. This has been addressed as much as possible through the thorough interview process of Member States' staff, which addressed these issues. Nevertheless, direct access to all original documents would have been the best option.
- It is difficult to be certain of exactly how each interviewee interprets each question as, for example, there may be different cultural interpretations between countries. Whilst considerable efforts have been made to mitigate this (by clarifying the questions as much as possible, sending them in advance to the interviewees, explaining them to the interviewees during the interviews as needed, as well as systematising the interviews' results to make them comparable across countries), some cultural or individual biases cannot be completely ruled out.
- Related to the above point is the extent to which a civil servant wishes to portray national practices. This could involve many practices, such as not wishing to fully disclose certain information or feeling the desire to present their institutional practices in a more favourable light. Whilst the carefully constructed questionnaire

minimises such effects, some questions inevitably invite the interpretation of the interviewee.

- The suggestions made in the study, including in the possible EU Common Framework for DIA use in official documents, aim to help interested Member States to increase and improve their use of DIA. They should therefore be seen as suggestions only, which the Member States can decide to implement or not, possibly also adapting or only implementing some of them.

5. Conclusions

As within-country income inequality has been increasing in the past four decades in many EU Member States, it becomes more important for policymakers to address it. In this perspective, DIA is an effective tool allowing an assessment of the impacts of policy reforms along the domestic income distribution, as highlighted in this study.

The aim of this study was to analyse the frequency and nature of DIA use in Member States (inside and outside the DBPs), to identify obstacles that prevent DIA inclusion in DBPs (and how to possibly alleviate them) as well as to assess the degree of similarity in the use of DIA use (among Euro Area Member States). It was also to provide concrete suggestions for increasing DIA use and further improving its quality in Member States.

Through thorough readings of the DBPs and systematic software-aided textual analysis of other key budgetary national documents of the Member states, it appeared that half of the Euro Area Member States did not include any DIA in their DBPs between 2015 and 2020. Only two countries (the Netherlands and Ireland) included DIA in DBPs in every year from 2015 to 2020. This does still not mean that most EU Member States do not conduct any DIA at all, as most of them included at least one DIA in some of their key budgetary documents outside DBPs (for Euro Area Member States) in recent years (or at least performed some DIA for these documents even if not including it in them). However, the frequency of DIA use differs between Member States and there is still progress to be made for almost all of them in using DIA more frequently for budgetary matters.

The interviews with the officials from the ministries responsible for DIA in the EU Member States shed more light on the obstacles that prevent the inclusion of DIA in DBPs (for Euro Area Member States) and helped to identify factors that could enable/incentivise it. The main obstacles (see Fig 3.11) are a lack of time due to the tight timeline of preparing DBPs, the complexity of the approval process for having DIA included in DPB, a lack of requests for DIA from the ministerial hierarchy as well as a limitation of qualified personnel capable of conducting DIA. With regard to the most significant enabling factors for the inclusion of DIA in DPB, Euro Area Member States mentioned the importance of the Commission providing: a web interface for a DIA software (note: such an interface, the EUROMOD-JRC Interface, is already available to Member States), (more) training on software for DIA (note: the JRC already provides regular trainings on EUROMOD) as well as guidance on DIA.

Based on the aforementioned findings, the study makes specific suggestions to the Commission and to Member States (depending on their frequency of DIA use) for increasing their use of DIA (in and outside DPBs). Most of these suggestions to Member States are further structured into a possible EU Common Framework for DIA use in official documents, which could serve as guidance to Member States interested in expanding their use of DIA as well as in ensuring its quality (also with the potential benefit of contributing to harmonise DIA results across Member States). This Framework - which provides an orientation to Member States on how to approach and (further) engage in DIA - is structured in two levels: a basic level and an advanced level. These two levels respectively provide suggestions reflecting good practices for DIA and best practices for DIA. The basic level is primarily aimed at those Member States which have not conducted any DIA yet (or that have little

DIA expertise) and can be fulfilled by using the EUROMOD model or even simply the EUROMOD-JRC Interface. The advanced level is aimed at those Member States that already conduct some DIA and that are interested in expanding their DIA use or in further improving its quality. It suggests, for instance, the use of richer data and of more sophisticated modelling techniques. To provide a clear picture on how DIA can be performed in line with the suggestions made in the Framework, three case studies of policy reforms are provided to give an illustration of the two levels of the Framework.

In conclusion, due to the still low number of DIA occurrences in DBPs, it is highly important for the EC to make Member States more aware of the importance of including DIA in their DBPs (for Euro Area Member States) and, more generally, to stimulate their use of DIA. This could contribute substantially to the distributional impacts of budgetary measures receiving more attention – most importantly while these measures are still in their design phase before a budget's adoption - thereby ensuring that they at least do not increase income inequality and poverty (if not even reducing them) and that they thus contribute to a rise in both social and economic welfare (and not only in the latter). However, the analysis points out that the EC should not seek to impose a specific methodology or template for DIA in an obligatory or normative manner, but rather seek to proactively reach out to Member states – if they are interested in it - to offer them supporting resources (workshops, trainings, tools, etc.) and guidance on DIA. Devised with this perspective in mind, the suggestions in this study are designed to support a fruitful DIA-related collaboration between EC and EU Member States, which would be tailored to their needs, capabilities and experience with DIA. As regards the findings of this study, the next steps would be – while also taking into account the actions on DIA mentioned in the European Pillar of Social Rights Action Plan – to communicate them further to Member States and to discuss with them how to best implement the study's suggestions, starting, for instance, by setting up workshops on DIA in EU or in single Member States.

References

- Acemoglu, D. (2002). Technical Change, Inequality, and the Labor Market. *Journal of Economic Literature*, 40(1), 7-72. Retrieved July 2, 2021, <http://www.jstor.org/stable/2698593>
- Acemoglu, D., and Autor, D. (2011). Skills, tasks and technologies: Implications for employment and earnings. In *Handbook of labor economics* (Vol. 4, pp. 1043-1171). Elsevier.
- Acemoglu, D., and Restrepo, P. (2019). Automation and new tasks: How technology displaces and reinstates labor. *Journal of Economic Perspectives*, 33(2), 3-30.
- Adams-Prassl, A., Boneva, T., Golin, M. and Rauth, C. (2020) Inequality in the Impact of the Coronavirus Shock: Evidence from Real Time Surveys, *IZA Discussion Paper* 13183.
- Alvaredo, F., Chancel, L., Piketty, T., Saez, E. and Zucman, G., (2018) World Inequality Report 2018, *World Inequality Database*, HUP, URL: <https://wir2018.wid.world/files/download/wir2018-full-report-english.pdf>
- Arnberg, S., Koch Helsø, A.-L. and Stephensen, P. (2018) Pension Wealth, Preference Heterogeneity and the Impact of Retirement Policies, DREAM Working paper, December 2018.
- Atkinson A. B. (1970) On the measurement of inequality. *Journal of Economic Theory*, 2(3):244–263
- Atkinson, A. B., Piketty, T. and Saez, E. (2011) Top incomes in the long run of history. *Journal of Economic Literature*, 49(1), 3-71.
- Azzolini, D., Bazzoli, M., De Poli, S., Fiorio, C., and Poy, S. (2017) Developing and Validating Regional Microsimulation Models. TREMOD: The Tax-Benefit Model of the Italian Province of Trento, *Economia Pubblica*, pages 5–33.
- Badenes-Plá, N. and Buenaventura-Zabala, J.M. (2017) The Spanish income tax reform of 2015: analysis of the effects on poverty and redistribution using microsimulation tools, *Public Sector Economics*, 41 (3).
- Barrios, S., Dolls, M. Maftai, A., Peichl, A. Riscado, S., Varga, J. and Wittneben, C. (2019) Dynamic scoring of tax reforms in the European Union, *Journal of Policy Analysis and Management*, 38(1), 239–262.
- Beirne, K., Doorley, K., Regan, M., Roantree, B. and Tuda, D. (2020) The potential costs and distributional effect of Covid-19 related unemployment in Ireland, *EUROMOD Working Paper Series EM5/20*
- Bonin, Holger and Reuss, Karsten and Stichnoth, Holger, Life-Cycle Incidence of Family Policy Measures in Germany: Evidence from a Dynamic Microsimulation Model (July 2015). SOEPpaper No. 770, Available at SSRN: <http://dx.doi.org/10.2139/ssrn.2630199>
- Bourguignon, F (1979), Decomposable income inequality measures. *Econometrica* 47, 901–920.
- Bourguignon, F., Bussolo, M. and Cockburn, J. (2010), Macro-Micro Analytics: Background, Motivation, Advantages and Remaining Challenges, *International Journal of Microsimulation*, 3 (1), pp. 1–7.
- Bourguignon, F., Spadaro, A. (2006) Microsimulation as a tool for evaluating redistribution policies. *Journal of Economic Inequality* 4, 77–106. <https://doi.org/10.1007/s10888-005-9012-6>
- Brunori, P., Maitino, M.R., Ravagli, L. and Sciclone, N. (2020) Distant and Unequal. Lockdown and inequalities in Italy, mimeo. Available online at: http://www.unicaldine.it/research/BMRS_2020.pdf

- Cantó, O., Figari, F., Fiorio, C.V., Kuypers, S., Marchal, S., Romaguera-de-la-Cruz, M., Tasseva, I.V. and Verbist, G. (2021), Welfare Resilience at the Onset of the COVID-19 Pandemic in a Selection of European Countries: Impact on Public Finance and Household Incomes. *Review of Income and Wealth*. <https://doi.org/10.1111/roiw.12530>
- Card, D., and DiNardo, J. E. (2002). Skill-biased technological change and rising wage inequality: Some problems and puzzles. *Journal of labor economics*, 20(4), 733-783.
- Conceição, P., and Ferreira, P. (2000). The young person's guide to the Theil index: Suggesting intuitive interpretations and exploring analytical applications.
- Cowell, F. (1980), On the structure of additive inequality measures. *Review of Economic Studies* 47, 521–531.
- Cowell, F., (2011), *Measuring Inequality*, 3 ed., Oxford University Press.
- Cowell, F. and Fiorio, C.V. (2011) Inequality decompositions—a reconciliation. *Journal of Economic Inequality* 9, 509–528.
- d'Andria Diego, Jason DeBacker, Richard W. Evans, Jonathan Pycroft, Wouter van der Wielen, Magdalena Zachłód-Jelec (2020) EDGE-M3: A Dynamic General Equilibrium Micro-Macro Model for the EU Member States, JRC Working Papers on Taxation and Structural Reforms No. 03/2020, European Commission.
- Dixon, P. B. and Jorgenson, D.W. (eds.) (2013) *Handbook of Computable General Equilibrium Modeling SET*, Vols. 1A and 1B, Elsevier.
- EUROMOD (2018) EUROMOD Modelling Conventions, EUROMOD Technical Note EMTN 1.1, Colchester: Institute for Social and Economic Research, University of Essex.
- European Commission (2015) Guidance on the content and format of the National Reform Programmes. Secretariat-General, Ares(2015)5723722, December.
- European Commission (2017) *Reflection Paper on the Social Dimension of Europe*, Bruxelles.
- European Commission (2019) *Reflection Paper Towards a Sustainable Europe by 2030*, Bruxelles.
- European Commission (2020) *Employment and Social Developments in Europe (ESDE)*, Bruxelles.
- Eurostat (2018) *Sustainable development in the European Union*. Monitoring report on progress towards the SDGS in an EU context. 2018 edition. Bruxelles
- Eurostat (2020) At-risk-of-poverty rate by poverty threshold, age and sex - EU-SILC and ECHP surveys. ([ilc_li02](#)). Accessed on May 12, 2020.
- Fiorio, C.V., Mohun, S., and Veneziani, R. (2020). Class, Power, and the Structural Dependence Thesis: Distributive Conflict in the UK, 1892-2018. *Political Studies*, online first <https://doi.org/10.1177/0032321720928259>.
- Figari, F., and Fiorio, C. V. (2015). Fiscal consolidation policies in the context of Italy's two recessions. *Fiscal Studies*, 36(4), 499-526.
- Figari, F. and Fiorio, C.V. (2020), Welfare resilience in the immediate aftermath of the Covid-19 outbreak in Italy, *Covid Economics* 8, 22 April 2020: 92-119, CEPR Press. Available online at: <https://cepr.org/sites/default/files/news/CovidEconomics8.pdf>
- Foster, J., Greer, J. and Thorbecke, E. (1984) A class of decomposable poverty measures. *Econometrica* 52, 761–776.
- Fuest, Clemens, Andreas Peichl, and Sebastian Siegloch (2018) Do Higher Corporate Taxes Reduce Wages? Micro Evidence from Germany. *American Economic Review*, 108 (2): 393-418. DOI: 10.1257/aer.20130570.
- Galor, O., and Moav, O. (2000). Ability-biased technological transition, wage inequality, and economic growth. *The quarterly journal of economics*, 115(2), 469-497.

- Harberger, Arnold C. (1962) The Incidence of the Corporate Income Tax, *Journal of Political Economy*, 70:3, June, pp. 215-240.
- Harberger, Arnold C. (1994) The ABCs of Corporate Tax Incidence: Insights into the Open-Economy Case, Prepared for Symposium of the American Council for Capital Formation Center for Policy Research, Tax Policy and Economic Growth, June 8.
- International Monetary Fund (2020). *World Economic Outlook*. Chapter 1. The Great Lockdown.
- Jenkins, S.P., Brandolini, A., Micklewright, J. and Nolan, B. (2013) The Great Recession and the Distribution of Household Income, *Oxford University Press, Oxford*.
- Joint Committee on Taxation (2013) Modeling the Distribution of Taxes on Business Income. JCX-14-13. Washington, DC: Joint Committee on Taxation. Available online at: <https://www.ict.gov/publications/2013/jcx-14-13>.
- Kakwani, N. C., "Measurement of Tax Progressivity: An International Comparison," *Economic Journal*, 87, 71– 80, 1977.
- Livemore, M. A. and Rosenberg. J. S. (2014) L'analyse distributive dans les études d'impact, ou comment prendre en compte la répartition des conséquences d'une réglementation, *Revue française d'administration publique*, 149(1), 145-161. DOI : 10.3917/rfap.149.0145.
- Manning, C. and Schutze, H. (1999). *Foundations of Statistical Natural Language Processing*. Cambridge, MA: MIT Press. ISBN 978-0-262-13360-9
- Lambert, Peter, J., (2011): *The Distribution and Redistribution of Income*. third edition, Manchester.
- University Press Nearchou, Paris and Costas Stavrakis (2020) EUROMOD Country Report – Cyprus, November. Available here: <https://euromod-web.jrc.ec.europa.eu/resources/country-reports>.
- Nunns, Jim (2012) How TPC Distributes the Corporate Income Tax, Urban Institute and Urban Brooking Tax Policy Center, September.
- O'Donoghue, C., Sologon, D.M., Kyzyma, I. and McHale, J. (2020) Modelling the Distributional Impact of the COVID-19 Crisis, *IZA Discussion Paper* 13235.
- Piazzalunga, D. and Di Tommaso, M. L. (2019) The Increase of the Gender Wage Gap in Italy during the 2008-2012 Economic Crisis, *Journal of Economic Inequality*, 17(2), 171-193.
- Reynolds, M. and E. Smolensky, *Public Expenditures, Taxes and the Distribution of Income: The United States, 1950, 1961, 1970*, Academic Press, New York, 1977.
- Roeger, W., Varga, J., in 't Veld, J. and Vogel, L. (2019). *A Model-Based Assessment of the Distributional Impact of Structural Reforms*, Discussion paper 091, Directorate General Economic and Financial Affairs (DG ECFIN), European Commission. URL: https://ec.europa.eu/info/publications/model-based-assessment-distributional-impact-structural-reforms_cs.
- Shorrocks, A.F. (1980), The class of additively decomposable inequality measures. *Econometrica* 48, 613–625.
- Shorrocks, A.F. (1982), Inequality decomposition by factor components. *Econometrica* 50(1), 193–211.
- Sutherland, H. and Figari, F. (2013) EUROMOD: the European Union tax-benefit microsimulation model. *International Journal of Microsimulation*, 6(1),4-26.
- United Nations (2015) *Transforming Our World: The 2030 Agenda for Sustainable Development*. Sustainable Development Knowledge Platform. United Nations. Available

online

at:

<https://sustainabledevelopment.un.org/post2015/transformingourworld/publication>.

Vergolini, L. (2011) Social cohesion in Europe: How do the different dimensions of inequality affect social cohesion?. *International Journal of Comparative Sociology*, 52(3), 197-214.

Appendix

Table A1 – Interviews conducted

MS	Interviewers	Entity of the interviewees
Austria	Research Team	Ministry of Finance
Belgium	Research Team	Ministry of Finance, Federal Planning Bureau, Federal Public Service Social security
Bulgaria	Local expert	Not disclosed
Croatia	Local expert	Ministry of Finance
Cyprus	Research Team	Ministry of Finance
The Czech Republic	Research Team	Czech Fiscal Council and Ministry of Finance
Denmark	Research Team	Ministry of Finance
Estonia	Local expert	Ministry of Finance
Finland	Research Team	Ministry of Finance
France	Research Team	Ministry of Finance
Germany	Research Team	Ministry of Finance and Fraunhofer Institute for Applied Information Technology
Greece	Research Team	Council of Economic Advisors
Hungary	Local expert	Ministry of Finance
Ireland	Research Team	Department of Finance
Italy	Research Team	Ministry of Economy and Finance
Latvia	Local expert	Ministry of Finance
Lithuania	Local expert	Ministry of Finance
Luxembourg	Local expert	Ministry of Finance
Malta	Research Team	Ministry for Finance and employment
The Netherlands	Research Team	Ministry of Finance and Ministry of Social Affairs and Employment
Poland	Local expert	Ministry of Finance
Portugal	Research Team	Ministry of Finance
Romania	Research Team	Ministry of Finance
Slovakia	Research Team	Ministry of Finance
Slovenia	Research Team	Ministry of Finance
Spain	Research Team	Ministerio de Hacienda
Sweden	Research Team	Ministry of Finance

Table A2 – Detailed and aggregated list of policy areas

Policy area	Aggregated policy areas
Public finances	Economic and financial affairs
Public debt	Economic and financial affairs
Financial stability	Economic and financial affairs
Banks and loans	Economic and financial affairs
Access to credit	Economic and financial affairs
Capital market	Economic and financial affairs
Labour market	Employment, social policies, welfare and health
Employment and welfare	Employment, social policies, welfare and health
Employability	Employment, social policies, welfare and health
Employment	Employment, social policies, welfare and health
Welfare and social exclusion	Employment, social policies, welfare and health
Family support	Employment, social policies, welfare and health
Poverty and inclusion	Employment, social policies, welfare and health
Education	Education and training
Training	Education and training
Skills	Education and training
Health	Employment, social policies, welfare and health
Investments	Competitiveness, innovation, and simplification
Transports and logistics	Transports, logistics, and infrastructures
Environmental protection/environmental policies	Environment and energy policy
Simplification	Competitiveness, innovation, and simplification
Energy efficiency	Environment and energy policy
Reducing emissions	Environment and energy policy
Renewable energy	Environment and energy policy
Digital technologies	Competitiveness, innovation, and simplification
Technological infrastructure	Competitiveness, innovation, and simplification
Regional disparities	Regional and cities policy
Restoring territorial balance	Regional and cities policy
Renewal of urban areas	Regional and cities policy
Competitiveness	Competitiveness, innovation, and simplification
Competition	Competitiveness, innovation, and simplification
Public administration	Public administration
Public Administration efficiency	Public administration
Judicial system	Justice and home affairs
European fund	EU general affairs
Infrastructures	Transports, logistics, and infrastructures
Research and development	Competitiveness, innovation, and simplification
Innovation	Competitiveness, innovation, and simplification

Note: The proposed aggregation is based on adaption of the list available at <https://www.government.se/sweden-in-the-eu/eu-policy-areas>

Table A3 – Number of DIA occurrences in the DBPs in the period 2015-2020 for the Euro Area Member States with at least one DIA occurrence by type (revenue or expenditure) and policy areas of the measures

MS	Year	N DIA	E/R	Policy area	Aggregated policy area
AT	2016	1	R	Welfare and social inclusion	Employment, social policies, welfare and health
EE	2018	1	R	Employment and welfare	Employment, social policies, welfare and health
EE	2019	1	R	Employment and welfare	Employment, social policies, welfare and health
EL	2019	1	E	Family support	Employment, social policies, welfare and health
EL	2019	1	R	Welfare and social inclusion	Employment, social policies, welfare and health
EL	2019	1	R	Capital market	Economic and financial affairs
EL	2019	1	R	Employment and welfare	Employment, social policies, welfare and health
EL	2020	1	E	Family support	Employment, social policies, welfare and health
EL	2020	1	R	Welfare and social inclusion	Employment, social policies, welfare and health
EL	2020	1	R	Employment and welfare	Employment, social policies, welfare and health
EL	2020	1	R	Simplification	Competitiveness, innovation, and simplification
FI	2019	1	R	Welfare and social inclusion	Employment, social policies, welfare and health
FI	2019	1	E	Welfare and social inclusion	Employment, social policies, welfare and health
FI	2019	1	E	Family support	Employment, social policies, welfare and health
FI	2019	1	E	Education	Education and training
FI	2019	2	R	Welfare and social inclusion	Employment, social policies, welfare and health
FI	2019	2	R	Energy efficiency	Environment and energy policy
FI	2019	2	E	Welfare and social inclusion	Employment, social policies, welfare and health
FI	2019	2	E	Family support	Employment, social policies, welfare and health
FI	2019	2	E	Education	Education and training
FI	2019	2	R	Health	Employment, social policies, welfare and health
FI	2019	3	R	Welfare and social inclusion	Employment, social policies, welfare and health
FI	2019	3	E	Welfare and social inclusion	Employment, social policies, welfare and health
FI	2019	3	E	Family support	Employment, social policies, welfare and health
FI	2019	3	E	Education	Education and training
FR	2018	1	E	Family support	Employment, social policies, welfare and health
FR	2018	1	R	Welfare and social inclusion	Employment, social policies, welfare and health

Table A3 – (continue)

MS	Year	N DIA	E/R	Policy area	Aggregated policy area
FR	2018	1	E	Welfare and social inclusion	Employment, social policies, welfare and health
FR	2018	1	E	Employment and welfare	Employment, social policies, welfare and health
FR	2018	1	R	Employment and welfare	Employment, social policies, welfare and health
FR	2018	2	E	Family support	Employment, social policies, welfare and health
FR	2018	2	R	Energy efficiency	Environment and energy policy
FR	2018	2	R	Welfare and social inclusion	Employment, social policies, welfare and health
FR	2018	2	E	Welfare and social inclusion	Employment, social policies, welfare and health
FR	2018	2	E	Employment and welfare	Employment, social policies, welfare and health
FR	2018	2	E	Energy efficiency	Environment and energy policy
FR	2018	2	R	Employment and welfare	Employment, social policies, welfare and health
FR	2018	2	R	Health	Employment, social policies, welfare and health
FR	2020	1	E	Health	Employment, social policies, welfare and health
FR	2020	1	E	Energy efficiency	Environment and energy policy
FR	2020	1	E	Employment and welfare	Employment, social policies, welfare and health
FR	2020	1	E	Family support	Employment, social policies, welfare and health
FR	2020	1	R	Welfare and social inclusion	Employment, social policies, welfare and health
FR	2020	1	R	Energy efficiency	Environment and energy policy
FR	2020	1	R	Health	Employment, social policies, welfare and health
FR	2020	1	E	Welfare and social inclusion	Employment, social policies, welfare and health
FR	2020	1	R	Family support	Employment, social policies, welfare and health
FR	2020	1	R	Employment and welfare	Employment, social policies, welfare and health
IE	2015	1	R	Welfare and social inclusion	Employment, social policies, welfare and health
IE	2015	1	R	Employment and welfare	Employment, social policies, welfare and health
IE	2015	1	E	Family support	Employment, social policies, welfare and health
IE	2016	1	R	Welfare and social inclusion	Employment, social policies, welfare and health
IE	2016	1	R	Employment and welfare	Employment, social policies, welfare and health
IE	2016	1	E	Family support	Employment, social policies, welfare and health
IE	2017	1	R	Welfare and social inclusion	Employment, social policies, welfare and health
IE	2017	1	R	Employment and welfare	Employment, social policies, welfare and health
IE	2017	1	E	Family support	Employment, social policies, welfare and health

Table A3 – (continue)

MS	Year	N DIA	E/R	Policy area	Aggregated policy area
IE	2018	1	R	Welfare and social inclusion	Employment, social policies, welfare and health
IE	2018	1	R	Employment and welfare	Employment, social policies, welfare and health
IE	2018	1	E	Family support	Employment, social policies, welfare and health
IE	2019	1	R	Welfare and social inclusion	Employment, social policies, welfare and health
IE	2019	1	R	Employment and welfare	Employment, social policies, welfare and health
IE	2019	1	E	Family support	Employment, social policies, welfare and health
IE	2020	1	R	Welfare and social inclusion	Employment, social policies, welfare and health
IE	2020	1	R	Employment and welfare	Employment, social policies, welfare and health
IE	2020	1	E	Family support	Employment, social policies, welfare and health
LT	2017	1	R	Employment and welfare	Employment, social policies, welfare and health
LT	2019	1	R	Welfare and social inclusion	Employment, social policies, welfare and health
LT	2019	2	E	Family support	Employment, social policies, welfare and health
LV	2018	1	R	Welfare and social inclusion	Employment, social policies, welfare and health
LV	2018	1	E	Employment and welfare	Employment, social policies, welfare and health
MT	2017	1	E	Welfare and social inclusion	Employment, social policies, welfare and health
MT	2017	2	R	Welfare and social inclusion	Employment, social policies, welfare and health
MT	2017	3	E	Employment and welfare	Employment, social policies, welfare and health
MT	2017	4	E	Employment and welfare	Employment, social policies, welfare and health
MT	2017	4	R	Welfare and social inclusion	Employment, social policies, welfare and health
MT	2017	4	E	Welfare and social inclusion	Employment, social policies, welfare and health
MT	2018	1	R	Welfare and social inclusion	Employment, social policies, welfare and health
NL	2015	1	E	Family support	Employment, social policies, welfare and health
NL	2015	1	R	Welfare and social inclusion	Employment, social policies, welfare and health
NL	2015	1	R	Employment and welfare	Employment, social policies, welfare and health
NL	2015	1	E	Welfare and social inclusion	Employment, social policies, welfare and health
NL	2015	1	E	Health	Employment, social policies, welfare and health
NL	2016	1	E	Family support	Employment, social policies, welfare and health
NL	2016	1	E	Health	Employment, social policies, welfare and health
NL	2016	1	R	Welfare and social inclusion	Employment, social policies, welfare and health
NL	2017	1	R	Welfare and social inclusion	Employment, social policies, welfare and health

Table A3 – (continue)

MS	Year	N DIA	E/R	Policy area	Aggregated policy area
NL	2017	1	E	Health	Employment, social policies, welfare and health
NL	2017	1	E	Family support	Employment, social policies, welfare and health
NL	2018	1	E	Family support	Employment, social policies, welfare and health
NL	2018	1	E	Health	Employment, social policies, welfare and health
NL	2018	1	E	Welfare and social inclusion	Employment, social policies, welfare and health
NL	2018	1	R	Welfare and social inclusion	Employment, social policies, welfare and health
NL	2019	1	R	Welfare and social inclusion	Employment, social policies, welfare and health
NL	2019	1	E	Welfare and social inclusion	Employment, social policies, welfare and health
NL	2019	1	E	Employment and welfare	Employment, social policies, welfare and health
NL	2019	1	R	Employment and welfare	Employment, social policies, welfare and health
NL	2020	1	R	Welfare and social inclusion	Employment, social policies, welfare and health
NL	2020	1	E	Welfare and social inclusion	Employment, social policies, welfare and health
NL	2020	1	E	Employment and welfare	Employment, social policies, welfare and health
NL	2020	1	R	Employment and welfare	Employment, social policies, welfare and health

Note: Tax policy is not included as a policy area as the distinction between revenue and expenditure measures has been used.

Figure A2 – Example of a DIA occurrence from the 2020 Draft Budget Plan of the Netherlands

8. Distributional impact of most important expenditure and revenue measures

Thanks to rising wages and lower taxes on labour, purchasing power is set to grow in 2020. The median (static) purchasing power is expected to rise by 2.1% in 2020. Next year working household purchasing power will grow the most, by 2.4%, but pensioners and benefit recipients will also see strong development in their purchasing power, with an expected increase of 1.2% in purchasing power for both groups. Not only do wage increases provide for additional disposable income, but the government is also reducing taxes which will give purchasing power a positive boost. This relates to measures which were already planned in the Coalition Agreement, and also additional purchasing power measures taken in August. As a result of the tax-relief measures, the marginal tax rate households face will be reduced in 2020. Aside from the tax-relief measures, which are mainly aimed at boosting incomes of the working middle class, the government has also paid special attention to the lower end of the distribution. For example, government benefits and the general tax credit will be increased in 2020 for the benefit of low-income households. The following table shows the total development in purchasing power. This does not differentiate the effect of government policy, because both the Coalition Agreement as well as current decision-making and economic expectations have an impact on developments in purchasing power.

Table 8. Development in purchasing power for various household groups (%)

	2020
Income group	
1 st quintile (0-20%)	1.4
2 nd	1.9
3 rd	2.2
4 th	2.4
5 th quintile (81-100%)	2.4
Source of income	
Working households	2.4
Benefit recipients	1.2
Pensioners	1.2
Household type	
Double-income households	2.3
One-person households	1.8
Single-income households	2.2
Family composition	
With children	2.6
Without children	2.2
All households	2.1

Table A4 – List of DIA keywords for text mining

DIA-related words	Words strictly related to DIA
<p>arop rates, arop rate, arop, arope, assessment, assessing, , atkinson, benefit, benefits, bonferroni, coefficient of variation, variation coefficient, decomposition, decile, decile ratio, decile share, deprivation, dispersion, dia, dynamic model, dynamic models, distribution, distributional, distributional effect, distributional impact, distributive, disposable income, taxable income, equally distributed, distributed equally, equality, equity, equivalised disposable income, equivalized disposable income, equivalised household income, equivalized household income, equivalized income, equivalised income, EUROMOD, europe 2020, europe2020, fair, fairness, fiscal impact, fgt(0), fgt0, fgt(1), fgt1, fgt(2), fgt2, ge(0), ge0, ge(1), ge1, ge(2), ge2, general entropy, generalized entropy, generalised entropy, gini, headcount, headcount ratio, head-count ratio, head-count, hoover, inequality, low-income, low income, middle class, middle-income, middle income, income, income losses, income loss, income share, inequality, inequalities, labor supply behavior, labour supply behaviour, elasticity, elasticities, lorenz, lorenz curve, mean log deviation, microsimulation, micro-simulation, overlapping generation model, olg, OECD-adjusted equivalence, OECD adjusted equivalence, OECD equivalent, percapita, per capita, pietra, poor, poverty, poverty gap, poverty index, poverty indices, poverty line, poverty risk, risk of poverty, poverty reduction, poverty increase, poverty target, progressivity, purchasing power, quintile, quintile ratio, quintile share, quantile, quantile ratio, quantile share, redistribution, redistributive effect, redistributive impact, rich, robin hood, reynolds-smolenski, reynolds smolenski, s80/s20 indicator, schutz, simulation, simulations, static model, tax benefit microsimulation, tax-benefit microsimulation, tax-benefit, tax benefit, tax benefits, theil, income transfers, income transfer, social inclusion, social transfers, social transfer, social contributions, socio-economic, means-tested transfers, gains, gain, loss, losses, unequal, vulnerable, vulnerabilities, vulnerability, wealth, winners, losers</p>	<p>arop rates, arop rate, arop, arope, atkinson, decomposition, decile ratio, decile share, dispersion, dia, distributional effect, distributional impact, equally distributed, distributed equally, equality, EUROMOD, fairness, fgt(0), fgt0, fgt(1), fgt1, fgt(2), fgt2, ge(0), ge0, ge(1), ge1, ge(2), ge2, general entropy, generalized entropy, generalised entropy, gini, headcount ratio, head-count ratio, head-count, hoover, inequality, income losses, income loss, income share, inequality, lorenz, lorenz curve, mean log deviation, overlapping generation model, olg, oecd-adjusted equivalence, oecd adjusted equivalence, oecd equivalent, poverty gap, poverty index, poverty indices, poverty risk, risk of poverty, progressivity, quintile ratio, quintile share, quantile ratio, quantile share, redistribution, redistributive effect, redistributive impact, robin hood, reynolds-smolenski, reynolds smolenski, s80/s20 indicator, schutz, tax benefit microsimulation, tax-benefit microsimulation, theil, winners, losers</p>

Table A5 – Link to the national documents in which DIA is performed

MS	Links
AT	https://tinyurl.com/k89wab7p https://tinyurl.com/3rsv28np https://tinyurl.com/32s72u9s https://tinyurl.com/2rfzhjcc https://tinyurl.com/4dv8u7sj https://tinyurl.com/bat6hhuh
BE	https://tinyurl.com/r46tnuyt https://tinyurl.com/4ehteybz https://www.dc2019.be/index_nl.html https://www.hogeraadvanfinancien.be/nl/publications?section=2 https://tinyurl.com/s3nad3ex https://socialsecurity.belgium.be/en/shaping-social-policy/belmod-project
BG	<i>None of them are public, only internal reports</i>
CY	<i>Not applicable (no DIA)</i>
CZ	https://tinyurl.com/dsmdmbb7
DK	https://www.retsinformation.dk/eli/ft/201112L00194 https://www.retsinformation.dk/eli/ft/201712L00238 https://www.ft.dk/samling/20201/lovforslag/l1/spm/68/svar/1705356/2269254.pdf https://www.ft.dk/samling/20201/lovforslag/l1/spm/99/svar/1730740/2309815.pdf
DE	<i>Links not released</i>
EE	<i>Links not released</i>
EL	<i>None of them are public, only internal reports</i>
ES	https://doi.org/10.1016/j.euroecorev.2020.103469 https://tinyurl.com/33ek32yw https://tinyurl.com/nbdh7twf
FI	https://tinyurl.com/xnjpk6b5 https://tinyurl.com/54cywp3m https://tinyurl.com/3tvzjb6k https://tinyurl.com/524ymf93
FR	https://tinyurl.com/v8yaxyyy https://tinyurl.com/au86p3zs https://tinyurl.com/23er3f4m https://tinyurl.com/24xdeyd4 https://tinyurl.com/sjdebfsh
HR	https://tinyurl.com/4pbchc78 https://tinyurl.com/3tnzndnc
HU	<i>None of them are public, only internal reports</i>

Table A5 – (continue)

MS	Links
IE	https://tinyurl.com/e2rcz48m https://tinyurl.com/sfrerur7 https://tinyurl.com/4cf3pk5e https://tinyurl.com/5a7bct58
IT	https://www.finanze.gov.it/it/il-dipartimento/collana-di-lavori-e-di-ricerca/working-papers https://tinyurl.com/y6kkjav4 https://www.mef.gov.it/inevidenza/2020/0462/Relazione-BES_2020_pub.pdf https://www.mef.gov.it/ministero/comitati/CBES/index.html
LT	https://socmin.lrv.lt/lt/veiklos-sritys/tyrimai/ministerijos-atlikti-tyrimai https://lrv.lt/lt/aktuali-informacija/xvii-vyriausybe/prioritetiniai-darbai/strukturines-reformas https://tinyurl.com/udktdtxm http://www.socmodelis.lt/ https://e-seimas.lrs.lt/portal/documentSearch/lt
LU	<i>Not applicable (no DIA)</i>
LV	https://likumi.lv/doc.php?id=291013
MT	https://finance.gov.mt/en/epd/Pages/WorkingPapers.aspx
NL	https://www.rijksoverheid.nl/documenten/begrotingen/2020/09/15/miljoenennota-2021
PL	<i>Links not released</i>
PT	https://tinyurl.com/nnx2v34c
RO	<i>Not applicable (no DIA)</i>
SE	https://tinyurl.com/9epkck7w https://tinyurl.com/4tsc6yvc https://tinyurl.com/2khzkxer
SI	<i>Links not released</i>
SK	Expenditure imputation and microsimulation of VAT - Rada pre rozpočtovú zodpovednosť (rrz.sk) https://www.rozpoctovarada.sk/vo_download/ko_2019_05_nczd.pdf https://tinyurl.com/zu8zbspw

Appendix to Section 4

Appendix 1: Advanced EU Common Framework Example: Italy – Reduction in personal income tax – Additional model details and results

The validation exercise in Section 4.4.3. showed a simulated reduction in personal income tax in Italy. The reform was first simulated with the EUROMOD microsimulation model and then with the EDGE-M3 macroeconomic model. For the sake of clarity, Section 4.4.3. focused on the distributional impact assessment results. In this Appendix, more details of the EDGE-M3 model are presented together with how it is linked with the EUROMOD microsimulation model and the simulation results for households.

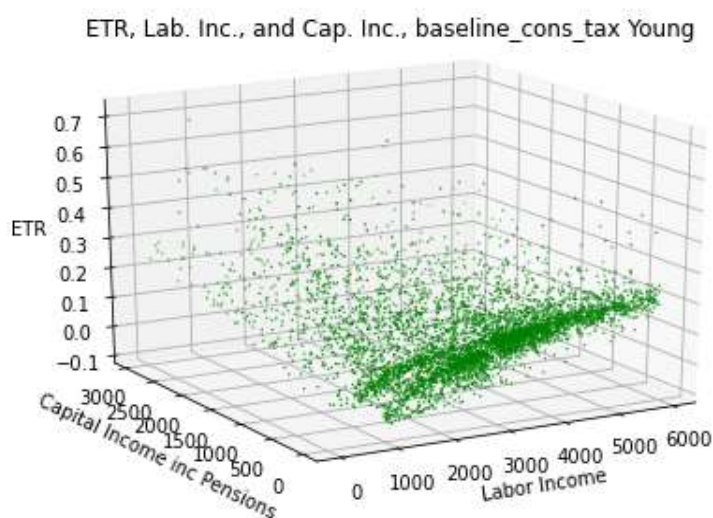
Implementing the reform in EDGE-M3

The analysis uses the EUROMOD microsimulation model and the EDGE-M3 overlapping generations model. The reform can be split into three components: (i) the microsimulation; (ii) the tax function estimation; (iii) the macroeconomic simulation.

- Microsimulation: PIT reform is run in the EUROMOD microsimulation model.

The key output is the effective tax rate (ETR) dependent on labour income and capital income (including pension income). This can be represented in the following figures showing the baseline and reform outputs.

Figure A3 – Scatterplot of the effective tax rate (ETR), monthly labour income and monthly capital income (including pensions) - baseline

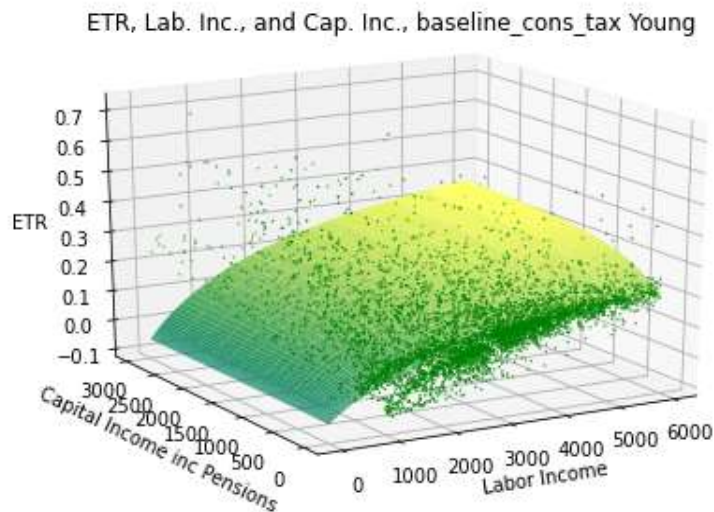


- Tax function estimation: The EUROMOD output is used to re-estimate the tax function for the EDGE-M3 macroeconomic model.

The baseline tax function is shown in Figure A4. The function captures salient features of the underlying microdata and hence the tax system itself. The effective tax rate function, ETR, is increasing in both labour and capital income. As labour income increases, the ETR increases at a diminishing rate. From any given labour income, higher capital income raises

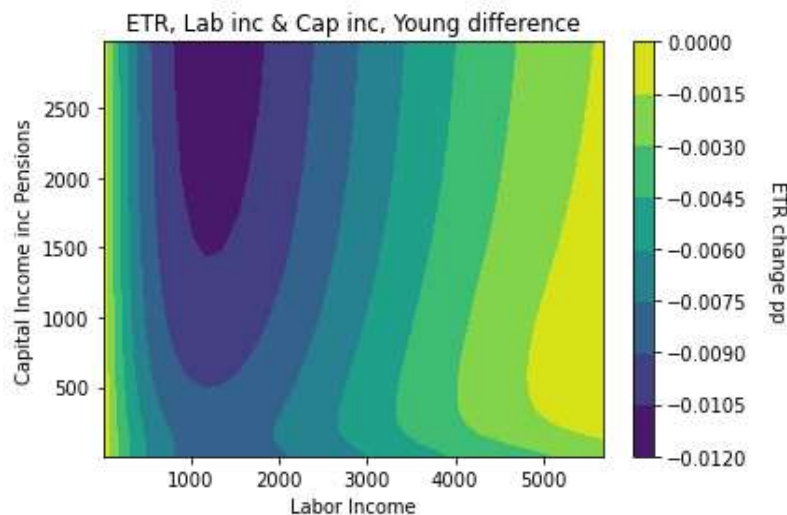
the estimated ETR somewhat, though this dimension is reasonably flat for higher capital incomes.

Figure A4 – Estimated tax function for scatterplot of the effective tax rate (ETR), monthly labour income and monthly capital income (including pensions) - baseline



Turning to the reform tax function and how it compares to the baseline tax function shown in Figure A4, the change in the microsimulation output between the baseline and the reform causes a change in the estimated tax function. The difference is hard to see by simple inspection, and so the following heat map (Figure A5) has been produced which shows the difference between the tax functions – reform minus baseline.

Figure A5 – Difference between ETR functions, by monthly labour income and monthly capital income – reform minus baseline



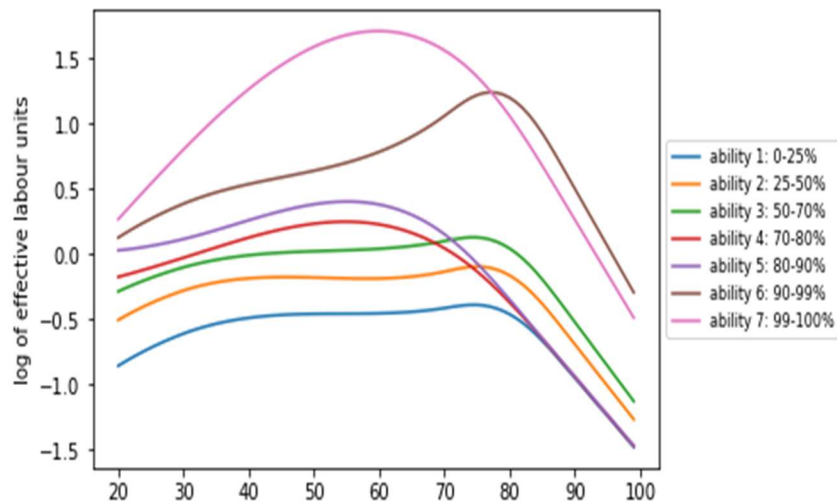
As anticipated, the primary change is in the labour income dimension, where those earning slightly above 1,000 euros per month benefit the most (approximately a 1 percentage point tax cut). As income rises, the impact of the threshold rise is reduced. The same is true as labour income falls, with those on very low labour incomes receiving less benefit. In the other dimension, capital income including pensions, there is an additional fall in ETR for those with a higher capital income, especially for those with around 1,000 to 1,500 euros of labour income. Overall, this demonstrates how this methodology can capture the key features of a tax reform using the microsimulation output data.

- Macroeconomic simulation: The EDGE-M3 model is run with the new tax function.

The EDGE-M3 model is run with the new tax function. The full documentation of the EDGE-M3 model is available in d’Andria et al. (2020). The following introduces some central features to allow the reader to interpret the main results.

The model allows for agent heterogeneity across ages and lifetime earnings-ability profiles. This allows the model to capture the richness of the cross-sectional and intergenerational distributions over income, wealth, labour supply and other endogenous variables. There are seven earnings-ability groups in the model. These groups refer to deterministic lifetime earnings-ability paths, which are shown in Figure A6. New cohorts of agents in the model are randomly assigned to each group and there is no mobility between groups. The groups are not of equal size: the first group represents the earnings ability path for up to the 25th percentile, the next for the 25th to 50th percentile, then for 50th to 70th, 70th to 80th, 80th to 90th, 90th to 99th and finally, the top group is for those workers with the highest percent of earnings ability. Splitting earnings-ability groups in this way allows us to focus on the highest earners, especially the top one percent. The earnings-ability paths are estimated econometrically.

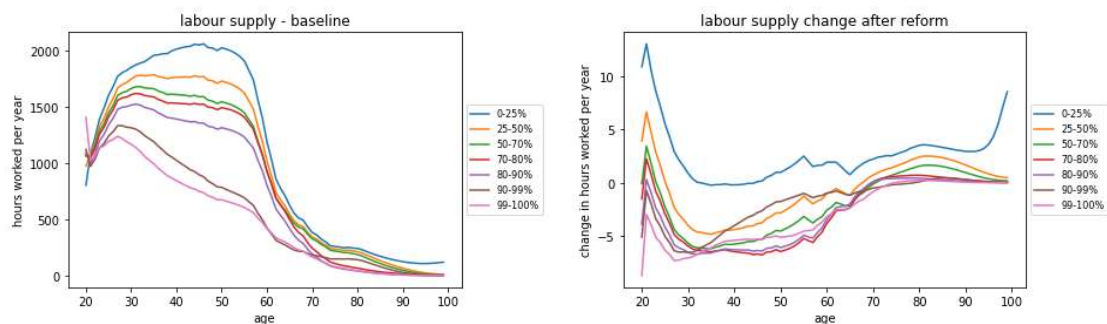
Figure A6 – Earnings-ability groups by age (20-99)



Macroeconomic results: labour supply, consumption and savings

In the macroeconomic model, the key choices that households make at each age over their lifetime is how much labour to supply and how much of their income is consumed or saved. The following figures summarise the outcomes in these areas.

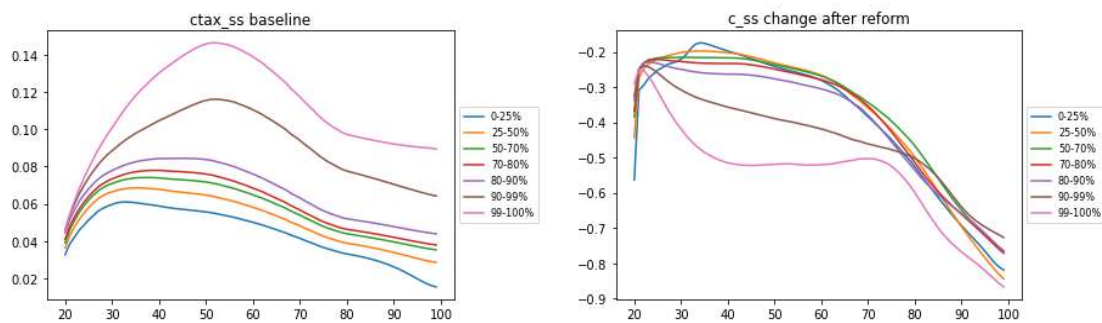
Figure A7 – Labour supply: baseline by age and earnings-ability types (left) and percentage change after reform (right)



Note: Labour supply is calibrated such that the average hours worked in a year by age matches the official data.

Figure A7 (left) shows the baseline labour supply by age and earnings-ability type. It shows the typical pattern of employment throughout a lifetime, where employment hours peak between the ages of the mid-20s until those of the late-50s. It also shows that those with a higher earning ability choose to work fewer hours (and so consume more leisure). Figure A7 (right) shows the change in employment due to the reform. It is important to recognise that the changes in employment are minor (of the order of one-quarter of one percent). The small reduction throughout much of the prime working ages comes from the combination of the threshold rise, which raises the average income and the mostly unchanged marginal tax rates, resulting in a small shift towards choosing more leisure and less work.

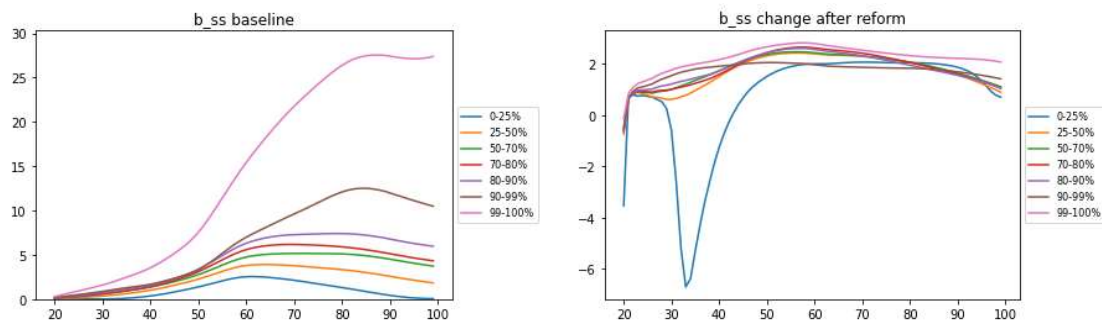
Figure A8 – Consumption: baseline by age (20-99) and earnings-ability types (left) and percentage change after reform (right)



Note: Consumption is presented in model units, which have been calibrated such that the average value matches the average consumption for an Italian household.

In what follows, it is also assumed for this reform that the government balance is maintained by raising consumption tax rates. Figure A8 (left) shows the baseline consumption by age and earnings-ability type. It shows how the model agents choose a smoothed consumption path across their lifetime. Figure A8 (right) shows the change in consumption due to the tax reform. The consumption tax rise induces a general reduction in consumption for all ages and ability types. This is more pronounced for the highest ability types and older ages.

Figure A9 – Stock of savings/assets: baseline by age (20-99) and earnings-ability types (left) and percentage change after reform (right)



Note: Savings are presented in model units, which have been calibrated such that the value of assets reflects the values of total assets for Italian households by age and income level.

Figure A9 (left) shows the baseline total stock of savings (i.e., assets held). It shows that most ability types reach a peak of assets around retirement age (early 60s), and then their assets level off and then fall before age 99 (if agents survive that long). The exceptions are the top two ability types, representing the top 1% and next 9%, who continue to accumulate wealth through interest on their savings/assets. Figure A9 (right) shows the change after the reform. Most ability types raise their savings somewhat due to the higher consumption tax, which makes consumption less attractive. The exception is the lowest ability type, representing the bottom 25%, whose savings are constrained during their 30s. In order to

smooth consumption, this ability type dramatically cuts back on saving during this time, which has consequences for their long-term accumulation of assets relative to the other ability types.

Appendix 2: Use of DIA for corporate tax reform: theory and implementation

Literature review

Early work on the incidence of corporate tax is usually traced back to Harberger (1962), which concluded that the owners of capital carry the burden of corporate tax in the long run. However, this theoretical result falls in the face of an open economy, where capital can enter and leave a country. This was acknowledged by Harberger himself in later work (1994), among others. In an open economy, capital is the more mobile factor of production and therefore, capital owners can escape a portion of the burden of the tax, passing it on to workers through lower wages or employment.

The question of the share of the corporate tax burden on labour has been investigated for Germany. For research purposes, Germany is a special case due to the heterogeneity of corporate tax rates across German municipalities. Using these differences, Fuest et al. (2018) estimated that workers bear about half of the total tax burden. Furthermore, their analysis shows that among workers, it is the low-skilled, young, and female employees that bear a larger share of the corporate tax burden.

Practical implementation: United States

These ideas are put into practice in some institutions in the United States. The methodology used by the Tax Policy Center (a think tank based in Washington D.C.) is to split the corporate income tax burden between labour (20 %), normal returns to capital (20 %) and supernormal returns to capital (60 %). The justification for these figures is provided in Nunns (2012).

The Joint Committee on Taxation (JCT) of the U.S. Congress has a method for allocating the combination of the total burden by income level, whether the total burden is passed to each income level through a reduction in labour income or a reduction in capital income or capital value. The methodology is described in detail in the Joint Committee on Taxation (2013).

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