



International
Labour
Organization

► Employment Policy Department

Reference guide for **Employment Impact Assessment (EIA)**



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Reference guide for Employment Impact Assessment (EIA)

Employment Policy Department

Task Force on EIA

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Introduction

The main work of the Employment Policy Department ('Employment' or EPD) of the International Labour Organization (ILO) is to provide policy advice to constituents on employment policies at macro, meso and micro levels. Our policy advice is guided by the principles of the ILO as enshrined in relevant Conventions and Recommendations. At the same time, policy advice should be agile and responsive to different scenarios, and therefore have at hand ready-to-be-applied tools and methods for assessing impact, so as to improve understanding of what works, when, where and how.

Due to the complex nature of employment policies – including macro, industrial and specific interventions implemented in different scenarios – the department uses a variety of impact assessment tools for its evidence-based policy development – both qualitative and quantitative, ex ante and ex post, macro, sectoral and individual. All these dimensions are relevant for assessing the success of an intervention.

This document sets out guidelines for the EPD on employment impact assessments (EIAs). This is especially relevant for the department, as without solid impact assessment the credibility and reliability of policy orientation efforts can be challenged, with significant implications for the validity and accountability of the EPD's work, as well as for resource mobilization. These guidelines are the result of long discussions within the Task Force on EIA established within the EPD, in order to review the existing EIA tools in the department and provide recommendations on the way forward.

The document describes the methods and tools most frequently used by the EPD and discusses some frequently asked questions, posed both to specialists in the field and at headquarters (HQ). It is worth mentioning that 12 previous reviews of EIA methodologies at the EPD have already been conducted (see Table 2 in the Annex). It is not the purpose of this document to repeat those reviews, but to focus on how the EPD uses or should use them.

It should be noted that the ILO – through the Employment Policies Departments and other departments – is not the only institution producing evidence on employment impact assessments. This has become a highly competitive area, as universities, non-governmental organizations and other international institutions also produce an increasing amount of information on the subject. Therefore, the Employment Department's leading role in employment impact analysis is critical in ensuring the continuity of the ILO's overall global leadership in employment policies.

► Why EIA?

The rationale for EIA is to anticipate and/or measure the potential or ex-post impact of particular policies or interventions on jobs and job-related outcomes, in order to constantly improve the design and implementation of policy and programme options. Employment policy is an area where there are relatively large gaps in evidence, and EIA can contribute to improving the effectiveness of policy response. Linked to this is the complexity of the policy-making process, especially when related to employment and labour market outcomes where stakeholders may have diverging interests. This is where the ILO can have a particularly important role to play in building the institutional capacity of national employment authorities to conduct EIA and advise on institutional coordination mechanisms.

► Overview of methods most frequently used by the EPD

The Employment Policy Department uses a series of methods for EIA. A consultation with colleagues in HQ and field employment specialists on their use of these tools has led to the identification of at least 62 documents directly or indirectly developed by the department. On the basis of this data, the following methods are the most frequently used:¹

► **Table 1. General description of methods used by the EPD**

Method	General characteristics
General Equilibrium Models (GEM)	GEM seek to account for the interdependence among all sectors in an economy and are typically used to simulate the potential impact of policy changes. There are variants, such as Macroeconomic GEMs, Computable GEMs or overlapping generations' models (Chumacero and Schmidt-Hebbel, 2004). A recent study by the Employment and Labour Market Policies Branch in Mongolia is an example of this methodology (Galindez, forthcoming). The ILO also partnered with the Asian Development Bank (ADB) in using a Computable General Equilibrium (CGE) model to assess the labour market implications of Association of Southeast Asian Nations (ASEAN) economic integration (ILO and ADB, 2014).
Partial Equilibrium Models (PEM)	These models typically consider only one market, or a group of markets, for estimating or simulating some key coefficients for policy-makers. They generally assume the effect of changing conditions (prices, quantities) on goods, factors or other markets to be constant. A recent example of this approach is an estimation of job deficits in Rwanda and a study in Colombia that uses a counterfactual scenario to assess the impact of policies on labour market outcomes (Malunda and Kiberu, 2016; Isaza-Castro, forthcoming).
Input-Output Analysis (IOA)	This is a method based on technical coefficients derived from input-output tables, which summarizes all inter-industrial exchanges within an economy and with the rest of the world. It is usually an ex-ante method, which shows the allocation of demand amongst economic activities to evaluate the impact of a policy. It generally produces static outcomes. There are several variants (Ernst, Miller, and Imschoot, 2015). More recently, IOA has been used to assess not only the quantity of employment generated, but also the type of employment ('informal employment' or 'green jobs' for example), by opening the institutional sector of households in the National Account System (NAS)². An example of an application to the construction sector is the multiplier analysis in the construction sector in Rwanda (Lieuw-Kie-Song and Abebe, 2018).

¹ Note that different studies provide different classifications of the relevant methods. This document uses a provisional classification, with the understanding that in some cases, some categories may overlap.

² Even more recently, although not at the ILO, informality has been assessed using a 'satellite' account in some countries.

Method	General characteristics
Social Accounting Matrices (SAM)	These can be considered to be an extension of input-output tables, which have been used extensively by the ILO in recent decades to measure, among other things, the direct and indirect employment effects of public investment through a multiplier analysis. The major disadvantage of input-output tables is that they do not contain data on the expenditure pattern of the economic actors (government, enterprises, and households). A SAM brings together data on income creation and production as national accounts and input-output tables do, and also includes information on incomes received by different institutions and related spending. It has variants such as Dynamic SAM (DySAM) and Regional SAM (Alarcón, Ernst, Khondker, and Sharma, 2011).
Growth accounting decomposition methods	There are a number of empirical studies using growth accounting decomposition methods to evaluate the relative importance of employment reallocation and within-sector effects, as well as the sectoral drivers of aggregate productivity growth, particularly labour productivity growth. These methods can reveal patterns that are not otherwise readily apparent, thereby helping to increase understanding of processes of structural transformation. They can also usefully inform sectoral policies by clarifying whether and how sectoral drivers within more and less successful countries differ from each other.
Local multipliers	These aim to measure the employment potential of different economic sectors relying on changes in employment across two censuses. This method has a dynamic dimension and a geographical dimension, enabling the construction of a cross-section/panel data of sectoral employment (tradable, non-tradable, agriculture) across administrative entities. Local multipliers look directly at employment (whereas IOA goes from production multipliers to employment multipliers). In addition, since it is based on censuses, the local multipliers methodology allows for a thorough statistical analysis even in very small areas. This is a method developed in the EPD (Charpe, 2017; Charpe, 2018).
Sectorial identification	Renewed interest in a new generation of industrial policies is motivated by the belief that well designed and implemented industrial policies are key to sustainable structural transition processes. What methodologies exist to select the 'right' industries? Here we discuss three methods for identifying potentially promising products and corresponding sectors for export expansion and structural transformation: (a) the growth identification and facilitation framework; (b) the economic complexity and product space method; and (c) the International Trade Centre's export potential and product diversification indicators.
Systematic reviews	- A systematic review summarizes the results of available carefully crafted studies (controlled trials) and provides a high level of evidence regarding the effectiveness of interventions. Judgements may be carried out with respect to the evidence and inform recommendations for employment and other relevant fields. - These reviews are complicated and depend largely on what trials are available, how they were implemented (the quality of the trials) and the outcomes, which were measured. Review authors pool numerical data about effects of the treatment via a process called meta-analysis. Subsequently, they examine the evidence for any benefits and/or harms from those treatments. Thus, systematic reviews are capable of summarizing the existing research on a topic (Kluge et al., 2017).

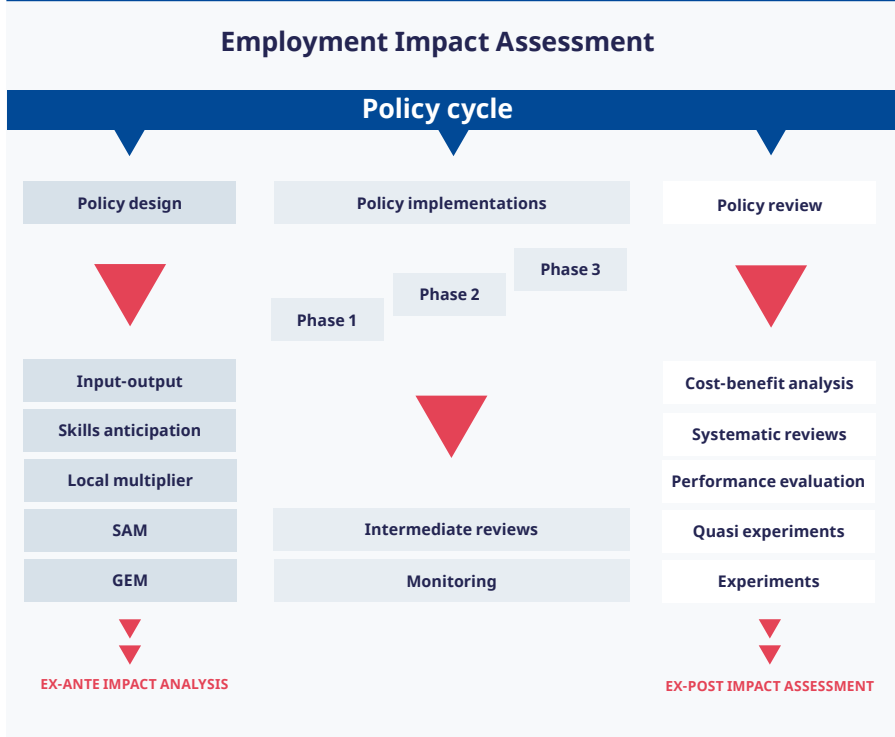
Method	General characteristics
Skills prospection (anticipation)	A variant of EIA is skills prospection. For this, a further step to employment assessment is required, to convert the information on jobs into skills needs. To this end, other pieces of information are needed: a) quantitative employment projections by sector and occupation; b) qualitative methods, including focus groups, round tables, expert interviews, foresights and scenario development; c) surveys among employers, i.e. establishments or enterprises; and d) tracer studies of school/training graduates and school-to-work transition surveys.
Experiments	Experimental approaches (randomized controlled trials) assess effectiveness (does it work or not?) and causality (does it work because of the intervention?) at the same time. The usual approach is to compare participants with non-participants to see differences. Since these differences can be attributed to the impact of the intervention or to pre-existing differences (selection bias), this method uses a random process to decide who is granted access to the programme or intervention and who is not, so that every eligible unit has the same probability of being selected for treatment. Together with partner institutions, the EPD has implemented some impact evaluations using randomized controlled trials (RCTs), including through the Taqeeem Initiative. Examples of this are reports in Morocco and Uganda (Fiala, 2015; Bausch, Dyer, Gardiner, Kluve and Kovacevic, 2017; McKenzie and Puerto, 2017; Diwan, Makana, McKenzie, and Paruzzolo, 2014; Bandiera et al., 2018; Cho, Kalomba, Mobarak, and Olvera, 2013).
Quasi-experiments	There are other ways to control selection bias which are valid under a set of identifying assumptions (Duflo, 2006). Several techniques can be used for this, including matching methods, difference-in-difference, instrumental variables, regression discontinuity design (World Bank, 2016). In the EPD, a recent example is the application of a double and triple difference estimation of the impact of the youth guarantee scheme in Italy (O'Higgins and Pica, 2017). Other applications have been implemented by the Taqeeem Initiative (Elsayed and Roushdy, 2017).
Qualitative assessments	These methods are based, for example, on expert opinion or beneficiaries' opinion surveys, etc. In some cases, they take the form of socio-economic monographs (Barussaud, 2017; Barussaud, 2018).
Meta-analysis	The purpose of meta-analysis is to provide a reliable estimate of the relationship between one phenomenon and another, based on a range of studies. An example is the impact of training programmes on the post-programme employment prospects of participants. Where sufficient estimates are available, meta-analysis can further seek to identify the causal factors underlying the relationship; not just 'what works' but 'why what works works'.

In many cases, applications combine different methods, for example, quantitative and qualitative methods, which are complementary and together can provide more in-depth insights into employment effects.³ The selection of economic sectors or economic structures is critical to the success of any employment intervention, and this can be done using ex-ante methods and/or prospective methods. The intervention itself can then be analysed using methods that assess the effects on individuals, in contrast to control groups.

³ Shaffer (2018) discusses some of the pros and cons of mixed methods, in particular regarding the precision of qualitative studies, external validity and usefulness in terms of causal inference.

None of the abovementioned methods is inherently superior to any other. In practice, all these methods or tools have strengths and weaknesses because all are based on specific assumptions. Some methods are better equipped for ex-ante analysis and others for ex-post analysis. Some are better for revealing the impact on beneficiaries and others for reporting the impact on the economy or economic environment. A diagram to illustrate the role of each tool is given in Figure 1 below, based on a simple project cycle scheme.⁴

► FIG. 1 – EIA overview



⁴ This is, of course, a simplification, as some of the methods can be used both ex-ante and ex-post, but it is a simple way to visualize them.

► Guidelines (on frequently asked questions)

This section offers some guidelines on how to use these methods, which depend heavily on factors that include the type of intervention or policy to be assessed, budget and time requirements, and institutional capacities.

The 'ILO approach'

The most frequently asked question refers to the method that the EPD uses for EIA. As already seen, the EPD does not use a specific method, but a diverse array, which have mostly been developed by academia. However, the ILO attempts to include several features in its EIA exercises:

- a. First, the EPD tries (or should try) to ensure that the theoretical background of the EIA is pro-employment. This means that employment is not a residual, but a central target of the EIA.
- b. Second, the EPD tries (or should try) to inform and ensure the participation of social partners in all steps of the EIA process, from the design to the results stage, in order to promote social dialogue on EIA.
- c. Third, the EPD tries (or should try) to target not only the employment dimension, but also to provide some insight on the quality of that employment (see the indicators section below).

What tool for what type of intervention?

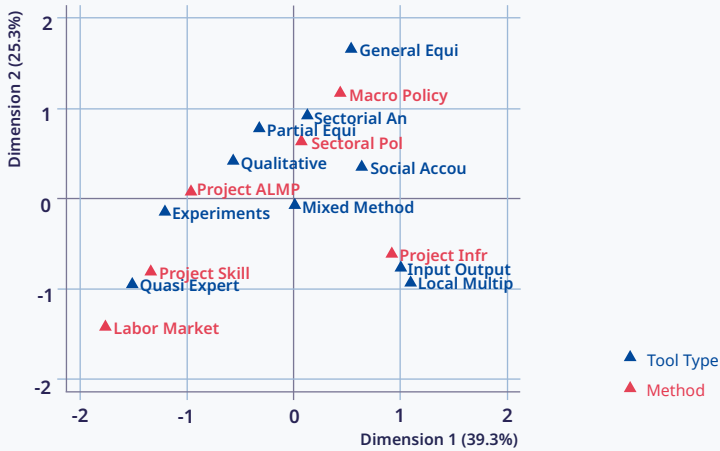
When it comes to employment assessment, the most common types of intervention analysed by the EPD are the following:

- Infrastructure projects
- Active labour market programmes
- Sectoral policy
- Macro policies
- Legislative proposals or reforms

Not all tools are useful for the same type of intervention.

Figure 2 shows that, for example, infrastructure projects tend to be assessed with IOA or local multiplier tools. Macro or sectoral policies are more related to GEM, partial equilibrium models, or sectoral analysis. Interventions more closely related to active labour market programmes (ALMPs), skills or labour market reforms have been assessed with (quasi-) experiments.

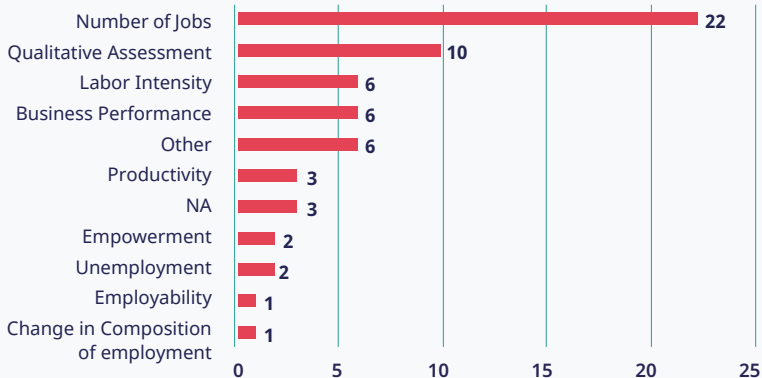
► FIG.2 – Correspondence analysis biplot: What method for what policy?



Outcome variable

Figure 3 below shows the indicators for EIA most commonly used by the EPD. There has been an emphasis on the number of employed persons as a key indicator. This indicator is comparatively easy to quantify, so virtually all methods reviewed here are capable of measuring it. There are two versions: a) the total number of persons employed; and b) the number of equivalent jobs per year. Gender breakdowns are essential.

► FIG.3– Number of studies by indicator



However, as previously mentioned, from the ILO perspective, at least one additional indicator should be used, especially in relation to the composition of employment in terms of quality. Options include the following:

- Income, which is also quantifiable and methods are capable of measuring income effects.
- Indicators of quality of employment (for example, access to social security or informality), although this is more complex and requires more data, especially in macro or input-output measurements.
- The composition of employment by occupation, educational attainment or skills level is another option.

Budget and time constraints

In practice, the budget and time available for employment impact assessments is likely to be a key determinant of the methods applied. For example, qualitative assessment is an important low resource-intensity method. Some partial equilibrium models, local multipliers or sectoral analysis require moderate resources. However, in general, most methods are expensive to develop in the first place and/or tailor to the needs of individual policies, if major changes to the model and available data are required (once set up, the marginal cost of running models can be modest). Experiments and quasi-experiments are also considered resource-intensive.

From the policy perspective, a key question is how the effects of a particular policy initiative will be felt over time (in the short, medium and longer term). Some methods and models can only provide information on a newly emerging equilibrium at a specific point in time after the policy has been implemented. Other methods and models can take into account the reaction of affected populations to the policy change, and thus provide an indication of the longer-term effects of the intervention in question. It is therefore critical to choose when to evaluate.

The link between monitoring and evaluation

Does every intervention need to be assessed in terms of impact? Not necessarily. Aside from the issue of measurability, the monitoring stage can provide important information for the development of an effective EIA.

Monitoring assesses how an intervention evolves over time, evaluating data available from the project management office in terms of initial goals,

indicators and outcomes associated with the programme. Although it does not address the issue of causality, it helps to understand if the intervention is being implemented according to its 'theory of change', i.e. the causal logic of how and why a particular programme, programme modality, or design innovation will reach its intended outcomes.

Take the case of the processes needed to produce results in a typical training programme. In order for training to produce results, first, the training has to take place (one party transferring messages to others). Second, those messages have to be incorporated by the receiver (learned). Finally, that information or knowledge has to change some behaviour. Only if that happens will the capacity of an individual to be employed (employability) have been transformed. However, even if this happens, it does not guarantee that employment will be created, since this does not only depend on training.

Another case concerns infrastructure projects. Here, the exogenous variable is investment, which is typically public. This investment first has to be implemented, which involves the construction of the infrastructure. That process will generate both direct employment (in the construction sector) and indirect employment (in suppliers, for example). Here, this short-term effect on employment can be considered an output for the project. However, sustained investment can produce long-term impacts (increased employment in the construction sector). In addition, the infrastructure itself, if relevant, can produce changes in the productive structure of a community or locality that could boost permanent employment creation.

Solid monitoring systems can solve the debate on 'attribution' vs. 'contribution'. Contribution is related to the processes or outcomes in control of the intervention. But for impact to happen, other elements need to be in place. On the other hand, if monitoring reports do not indicate that intermediate processes took place, then it is almost certain that no impacts were realized.

Institutional capacities needed

The institutional capacities required to carry out an effective EIA is an important topic because without the necessary institutional support, the assessment will be less effective. In general, due to the complex nature of methodologies, agencies can carry out the economic impact assessment themselves, or they can interact with specialized institutions. This is a

key element of the ILO's work, since to 'transfer' a methodology or build ownership of it, a minimum set of technical capacities is needed.

From the institutional side, employment assessment is frequently included as a task of more general social monitoring and evaluation institutions.

- In Portugal, the Central Bank, together with partner institutions, evaluates the quantitative impact of structural reforms on employment and other outcomes. To this end, it uses econometric approaches and Dynamic Stochastic GEM to assess the impact of the National Reforms Programme on Employment, Productivity and Inclusiveness

In other cases, there are separate bodies, since some type of specific expertise is required to conduct employment assessments. Some institutional mechanisms include the following:

- South Korea installed the Center for Employment Impact Assessment at the Korean Labor Institute as the designated body in charge of assessments. This is led by a director, who oversees three different branches of teams for (a) planning and assessment; (b) policy assessment; and (c) fiscal programme assessment. As of July 2019, a total of 819 programmes had been assessed, including 180 labour market policy programmes, 349 research and development programmes, 30 programmes in the arts/culture/sports sector, and 42 welfare/public health programmes (Lee, 2019; Yoon, 2019).
- The United Kingdom's Department for Work and Pensions (DWP) is a leader in evaluating national active and passive labour market policies and committing to evidence-based policy-making. The vast majority of the DWP's evaluation activities are delivered by external contractors, and the department commits a high level of funding and staff time to supporting evaluation. A wide range of methodologies are employed in DWP evaluations, ranging from qualitative interviews to the use of more sophisticated quasi-experimental methods and randomized control trials to identify gross and net impacts. All evaluations are made available to the public, including those with negative results.
- In Germany, the Institute for Employment Research (IAB) conducts research on labour market issues to advise political actors at all levels. Economists, sociologists and researchers from other disciplines create the base for empirically-informed labour market policy. This institute was founded in 1967 and has been a special office of the Federal Employment Agency (BA) since 2004. With this institutionalization as a special office, a clear separation was made between the IAB and the headquarters of the BA. Meanwhile, the IAB was firmly anchored within

the Executive Board of the Federal Agency. This organizational structure emphasizes the IAB's significance as the central institution for science-based policy advice on issues related to the labour market.

In other cases, EIA is developed in a priority sector supported by a dynamic agency of the government, sometimes with strong donor support and important policy questions to be addressed.

- Some (not many) labour market observatories include, as one of their functions, the task of assessing the impact of specific interventions.
- In other cases, there are Employment Funds (similar to Social Investment Funds). In Peru for example, the *Fondo Empleo* is a private agency – managing a public fund – which finances social programmes with a clear target in terms of employment, income or productivity. When the project is approved, an independent monitor is simultaneously designated, and another independent evaluator is selected, so as to ensure a double check.

Finally, the third way is the ad hoc approach. This usually evolves from individual evaluations, which were carried out to take advantage of available funding or originated from the desire of a government official or a specific donor.

► Detailed descriptions of the methods

General equilibrium models

► Objective

General Equilibrium (GE) models aim to account for economy-wide effects of changes brought to the economic system in its equilibrium state by external factors, such as a policy change. Unlike Partial Equilibrium models, which incorporate only a part of the market, General Equilibrium models take into account the interdependence among all sectors, markets and regions/countries. The analysis of this interdependence allows for the identification of winners and losers resulting from the policy change. Typically, General Equilibrium models are used *ex ante* to simulate the potential economic and social impact of policies. By comparing the policy-induced scenarios in which the economic system remains in general equilibrium (that is, the circular flows of income and expenditure are balanced) against the baseline scenario, these models allow for consistent comparative analysis of policy scenarios. For this reason, they have been widely used to assess the potential distributional and long-term effects of policy changes, typically trade liberalization, taxation and climate policies.

► Brief description of the method

There are a number of General Equilibrium models, including Computable General Equilibrium (CGE) models and Dynamic Stochastic General Equilibrium (DSGE) models. Most widely used among General Equilibrium models, CGE models usually start by mapping the flow of goods and services, factors of production, and payments in an economy, typically in the form of a Social Accounting Matrix (SAM). A CGE model is calibrated by fitting the SAM to a system of parameters and equations, which define the behaviour of different economic agents (e.g. utility maximization of households and profit maximization of firms). If calibrated correctly, the model replicates the base year equilibrium, which serves as the point of comparison for counterfactual-equilibrium analysis of any hypothetical policy change (Whalley, 1985).

CGE models include static, recursive-dynamic and dynamic versions. In dynamic models, the way on which economic agents adjust to the shocks over time is taken into account. For example, in relation to the labour market, the supply of labour is usually taken as a given parameter in static

models. However, in dynamic models, assumptions about the labour force participation rate can be combined with population forecasts, to determine the supply endogenously (Gibson, 2011).

Overlapping generations models are a variant of CGE models, and model each successive generation. They are therefore used when incorporating the allocation of resources across different generations. DSGE models seek to capture business cycle fluctuations and uncertainty and focus on shorter-term impacts of policy changes.

► **Typical questions that this method could answer**

- What are the effects of trade liberalization (or alternatively, increased tariffs) on employment and wages? See, for example, ILO and ADB (2015), which uses a CGE model to assess the potential economic and social impacts of deepening ASEAN integration in the form of tariff removals, liberalization of non-tariff barriers and trade facilitation in the form of reduced fixed trade costs.
- Who gains and who loses from the implementation of climate and energy policies? See, for example, Chateau et al. (2018), which uses a CGE model.
- What is the effect on employment resulting from reductions in corporate taxes? See, for example, Alvarez-Martinez et al. (2018), which uses a CGE model to assess the impact on gross domestic product (GDP), tax revenues and employment resulting from reductions in corporate taxes, taking into account cross-country spillovers in corporate taxes and investment.
- What are the international spillover effects of lower labour costs? See, for example, Charpe and Kuhn (2015), which uses a two-country DSGE model to assess the international spillovers of a decline in labour costs.
- While not forecasting tools, CGE models are also used to inform employment projections. For example, the medium- to long-term employment projections of New Zealand's Ministry of Business, Innovation and Employment uses a CGE model for the projections (MBIE, 2018).

► **Centrality of employment in the method**

While employment is a central variable of interest, first generation and standard CGE models have often been criticized for not modelling the labour market in detail, including a flexible, market clearing wage leads to full employment. However, newer CGE models often incorporate a wide

range of model labour market imperfections, including unemployment, various wage-forming mechanisms, dual labour markets, and larger numbers of representative households (for a comprehensive review of labour markets in CGE models, see Boeters and Savard, 2011).

► Pros and cons

Pros

- Ability to assess potential economy-wide and second-round effects of policy changes, including their distributional implications and trade-offs between policies.
- CGE models provide a consistent framework, based on microeconomic foundations rather than historical relationships, for quantitative analysis.
- Newer CGE models are able to incorporate a wide range of labour market imperfections, and the minimum data requirements can be limited to one SAM and one household survey (rather than time-series), making these models useful for developing countries.

Cons

- It can be difficult to assess what is driving the results ('blackbox' argument).
- The choice of the closure rule can impact results.
- There can be uncertainty over parameter values, with some taken from empirical studies of developed countries, while similar values for developing countries are often lacking.

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Input-Output Tables and Social Accounting Matrices

► Objective

This section summarizes how Input-Output Tables (IOTs) and Social Accounting Matrices (SAMs) can be used to estimate the macro-level employment effects of certain interventions in the economy. Because IOTs and SAMs contain sector-level information, they are useful for analysing the effects of sector-specific interventions, in particular how such interventions impact other sectors and other actors in the economy.

Since IOTs and SAMs only contain financial information (the transactions between sectors and actors in the economy), they are typically used together with sectoral-level employment data to estimate the employment effect. IOTs and SAMs are widely used for different kinds of economic analysis; this section does not capture all their uses, but focuses on their use for analysing employment effects.

► Brief description of the method

IOTs describe the sale and purchase relationships between producers and consumers within an economy and show the flows of intermediate and final goods and services defined according to industry (sector) outputs for a given year. The SAM is an expansion of the IOT and adds other actors in the economy: government, savings & investments, households and rest of the world (imports and exports). Since it has all actors and agents in the

economy, a SAM can also be described as a tabular form of the circular flow of income in the economy.

The multipliers derived from IOTs and SAMs can be used to assess the direct and indirect employment effects of introducing certain changes (shocks) to a sector of the economy. A typical example could be an increase in output of the construction sector due to increased government spending on infrastructure (the shock). The increased output of the construction sector would in turn also trigger increased outputs from other sectors that supply inputs to it. Using the Leontief multipliers, which can be derived from the IOT or SAM, these output effects on other sectors are calculated. The changes in output are then used to estimate impacts on employment. The multipliers calculated using the IOT provide the indirect multiplier effect, which arises from one sector purchasing inputs from other sectors in the production process. These are sometimes also referred to as Type I multipliers. Multipliers calculated using the SAM also include induced (consumption) effects and are referred to as Type II multipliers.

Depending on data availability, the sectors in IOTs and SAMs can be highly aggregated, with only the main economic sectors represented (for example, agriculture). Alternatively, they can be very detailed, with a sector such as agriculture disaggregated into tens or hundreds of subsectors for different crops and farming technologies. If sectors are too aggregated and a specific subsector is of interest, a specific subsector account can be created in the IOT or SAM, and the effects of this subsector can be estimated. This typically requires a survey of enterprises operating in the subsector of interest to quantify their inputs and identify who their outputs are sold to.

It is important to be aware of key assumptions inherent in the use of IOTs and SAMs when conducting this multiplier analysis, namely that:

- There are no material, labour or capital supply constraints in the economy and if demand is increased, the economy will be able to increase its supply. This also means that there is no increase in prices as a result of the increased demand.
- There are no changes in technology in the production process, and the ratio of different inputs (technical coefficients) remains the same, even if outputs are increased.

The extent to which these assumptions hold in the context being analysed should be ascertained.

► **Typical questions that this method could answer**

- What are the employment effects of investments in infrastructure by governments or donors?
- What are the employment effects of increasing exports of products from certain sectors?
- How do employment effects of increasing outputs differ between sectors?
- How will increased demand in one sector impact labour demand in other sectors?

► **Centrality of employment in the method**

The information on employment in the IOT is usually limited to the share of wages in the production process. The SAM also contains information on the distribution of wage payments to households. In order to estimate effects on employment, it is therefore necessary to convert payments and outputs, which are in local currency, into employment (hours worked or number of persons employed). This is typically done in one of two ways:

- Additional output is converted into additional employment using employment-output ratios (total employment in sector X/total output of sector X).
- Factor payments to labour (total wages) are divided by the average wages in the sector to obtain employment in the sector.

It is important to note that neither SAMs nor IOTs contain any labour market information as such, so the estimated employment effects are based on the extent to which demand for labour is increased. It is assumed that the labour market is able to meet this increased demand. If the question of interest is how the labour market will respond to this increased demand, different methods to model the labour market need to be used.

► **Pros and cons**

IOTs and SAMs have several advantages, since:

- They are relatively simple to use and the data requirements are limited.
- They are available for most countries and so widely applicable.
- Key underlying assumptions are easy to understand.
- They are widely used and SAMs also form the basis for other methods, such as CGE models.
- They are also useful for analysing other non-employment-related effects.

Some of their disadvantages include the following:

- Analysis and the results provided are static.
- Since they are constructed using several different data sets, some of the data sets used are frequently old, and even with ‘updated’ SAMs, it often happens that only some of the data are updated.
- Due to the assumptions implicit in the method, in particular that there are no supply constraints and that increases in output require proportional increases in inputs, the results tend to overestimate the employment effects.
- The sectors can be highly aggregated, with a wide variety of economic activities aggregated into one sector, which can distort results if the specific intervention analysed is very different from this sector average.
- The methods provide little insight into the quality of jobs created; typically, it is assumed that jobs created will be, on average, similar to employment in the sector as a whole.
- They do not capture negative effects on employment (unless a negative shock is applied).

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Growth accounting decomposition methods

► Objective

Recent economic policy discussions have been marked by a renewed interest in structural transformation. One reason for this is concern over the potentially negative implications of deindustrialization in both developed and developing countries, and in particular ‘premature’ deindustrialization among the latter. Another is the debate on whether advanced services relying on information and communications technology can function as a leading sector in economic development, characterized by static and dynamic economies of scale and positive spillover effects. More specifically, this debate addresses whether and how advanced services can serve as a substitute for, or rather as a complement to manufacturing, the archetypal leading sector.

A key strand of the literature on structural transformation focuses on the reallocation of labour from lower- to higher-productivity sectors, as well as on accompanying changes in productivity within sectors. These are respectively referred to as employment reallocation and within-sector effects on aggregate productivity growth. There are a number of empirical studies using growth accounting decomposition methods to evaluate the relative importance of employment reallocation and within-sector effects, as well as the sectoral drivers of aggregate productivity growth, particularly labour productivity growth (for example, Pieper, 2000; Ocampo et al., 2009; Timmer and de Vries, 2009; Roncolato and Kucera, 2014; Kucera and Roncolato, 2016; Kucera and Jiang, 2018; Dasgupta et al., 2017). Labour productivity growth plays a central role in economic development, for, as Ocampo et al. observe, “Historically, labor productivity increases have been the major contributing factor to growth in real GDP per capita’ (2009, p. 42). From the employment perspective, structural transformation is thus typically considered to have profound implications through compositional shifts towards leading sectors, as well as corresponding changes in per capita incomes and aggregate demand via Kaldor-Verdoorn growth dynamics (Kaldor, 1967; Verdoorn, 1949).

► Typical questions that these methods could answer

Growth accounting decomposition methods can reveal patterns that are not otherwise readily apparent, and can therefore deepen our understanding of processes of structural transformation. Kaldor (1968) hypothesized that employment reallocation effects are generally less important than the within-sector effects induced by employment

reallocation, for which growth accounting decomposition methods provide a test. These methods can also usefully inform policy, insofar as they facilitate learning from the examples of more and less successful countries in terms of economic development. For example, the view that differences in employment reallocation distinguish more and less rapidly growing economies has led some to search for barriers to labour mobility across sectors (McMillan and Rodrik, 2011).

Growth accounting decomposition methods can also usefully inform sectoral policies by clarifying whether and how sectoral drivers within more and less successful countries differ from each other. More specifically, does aggregate labour productivity growth in more rapidly growing economies tend to be driven by a particular set of sectors and, if so, which ones? These methods have also been used to study changes in female shares of employment, in particular to identify the sectoral drivers of these changes and the relative importance of employment reallocation and within-sector effects, so as to better understand gender aspects of structural transformation (Esquivel, forthcoming). Some of these studies focus on better understanding the widely observed pattern of rising female shares of manufacturing employment in the early stages of export-oriented industrialization, often followed by falling shares (Kucera and Tejani, 2014).

► Centrality of employment to the methods

Useful decompositions of labour productivity growth are provided by Pieper (2000) and Ocampo et al. (2009). Aggregate labour productivity is defined as total value added over total employment, or $q = X/L$, and sectoral labour productivity is correspondingly defined as $q_i = x_i/l_i$. Aggregate labour productivity can be expressed as:

$$q = X/L = \sum x_i / \sum l_i \quad [\text{Eq. 1}]$$

Taking first-order differences with respect to time ($t = 0$), labour productivity growth can be expressed as:

$$\xi = \sum [\theta_{i0} (g_i - n_i) + (\theta_{i0} - (q_1/q_0)\lambda_{i0})n_i] \quad [\text{Eq. 2}]$$

where:

$$\xi = (q_1 - q_0)/q_0$$

$$n_i = (l_{i1} - l_{i0})/l_{i0}$$

$$g_i = (x_{i1} - x_{i0})/x_{i0}$$

$$\theta_{i0} = x_{i0}/X_0$$

$$\lambda_{i0} = l_{i0}/L_0$$

The within-sector effect on labour productivity growth is represented by the left-hand bracketed term in Equation [2], that is:

$$\xi_w = \sum [\theta_{i0} (g_i - n_i)] \quad [\text{Eq. 3}]$$

In words, the within-sector effect is the difference between sectoral value-added growth and employment growth weighted by the output share of the sector. In this sense, positive within-sector effects result when sectoral value-added grows faster than sectoral employment.

The interaction term is represented by (q_1/q_0) , the result of first-order differencing in discrete time steps, while the interaction effect is the difference between aggregate labour productivity growth and the sum of within-sector and reallocation effects. Leaving the interaction term aside, the employment reallocation effect on labour productivity growth is represented by the right-hand bracketed term in Equation [2], that is:

$$\xi_r = \sum [(\theta_{i0} - \lambda_{i0}) n_i] \quad [\text{Eq. 4}]$$

The reallocation effect is the difference between sectoral output and employment shares multiplied by sectoral employment growth. Positive reallocation effects result when sectoral employment grows in sectors for which the difference between sectoral output and employment shares is positive, that is in sectors with above-average labour productivity.

Leaving aside the interaction effect, each sector's contribution to aggregate labour productivity growth is its labour productivity growth weighted by its relative output – the within-sector effect – plus its employment growth weighted by its relative labour productivity – the reallocation effect. In this sense, relatively larger sectors will tend to contribute more to aggregate labour productivity growth through the within-sector effect. Moreover, the larger the difference in labour productivity among sectors, the larger the potential increases in aggregate labour productivity through reallocation effects, provided that employment shifts from less to more productive sectors.

► Pros and cons

Unlike most employment impact assessments, results from accounting decomposition methods are not estimates, but rather tautologies. However, there are different accounting decomposition methods, which have different pros and cons, depending on the measure of change being decomposed. The method presented here decomposes

labour productivity growth. Other methods decompose differences in productivity *levels* (for example, that used by McMillan and Rodrik (2011)). One generally thinks of economic development and structural transformation in terms of growth, not differences in levels, and correspondingly, one wants to understand what drives growth. Moreover, the limitation of looking at differences in productivity levels is that higher-income countries with higher productivity levels have greater differences in productivity levels for a given rate of productivity growth. Thus, results from the decomposition of differences in levels of productivity growth do not lend themselves as readily to comparison among countries and can create the false impression that higher-income countries are undergoing more rapid structural transformation than lower-income countries.

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Local multipliers

► Objective

This is an empirical methodology that aims to produce sectoral employment multipliers. The local multiplier answers the following question: How many jobs are created in the (local) economy when one job is created in sector X in the same municipality?

This approach is useful for policy-makers who would like to identify the industrial sectors with the highest employment potential, as is often the case when designing national employment policies. It can also be useful in informing policy-makers with respect to the specialization and dynamic of local labour markets measured at the level of municipality, urban agglomeration or county. The local multiplier is therefore an important tool to track structural transformation at subregional level. Lastly, local multipliers can be used to measure the indirect and induced employment effects associated with development programmes or financial investment from development institutions.

► Brief description of the method

Local multipliers make use of information related to geography, employment and industry contained in the population and housing census. The starting point of this approach is to construct a cross-section/panel database with information of sectoral employment measured at local level over time. The cross-section dimension is conveyed by the spatial information - either agglomeration, municipality or district - contained in the census. Employment is measured at the level of industry, differentiating manufacturing, services and agriculture subsectors.

The impact of the creation of one job in location *m* and subsector *j* on another subsector *k* is estimated via a reduced form equation. The size of the effect reflects different transmission channels, such as the demand for local goods, labour intensity and local supply chains, as well as wage and price inflation.

Local multipliers usually deliver an intuitive hierarchy of sectors with the highest employment potential in manufacturing, followed by services and agriculture. In high-income countries, the creation of 1 manufacturing job is usually associated with 1 job creation in services in the United States of America and 0.5 jobs in Sweden. In sub-Saharan Africa, the multiplier is up to 5 times larger than in the United States. The main reason is related to wage differentials between manufacturing jobs and services. An additional result is that the size of the multiplier increases with skills, as well as with the degree of formality in the employment relationship.

► **Typical questions that this method could answer**

- What are the industrial sectors with the most promising employment potential?
- What is the sectoral employment distribution at the local level, such as municipality? How does it evolve over time?
- How many jobs are created in the (local) economy when 1 job is created in sector X in the same municipality?
- How does the quality of jobs created impact the local labour market?

► **Centrality of employment in the method**

- The main advantage of the local multipliers method is the centrality of the employment dimension.
- The local labour market is the start and the finality of the analysis.
- Local multipliers can easily be decomposed by gender, age group, skills level and employment status (formal and informal).

► **Pros and cons**

Pros

- Input-Output Analysis has limitations in producing reliable sectoral employment multipliers, while the Computable General Equilibrium model quickly becomes highly complex and data-intensive.
- Local multipliers are well suited to the context of low- and middle-income countries, which are characterized by a scarcity of data, especially when it comes to national accounts.
- On the contrary, census data are the primary data set collected in low-income countries.
- The large number of data points and the time dynamic behind the estimation.
- Provide a picture of local employment dynamics and specialization.

- There is no preconceived assumption of the sign and the size of the multipliers, which can be positive, zero or negative.
- The hierarchy of sector is intuitive: manufacturing > services > agriculture.
- The level of analysis is local and fits well the type of intervention financed by United Nations agencies or international finance institutions.
- The multipliers are easily decomposed by gender, age, skills and employment status.

Cons

- The challenge associated with the instrumental variable in low- income countries with homogenous industrial specialization.
- The importance of internal migration in low-income countries that can bias the effects upwards.
- The limited sectoral disaggregation, given the geographic disaggregation.

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Sectoral identification

► Objective

This section briefly surveys three prominent methods for identifying potentially promising products and corresponding sectors for export expansion and structural transformation for any given country (which we refer to hereafter as the country of interest, or COI). These are i) the growth identification and facilitation framework (Lin, 2012); ii) the economic complexity and product space method (Hausmann and Klinger, 2006; Hidalgo and Hausmann, 2009; Hausmann et al. (2014); and iii) the International Trade Centre's (ITC) export potential and product diversification indicators (Decreux and Spies, 2016).

► Brief description of the methods

The growth identification and facilitation framework (GIFF) is a method to identify potentially promising sectors by purportedly following comparative advantage based on the COI's factor endowments. The first step is to identify countries that either have per capita incomes two to four times as high as the COI, or that had a similar per capita income as the COI 20 years ago, and which also had average annual GDP growth rates of greater than 6 per cent over 20 years. These are argued to provide aspirational benchmark countries for the COI. The next step is to analyse these benchmark countries' export data at the four-digit Standard International Trade Classification (SITC) level, but asymmetrically, depending on whether the COI and benchmark countries are classified as resource-poor versus resource-rich. That is, one looks at which sectors have moved into or fallen out of the top 10 ranking of a benchmark country's export shares over 20 years, which is meant to suggest export market opportunities for the COI. This list of sectors is reduced by screening for COI-specific characteristics, but also augmented based on the sectors in the COI for which an index of so-called revealed comparative advantage (RCA) has increased in recent years.

The economic complexity (EC) and product space (PS) method identifies potentially promising sectors largely based on multidimensional analyses of export data at the four-digit SITC level, encompassing roughly 1,000 products. Hausmann et al. (2014) explicitly contrast their approach with comparative advantage based on factor endowments. The notion of EC is based on the inverse relationship across countries between the diversity and ubiquity of their exports, in which diversity and ubiquity

are described as “indirect measures of the capabilities of each country” (Hausmann et al., 2014, p. 10). EC is complemented by the notion of PS, a mapping of products in which their ‘proximity’ is meant to indicate the extent of similarity in the knowledge required to produce them. As with EC, the extent of similarity in productive knowledge is measured indirectly, based on the probability of any two products being co-exported by countries. Complementing the measures of EC and distance in PS is a measure reflecting the extent of connectedness in PS. For the COI, the opportunities for diversification into new products are greater the closer in PS are the COI’s current products to prospective products. From the notion of connectedness are derived measures of opportunity gain, which for any given COI reflects the potential benefit of diversifying into each product that it does not yet successfully export. Hausmann et al. (2014) apply the measures of complexity, distance and opportunity gain to identify potentially promising sectors to promote diversification and economic growth for the COI, while also bringing in product demand, as indicated by the size of global export markets for these products.

The International Trade Centre developed two indicators to identify potentially promising sectors: the export potential indicator (EPI) and the product diversification indicator (PDI), both based on export data at the six-digit Harmonized System classification level, encompassing roughly 4,000 products. For any given country and product, the EPI is constructed as the multiplicative product of three components: supply, demand and ease of trade. The central variable for *supply* is projected market share, measured as the ratio of a country’s exports of a given product relative to world exports of that product, adjusted by the projected GDP growth of the exporting country. The central variable for *demand* is projected imports of a given product into the importing country. *Ease of trade* is a ratio of actual exports from the exporting country to the importing country relative to hypothetical exports if the exporting country had the same market share in the importing country as in the world market. In contrast with the EPI, the PDI is intended to help countries to identify export opportunities in new rather than established sectors. Like the EPI, the PDI is constructed as the multiplicative product of supply, demand and ease of trade. While the demand and ease of trade components are identical in the EPI and PDI, supply in the PDI is based on the EC and PS space method described above.

► Typical questions that these methods could answer

All the methods are designed to inform targeted industrial policies and sectoral strategies. The GIFF, EPI and PDI methods are meant to identify sectors with export potential for the COI. While the EC/PS method is based on export data, Hausmann et al. (2014) argue and provide evidence that the method is not about export-oriented growth per se, but rather which sectors can contribute most to economic growth more generally.

► Centrality of employment to the methods

The difference between the EPI and actual exports for any given sector in a COI provides measures of ‘untapped’ export potential. The EPI and untapped export potential are the only measures in this survey expressed in value terms. Because untapped export potential is expressed in value terms, it can be used to estimate the number of jobs that would be created if a country were to reach its export potential, which the ITC does in a study by applying fixed employment multiplier analysis to a Social Accounting Matrix for Jordan (ITC, 2018).

The concern about the potential trade-off between more and better jobs was a key motivation for Hausmann et al. (2014) to construct separate sector rankings for what they refer to as “parsimonious transformation” versus “strategic bets”, based on giving different weights to the measures of complexity, distance and opportunity gain. For developing countries more reliant on agriculture, the parsimonious transformation ranking generally gives greater emphasis to labour-intensive sectors that can more readily provide jobs for low-skilled rural workers.

► Pros and cons

All three methods are primarily based on trade data. This means that non-tradable sectors are excluded by construction, including both goods and services, as are tradable goods sold exclusively in the domestic market. Given current data limitations on tradable services in the data sources used by these methods, these sectors are also excluded.

Another consideration about the results of these methods relates to the fallacy of composition, in that not all countries may be able to successfully diversify into identified target sectors at the same time, due to constraints in the size and growth of world markets. This is of particular concern for the GIFF, given that only a few countries are able to sustain growth rates of greater than 6 per cent over 20 years and so attain designation as benchmark countries.

The GIFF method is based on thresholds and dichotomies, for which a product either makes the list of potentially promising sectors or does not. By contrast, the results of the EC/PS and ITC methods vary by gradations and so can generate long lists of ranked sectors, which are useful in providing policy-makers with a wide range of prioritized options.

The key measures in the EC and PS method, including the PDI, are meant to reflect underlying capabilities and productive knowledge, yet these are only addressed indirectly and abstractly. For countries wishing to diversify into new industries, more concrete and specific information on skills and knowledge requirements is needed, for workers and employers alike.

Going beyond identifying potentially promising products and sectors requires an understanding of binding constraints on their expansion. This requires more in-depth analysis than these methods can provide, such as through market systems analysis (The Springfield Centre, 2015).

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Skills anticipation methods and tools

► Objective

In most of the methods, the outcome variable tends to be the number of employed persons. A further step in Employment Impact Assessments is to translate this number of jobs, into skills requirements – how many workers are required by skill type. Moreover, one needs to understand the gap between the skills requirements of the future and current skills availability, in both quantitative and qualitative terms. Quantitative work on skills requirements typically uses the level of a worker occupation, based on the International Standard Classification of Occupations, or the level of educational attainment and qualifications as proxy measures for skills. These measures provide only partial information on skills that are important in the workplace. In addition, due to significant gaps in data availability, qualitative analysis and methods are necessary to provide a reality check on quantitative modelling of skills demand. There are a number of skills anticipation methods that can be combined to produce information to all labour market actors about potential future skills needs and imbalances to inform their decision-making.

This note provides a description of the existing methodologies and their relative strengths and weaknesses. Readers should keep in mind that an effective system to anticipate skills demand usually combines several of these methods and addresses challenges, which are not just technical but also institutional in nature. For example, the generation of quality data is important, but so too is the creation of processes to ensure that this information is effectively used in decision-making.

► Brief description of the methods

Delphi method: Delphi is a widely used exploratory technique aimed at structuring group communication processes to deal with complex issues. The Delphi technique is well suited as a method for consensus-building by using a series of learning rounds to collect data from a panel of experts. The important characteristic of this method is that in the second and later rounds of the survey, the results of the previous round are given as feedback. The feedback process allows and encourages experts to reassess their initial judgements about the information provided in previous rounds. The Delphi method is mainly used when long-term issues (up to 30 years) have to be assessed. For example, it is useful for predicting and assessing developments where there is no empirical database and where external factors are likely to have a determining effect.

Employer skills surveys (ESS): The ESS is an instrument designed to generate data on employer demand for and investment in skills. It helps to define the type, level and composition of skills that individuals need to perform the work demanded by enterprises. This type of survey not only documents the skill content of current occupations, but is also an appropriate tool for investigating future needs, as it can be designed to obtain past or current information that may be used to anticipate which type of occupations will be in higher (or lower) demand, or which skills will be key in future workers' skills portfolios. An ESS usually collects information on employment within firms and requirements in terms of qualifications, skills and or tasks, along with information related to the firm itself or the sector.

Focus groups: A focus group is a form of qualitative research in which a group of people are asked about their perceptions, opinions, beliefs and attitudes regarding issues of interest. It supports the generation of ideas and encourages group thinking. The focus group concentrates on improving existing ideas. Preliminary ideas/products/versions of strategies are usually presented as a starting point. Participants are encouraged not only to express their own opinions, but also to interact with other members and the facilitator. Standard focus groups are more oriented towards obtaining information for researchers. Participants may include representatives of expert and technical staff involved in various aspects of skills anticipation and users of skills anticipation products.

Graduate surveys or tracer studies: These are surveys of graduates from education and training institutions. They are the most valuable single type of survey for collecting systematic and reliable information on the links between study and subsequent employment and work. Graduate surveys provide information on the whereabouts of graduates some time after the awarding of a degree, and allow this information to be linked with socio-biographic and study descriptors (such as gender, age, field of study, institution awarding the degree). These surveys can provide valuable data for evaluating the results of the education and training of a specific institution, which may then be used for further development of the institution in the context of quality assurance.

Quantitative models: Such models help to develop an understanding of the economic reality, in particular trends and interactions within the economic indicators. These can be used under the assumption of relatively unchanged patterns to produce projections and forecasts of future trends or to simulate responses of the economy on different

policy measures. Quantitative models are typically built using different statistical and econometric techniques. The development of such models is highly dependent on the quality of input data, which are largely gathered by official authorities. Quantitative models for skills anticipation and forecasts require quite sophisticated information on occupational structure within sectors and/or qualification (education) structure within occupations. In practice, this process involves combining data that are usually derived from national accounts (NA) and surveys of households/ labour force surveys.

Scenario development and foresights: Scenario planning is one of the best known and most often cited techniques for preparing for the future. In foresight projects, the scenario method is a policy analysis tool that helps to describe a possible set of future conditions. At national, regional and local level, scenarios can be used to improve planning capacity, enrich strategic public policy decisions, and guide major capital investments. Scenarios are a preparation for potential future challenges, not predictions of what will happen. They help us to identify future option spaces and give us confidence to act in a world of uncertainty. The method creates plausible views of the future that decision-makers can use to determine their best response and how to react to alternative situations. Scenarios are qualitatively distinct visions, told as stories, of what the future may look like. They make explicit the assumptions of how the world works.

Sectoral approaches: A sectoral approach to skills anticipation is defined as one that looks at changing skills needs from the perspective of a particular sector. Such an approach includes any study, larger project or programme that adopts a methodological and analytical viewpoint of the sector. It also includes work carried out within a framework of institutional and stakeholder involvement (sectoral bodies such as Sectoral Skills Councils). In many respects, it makes more sense to talk about a sectoral focus rather than a sectoral approach or methodology. The sectoral approaches to anticipation and matching of skills are often included in the broader framework of the development of the sector in the country or region.

Big or real-time data methods: The use of big data analytics or of (almost) real-time information derived mainly from Internet-based/ digitized data sources is a growing area of business, research and policy concern. Rapid developments in the field of machine learning and algorithms (such as text mining, web crawling) have enabled the collection, synthesis and analysis of a rich and relatively unbounded set of data on skills and skills needs that were previously difficult or costly

to collect using conventional sources, such as household or enterprise surveys. The exploration of big data analytics (for example, analysis of Google search keywords, online surveys on wages) and of data on vacancies collected by online job advertisement portals (such as the European Centre for the Development of Vocational Training's pan-European Union real-time job vacancy tool and US data analysed by Burning Glass technologies for the World Economic Forum) constitute innovative approaches.

► **Typical questions that these methods could answer**

- What are the current and future occupations in demand?
- What are the skills implications of a country's strategic priorities (growth potential, change in technology)?
- Which skills should a country develop towards the future (mid-term/ long-term) and how can these skills be generated by the education and training system?
- What education level and field are most suitable for key occupations in a sector?
- What are the emerging occupations in the labour market?
- What demand for skills is likely to be newly emerging?
- How do the skills profiles of occupations change?
- What are the prospective fields of retraining and reskilling?
- What are the critical existing and future skills gaps?
- How can existing and future skills gaps be closed?
- How can skills demand be better anticipated in the future?

► **Centrality of employment to the methods**

Skills anticipation methods and tools are used to address a wide range of issues that countries face in developing skills for which there is a demand in the labour market; they also help to avoid skills mismatches that contribute to unemployment. Skills needs anticipation aims to provide information to all labour market actors about potential future skills needs and imbalances, so that they can make decisions, develop measures and take actions with a view to creating better and more employment. Skills anticipation enables labour market actors to make better educational and training choices, and through institutional mechanisms, it leads to improved use of skills and human capital development.

► Pros and cons

Method	Pros	Cons
Delphi method	• Offers the possibility of avoiding large group gatherings through virtual participation • Addresses single or multiple questions • Brings together large numbers of different opinions • Fosters consensus-building • Has the ability to provide anonymity to respondents • Offers a controlled feedback process	• Time-consuming process • Potential of low response rates • Labour-intensive • Participant expertise may be unevenly distributed • Team leaders can bias the results
Employer skills surveys (ESS):	• Provide first-hand direct information on demand • Allow detailed analysis of skills requirements (quality of skills and competencies available, etc.) • Offer a possibility to monitor change • Offer the opportunity to link with other firm characteristics, such as business strategies	• Time- and resource- consuming • Regularity and representativeness are costly • Risk of company survey fatigue • Subjectivity of information • Inflated/deflated data • Lack of broader contextual awareness among respondents
Focus groups	• Useful to improve and develop ideas • Strong tools to validate preliminary versions of results/ideas/tools/strategies • Brings new ideas on how to tackle a particular problem • Problems can be redefined as new questions arise • Help to reduce conflicts	• The results obtained may be influenced by the facilitator • Sometimes ideas produced are unworkable • Opinions can be biased (group thinking effect) • Participants may be reluctant to share some opinions in a group • Criticism often appears and 'kills' creative ideas
Graduate surveys or tracer studies	• Relatively low-cost • Easy execution • Ability to combine objective and subjective data • Flexibility to cover the topics relevant for individual education/training institutes • Ability to secure a systematic information input without a permanent information system	• Demand for detailed information about sample groups or national/regional averages for groups with the same age, gender and educational compositions. • Typically confined to workers' early market experience and findings may be biased.
Quantitative models	• Provides high level of detail (sectoral, occupation, qualification) • Typically comprehensive, covering the whole economy in selected geographical unit • Logical consistency • Inclusion of accounting constraints • Recognition of basic economic theories, constraints and influences • Helps to make underlying assumptions explicit • Consistent scenarios across all sectors	• Technical limitations, within fixed resource limits • Limits to current understanding of the way labour markets work • Possibly limited relevance of the past (such models being based on an assumption of a continuation of past patterns of behaviour) • Substantial data requirements • Data limitations • Resource costs of development and maintenance
Scenario development and foresights	• Helps to avoid unpleasant surprises • Helps to 'see' the future • Helps to inspire, engage and enable shared action • Identifies issues for further horizon scanning	• Can be constructed as the 'official future' • People may not be able to suspend their disbelief • May suffer from cultural/cognitive myopia • Cannot be validated

Method	Pros	Cons
Sectoral approaches	• Sector is crucial to understand the key drivers of change in skills demands • Easier to facilitate coordination among all relevant stakeholders and social dialogue • Reduce complexity and scope of interventions • More chances to provide immediate results • Linked to industrial policies etc.	• Can be partial, especially when it comes to quantitative modelling, so should be combined with broader macroeconomic model • Engagement of sector is a challenge in many countries (especially small and medium-sized enterprises in remote areas) • Coverage of informal and unorganized sector is a challenge
Big or real-time data methods	• (Almost) instant and cost-effective • Big volume of information • In-depth information on skills (needs) across and within units (e.g. countries, occupations) • No need to collect 'new' data • Online information declared by individuals may be more 'truthful'	• Information is unstructured and imperfect • Issues of non-representativeness • Measurement errors (e.g. duplication or extended lifespan of vacancies) • Privacy concerns, ethical/legal considerations • Need for advanced data analytical skills • 'Partial' occupational skills profiles

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Experiments

► Objective

Experimental approaches rely on some element of randomization in the allocation of participants into treatment and comparison groups. They can produce highly credible impact estimates but are often costly and, for certain interventions, difficult to implement.

The main method used in experimental approaches is the randomized controlled trial (RCT), a study in which people are allocated at random (by chance alone) to receive a treatment, such as participating in a specific intervention.

RCTs answer cause-and-effect questions regarding the impact of programmes on participants. The objective is to determine not only whether the desired outcome(s) occurred, but also if those outcomes occurred because the programme was implemented. In other words, RCTs aim to determine whether observed changes in the economic or social well-being of beneficiaries can be attributed to a particular intervention, project or programme. This is achieved by constructing a counterfactual scenario, i.e. aiming to answer the question “What would have happened to the programme participant in the absence of the programme?”

► Brief description of the method

The main application of an RCTs is the lottery. In a lottery, a sample of eligible individuals is randomly assigned to one of two groups: those who receive the intervention and those who do not. Impact is the difference in outcomes between the two groups. There are different ways of carrying out the randomization.

Variations

Randomized phase-in design

The main difference between a phase-in design and a lottery design is the method of assigning people to treatment and comparison groups. In practice, potential beneficiaries are randomly divided into two or more groups. The intervention is then rolled out over time, so that individuals from group 1 participate in the intervention first, followed by group 2, group 3, and so on. During the time when groups are on the waiting list, they can serve as the comparison group until they receive the intervention.

Randomized promotion design

There may be cases where it is neither possible nor desirable to exclude any potential beneficiaries and where the intervention is not rolled out over time. In such cases, the randomized promotion method (also called encouragement design) may be suitable. When it is not possible to randomly assign young people to a group that receives benefits and a group that does not, it may be possible instead to randomly promote the intervention. That is, rather than randomizing those who receive the benefits and services, we randomize who is encouraged to receive those benefits.

► Typical questions that this method could answer

What is the overall intervention impact on outcomes A, B and C in group X? ...in context Y?

- For example, the average impact of the training intervention on the income of youth is +US\$20 per month. The intervention has a positive impact on participants' income.

Do the outcomes vary across population groups?

- For example, the average increase in income is \$40 for boys and \$0 for girls. Older youth benefit more than younger youth (\$30 versus \$10, on average). Therefore, the intervention is not equally effective for all participants.

What is the short-term versus the long-term impact of the programme?

- For example, at the end of the programme, we observe an average monthly income for participants of -\$5 (a loss) compared with the controls. Two years after the programme, the average increase in monthly income for the treatment group is \$20.

Is intervention design A or intervention design B more effective in terms of its impact on the direct beneficiaries?

► Centrality of employment

Impact evaluations have traditionally been mainly focused on active labour market programmes, which include four broad classes of intervention – (a) training programmes; (b) subsidized employment programmes; (c) job search assistance programmes; and (d) entrepreneurship programmes. In many countries, these are used to help labour market participants to find and retain better jobs. It is also assumed that the primary objective of the programme is to improve the post-programme labour market outcomes of participants. Despite their widespread adoption, the effectiveness of

these programmes remains controversial. With the increasing emphasis in many governments and international agencies on evidence-based policy advice, it is important to understand which programmes actually ‘work’ – generating gains for participants that are large enough to justify their costs – and which ones are less successful.

► Pros and cons

Pros

- Randomized controlled trials perform well in terms of internal validity when appropriately applied; lottery design is a robust method for developing a counterfactual, because randomization implies no systematic differences between control and treatment groups (relying on fewer assumptions than other methods). It is therefore considered the most credible design to measure impact from the standpoint of individual outcomes.
- This is by far the simplest of all evaluation methods in analytical terms. The impact of the intervention in a random trial is simply the mean difference in outcomes between treatment and comparison groups.
- It allows for communities to be directly involved in the selection process for a fair and transparent allocation of benefits.
- It is easy to implement and communicate to programme staff.

Cons

- Conducting a randomized experiment can be very cost- and time-intensive.
- No ex-post implementation of this method is possible. Planning the evaluation has to be part of planning the intervention (which is good practice in any case, but does not always represent the reality in project work).
- It requires a comparison group to be excluded from the intervention for the duration of the impact evaluation. Political and/or ethical concerns may emerge in spite of the transparent allocation criterion of randomization (see more in the section Adapting random designs to different contexts below).
- A key assumption is that the intervention itself does not influence the broader environment in which it operates, thereby affecting the labour market experiences of the control group and invalidating its role as ‘counterfactual’.

- Organizations must ensure that partners and local stakeholders consent to the method.
- The internal validity of a lottery design depends on the fact that the randomization works and is maintained throughout the study, which may not be easy to achieve. This condition may be threatened if randomization is implemented incorrectly, if treatment or comparison groups do not comply with their status (that is, if treatment individuals do not take up the intervention or comparison individuals receive the programme), if participants drop out of the study prior to completion, or if there are spillover effects.
- External validity can be an issue.

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Quasi-experiments

► **Objective**

As with experimental approaches, the main aim of quasi-experimental approaches to impact evaluation is to identify the causal impact of a programme or intervention on the post-programme experiences of programme participants. The post-programme experiences of programme participants are compared with a ‘control group’ of persons who have not participated in the programme.

► **Brief description of the method**

The defining difference between experimental and quasi-experimental approaches concerns the construction of the control group. With experimental methods, random allocation to the programme – or

treatment – seeks to ensure that the group of non-participants – or control – does not differ from the group of programme participants in any systematic way that may affect post-programme outcomes independently of the treatment.

Quasi-experimental methods employ ex-post statistical corrections and/or programme design features to identify an appropriate control group ex post. These methods include:

Matching methods: Propensity score matching and other statistical corrections for sample selection bias seek to nullify any systematic differences between non-participants and participants, so that any important factors that may affect differences between outcomes experienced by the control group and by programme participants are factored out.

Difference-in-difference: This method first compares post-programme experiences with pre-programme experiences of participants; then it does the same for a ‘similar’ group of non-participants. Programme impact is then evaluated in terms of the difference (between control and treatment) in the difference (in pre- vs. post-programme experiences) between the two groups in terms of the outcome of interest.

Regression discontinuity: This approach uses a design feature of the programme itself in order to identify the control group. The approach compares the (post-programme) experiences with participants and non-participants who are close to each other in some feature that determines programme participation. For example, if a programme has an upper age limit of say 27, one might compare the experiences of 27 year-olds with a ‘control’ group of 28 year-olds not eligible for programme participation.

Very often, two or more of these methods can be combined to better identify the control group.

► Typical questions that this method could answer

These are precisely the same as for experimental evaluations, but they can be applied to a broader range of interventions.

What is the overall intervention impact on outcomes A, B and C in group X? ...in context Y?

- For example, the average impact of the training intervention on the income of youth is +\$20 per month. The intervention has a positive impact on participants’ income.

Do the outcomes vary across population groups?

- For example, the average increase in income is \$40 for boys and \$0 for girls. Older youth benefit more than younger youth (\$30 versus \$10, on average). Therefore, the intervention is not equally effective for all participants.

What is the short-term versus the long-term impact of the programme?

- For example, at the end of the programme, we observe an average monthly income for participants of –\$5 (a loss) compared with the controls. Two years after the programme, the average increase in monthly income for the treatment group is \$20.

Does the intervention have spillover effects?

- For example, not only do participants have a \$20 higher average income, their neighbours also experienced a \$5 increase.

Is intervention design A or intervention design B more effective?

► Centrality of employment

Impact evaluations have traditionally been mainly focused on active labour market programmes, which include four broad classes of intervention – (a) training programmes; (b) subsidized employment programmes; (c) job search assistance programmes; and (d) entrepreneurship programmes. In many countries, these are used to help labour market participants to find and retain better jobs. It is also assumed that the primary objective of the programme is to improve the post-programme labour market outcomes of participants. Despite their widespread adoption, the effectiveness of these programmes remains controversial. With the increasing emphasis in many governments and international agencies on evidence-based policy advice, it is important to understand which programmes actually ‘work’ – generating gains for participants that are large enough to justify their costs – and which ones are less successful.

► Pros and cons

Pros

- Quasi-experimental methods are much cheaper than experimental methods.
- Such methods are also applicable in a broader range of contexts and interventions than experimental evaluations.
- Some of these methods can also take into account the effects of programmes on the broader environment, such as in the application of difference-in-difference approaches to large-scale interventions that are also likely to impact the labour market experiences of non-participants.

- They do not normally require ex-ante action at programme level, in contrast to experimental methods; however, depending on the specific method applied, pre-programme planning of control group identification may be advisable.

Cons

- Appropriate implementation of the methods requires a much greater knowledge and understanding of quite sophisticated statistical techniques and must therefore be implemented by adequately trained staff.
- These methods use a variety of techniques to appropriately identify an 'as if' randomly chosen control group; however, they are not randomly chosen and verification of the appropriate identification of the control group can be difficult.
- External validity is also an issue for this approach.

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Meta-analysis

► Objective

The purpose of meta-analysis is to provide a reliable estimate of the relationship between one phenomenon and another, based on a range of studies. An example could be the impact of training programmes on the post-programme employment prospects of participants. Where sufficient estimates are available, meta-analysis can further seek to identify the causal factors underlying the relationship; not just 'what works' but 'why what works works'. Meta-analyses can be performed where there are multiple studies seeking to identify the same, or similar effects. It is, in

essence, “a quantitative survey of a literature reporting estimates of the same parameter” (Paldam, 2015). In this context, it is important that the studies under analysis are sufficiently similar and that their differences can be recorded in an appropriate quantitative (or qualitative) manner.

► **Typical questions that these methods can answer**

Paldam (2015) suggests that meta-analysis can be used to answer two fundamental questions in relation to estimates in existing studies:

- Do the estimates converge to a meta-average that provides a ‘good’ approximation of the true relationship?
- Can we identify the factors underlying variations in the estimated effects?

Paldam (2015) argues that meta-analysis is better at answering the first of these questions.

In practice, meta-analyses have been performed in a variety of fields. For the labour market, they have been used to assess the effects of minimum wage on employment, for example (Card and Krueger, 2007) or on the effects of active labour market policies (Card et al., 2017).

Performing a meta-analysis involves a number of steps:

- Identification of a research question and a justification for the meta-analysis.
- The sampling process: This involves the identification of relevant impact evaluations or quantitative assessment studies. It is typically based on searches of multiple sources and databases. First, target websites and databases need to be defined, or other methods to search for information (e.g. through networks). Second, strings or specific titles need to be defined, which will be used to systematically identify relevant content in previously defined sources.
- Inclusion criteria of the potential lists: This includes defining the languages in which the search will be conducted and what type of studies will be included. Typically, the selection of studies includes an assessment of the quality of those articles, based, for example, on whether studies eliminated biases in their analyses, as well as risks of self-selection. To achieve this, studies can be selected based on their methodology.
- Coding: The analysis includes a process of coding and classification of the estimates, including intervention characteristics, target groups, period and scope of the interventions, outcomes (typically income and employment, but also outcomes related to the quality of employment), unit of observation, characteristics of the sample and techniques used in the studies.

Once the data set of estimates, characteristics and covariates is completed, meta-analyses are used to summarize the results and to gain an understanding of whether the effects can be generalized. The goal is to derive improved parameter estimates of the effects under analysis. For example, Card et al. (2017) consider an outcome observed for members of both a treatment group and a comparison group for a defined set of studies and their estimated effects (β). They then manage to express the estimated effects in terms of observed sources of heterogeneity in the “limit effect” (β), arising, for example, from differences in the type of intervention, characteristics of target group or contextual factors, and control for the unobserved determinants of the limiting intervention effect for a given study. Next, they propose the use of simple regression models based on equation (3) to analyse the intervention effects on the relevant outcomes available in the meta-sample.

► Centrality of employment to the methods

With a focus on employment outcomes, the ILO has recently promoted studies that use this method.

First, O’Higgins and Moscariello (2017) employ meta-analysis to look at the impact of labour market institutions on youth labour market outcomes. Specifically, the paper examines the effects of minimum wages on youth employment, based on 328 estimates from 15 countries. The meta-analysis first confirms the findings that the literature review reported in O’Higgins (2001) – that, in the overwhelming majority of cases, the estimated negative effects of minimum wages on youth employment are either zero (i.e. not statistically significant) or very small. Hence, removing or lowering minimum wages for young people is unlikely to be an effective tool for improving the employment prospects of the young. The meta-analysis further identifies the presence of strong complementarities between minimum wages and other labour market institutions. For example, minimum wages and employment protection legislation (EPL) are mutually supportive institutions, so the introduction or raising of minimum wages will have less of a negative impact on youth employment in the presence of strong EPL. Moreover, in high-income countries, minimum wages have smaller disemployment effects in the presence of the appropriate collective bargaining arrangements – specifically in the presence of strong worker representation, accompanied by coordinated but decentralized collective bargaining arrangements. Overall, minimum wages tend to have more detrimental effects on youth labour markets in lower-income countries where, inter alia, labour market institutions are

weaker, suggesting that minimum wages are a more useful instrument when other protective labour market institutions are already in place and operating effectively.

The second study focuses on youth employment interventions. Kluve et al. (2017) analyse the effects of different interventions on labour market outcomes of youth. In addition, they attempt to explore the role of context and programme design. They conduct a systematic review of empirical evidence on the labour market outcomes of active labour market programmes (ALMPs) targeting youth worldwide. Interventions in this review include skills training, entrepreneurship promotion, employment services and subsidized employment. Outcomes of interest included employment, earnings and business performance. The focus was studies conducted in low-, middle- or high-income countries. A systematic search was performed for relevant evidence across more than 70 sources, using search terms in English, French, German, Portuguese and Spanish. After reviewing some 30,000 registries, 113 eligible impact evaluations were identified, including 2,259 effect sizes. The meta-analysis indicated positive effects of entrepreneurship promotion and skills training on employment and earnings. Effects of employment services and subsidized employment were generally small and non-significant. Moreover, the analysis estimated larger programme effects in low- and middle-income countries than in high-income countries, and in programmes targeting disadvantaged youth.

The third study focuses on active labour market policies in general (for youths and adults), highlighting the Latin American experience. Escudero et al. (2019) compile a meta database of 51 studies and extract a sample of 296 impact estimates. The analysis includes interventions in skills training programmes (around 75 per cent of the estimates) and also labour market intermediation services, private sector incentives (such as employment subsidies and self-employment and micro-enterprise creation programmes) and public works. Outcome variables include earnings and employment, and some measures of job quality, such as hours worked and formality rates. The study finds that ALMPs in Latin America and the Caribbean are particularly effective in increasing the probability of having a formal job, compared with other outcomes and in particular, that training programmes are slightly more effective than other types of intervention. In fact, formal employment is also the outcome category that is most likely to be impacted positively by these programmes. In terms of targeting, the study finds that ALMPs in Latin America and the Caribbean work better for women than for men, and for youth compared with

prime-age workers. Finally, medium-run estimates are not more likely to be positive than short-run estimates, while programmes of short duration (four months or less) are significantly less likely to produce positive effects compared with more prolonged interventions.

Finally, Jessen and Kluve (2019) explore the effectiveness of formalization interventions in low- and middle-income countries. Interestingly, while a multitude of interventions have been implemented to increase the formalization of workers and economic units, there is little empirical evidence on these initiatives. The study included the following types of intervention: information campaigns, simplified registration procedures, reductions of payroll taxes, and interventions enforcing formalization. The study identified 32 academic studies and compiled a database of 157 impact estimates that empirically evaluate one or more of these formalization interventions. The quantitative analysis correlates the impact estimates of the studies – effect size, sign and statistical significance – with explanatory factors such as intervention type, outcome variable, scope of the intervention, and other covariates. Several key findings emerge. First, the intervention type is not a strong determinant for the effectiveness of formalization interventions. Second, the outcome ‘worker registration’ shows significantly better results than other outcomes (for example, firm registration). Third, interventions at scale are more effective on average than singular ‘programmes’. This is in line with ILO Recommendation 204, which states that an integrated approach is required to facilitate the transition from the informal to the formal economy. It is in line with episodes of formalization where multiple and complementary interventions were implemented.

► Pros and cons

Meta-analysis directly addresses the issue of external validity – a weak point in individual studies of impact. As noted at the outset, given the inclusion of a sufficient number of independent estimates in the meta-analysis, the method can also provide additional information on the source of effects: for example, why the effects of minimum wages on employment are negative in some circumstances, and positive in others. It is, however, susceptible to publication bias.⁵ There are a number of tests that can be employed to reduce this problem. The key issue is the quality of the underlying estimates. Systematic reviews seek to address these

5 Publication bias arises where studies are more likely to reach the light of day if they obtain one type of a result rather than another.

issues by specifying a series of additional criteria that must be fulfilled for the inclusion of studies in a meta-analysis.

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► Annex

► Table 2. Previous reviews, guidance documents and other tools

Author(s)	Document
Aloui & Gbemenou (2019)	• Instruments de modélisation des politiques économique et de l'emploi au Maroc: Une cartographie des outils. Prepared for ILO project "Advancing the Decent Work Agenda in North Africa"
Destefanis (2017)	• A literature review of the main elements for a social-cost benefit analysis of youth guarantees
EC & ILO (2015)	• Social cost-benefit analysis of youth guarantees: A learning package
EC & ILO (2017)	• Towards a methodology to estimate the social costs and benefits of the Youth Guarantee: A background paper
Ernst, Miller & Imschoot (2015)	• The employment dimension of infrastructure investments: A guide for employment impact assessments. Employment Working Paper No. 178 (Geneva, ILO)
FAO & ILO (2018)	• Manual de metodología de estimación de empleo verde en la bioenergía (Rome, Food and Agriculture Organization of the United Nations (FAO) & Geneva, International Labour Office (ILO))
Gibson & Flaherty (2017)	• Employment impact assessments: A review of methodologies. Strengthen Publication Series. Working Paper No. 3 (Geneva, ILO)
Gibson (2011)	• Assessing the impact of trade on employment, Chapter 3 of M. Jansen, R. Peters and J. M. Salazar Xirinachs (eds.) "Trade and employment: From myths to facts" (Geneva, ILO)
ILO (2013)	• Monitoring and evaluation of youth employment programmes: A learning package (Geneva)
ILO (2015)	• Methodologies for sectoral employment impact assessment: An internal ILO guide (Geneva)
ILO (2016)	• Employment Policy Brief "Investment in infrastructure – Assessment of employment outcomes using macro-level analysis: Approach and indicators" (Geneva)
ILO (2016)	• STED RBM and M&E manual (Geneva)
ILO (2017)	• Skills needs anticipation. Systems and approaches. Analysis of stakeholder survey on skill needs assessment and anticipation (Geneva)
ILO (2017)	• Guide for evaluating the employment potential of projects and public investment programmes in Cameroon [English and French version available] (Geneva)
ILO (2018)	• What works in youth employment? Guide on measuring decent jobs for youth. Monitoring, evaluation and learning in labour market programmes (Geneva)
Kluve et al. (2017)	• Interventions to improve labour market outcomes of youth: A systematic review of training, entrepreneurship promotion, employment services, mentoring, and subsidised employment interventions
Shaffer (2018)	• "Improving impact assessment of the effects of trade on employment: Study on qualitative and mixed method approaches", Employment Working Paper No. 178 (Geneva, ILO)
Vaidya (2017)	• Review of impacts on roads sector investments on employment, Strengthen Working Paper No. 2 (Geneva, ILO)

► Table 3. List of studies

Name	Type of tool	Type of intervention	Indicator (main)
• Alarcón, J.; Ernst, C.; Khondker, B.; Sharma, P. 2011. Dynamic Social Accounting Matrix (DySAM): Concept, methodology and simulation outcomes. The case of Indonesia and Mozambique. ILO Employment Sector Employment Working Paper No. 88. (Geneva, ILO)	• Social Accounting Matrix (SAM)	• Infrastructure project	• Number of jobs
• Alarcon; Ernst. 2017. Decent work inter-regional SAM modelling with employment satellite extension including regional infrastructure scenarios, Case study 2005 IRSAM, EMP Working Paper No. 217	• Social Accounting Matrix (SAM)	• Infrastructure project	• Other
• Barsoum et al. 2015. Evaluating the effects of entrepreneurship edutainment in Egypt: Randomized controlled trial baseline report, September 2015	• Experiments (RCTs)	• ALMP project	• Other
• Barussaud. 2017. Les politiques sectorielles intégrées de formalisation de l'emploi: L'exemple du secteur commercial au Burkina Faso, ILO Employment Policy Department Working Paper No. 220 (Geneva, ILO)	• Qualitative assessments	• Sectoral policy	• Qualitative assessment
—. 2018. Etude-diagnostic sur le fonctionnement des filières commerciales informelles et la promotion de l'emploi décent: Exemple de la commercialisation du vivrier marchand en Côte d'Ivoire, mimeo ILO (Geneva, ILO)	• Qualitative assessments	• Sectoral policy	• Qualitative assessment
• Bausch et al. 2017. The impact of skills training on the financial behaviour, employability and educational choices of rural young people: Findings from a randomized controlled trial in Morocco	• Experiments (RCTs)	• Skills project	• Business performance
• Berbée. 2018. Constraints and good practice in women's entrepreneurship in MENA: New evidence on gender attitudes towards women in business	• Qualitative assessments	• ALMP project	• Qualitative assessment
• Bivens. 2014. The short- and long-term impact of infrastructure investments on employment and economic activity in the U.S. economy, EPI Briefing Paper #374	• Local multipliers	• Infrastructure project	• Number of jobs
• Charpe. 2017a. Local multipliers in a selection of sub-Saharan countries, mimeo ILO (Geneva, ILO)	• Local multipliers	• Infrastructure project	• Other
—. 2017b. Sectoral employment multipliers in Rwanda: Comparing local multipliers and input-output analysis (Geneva, ILO)	• Local multipliers	• Infrastructure project	• Number of jobs

Name	Type of tool	Type of intervention	Indicator (main)
• Chatani; Ernst. 2011. "Fiscal stimulus and employment: The fiscal stimulus package in Indonesia and its impact on employment creation", in: The global crisis. Causes, responses and challenges – Essay from an ILO perspective (Geneva, ILO)	• Social Accounting Matrix (SAM)	• Macro policy	• Number of jobs
• Diwan et al. 2015. Women business training programme in Kenya: Impact of incentives, Employment Working Paper No. 191	• Experiments (RCTs)	• ALMP project	• Business performance
• ECOCENTRA SARL. 2017. Assessing employment impact of road sector investments in Lebanon and Jordan, Final report, mimeo	• Input-Output Analysis	• Infrastructure project	• NA
• Elsayed; Roushdy. 2017. Empowering young women through business and vocational training: Evidence from a field intervention in rural Egypt	• Quasi-experiments	• ALMP project	• Employability
• Ernst; Iturriza. 2011. Tackling deforestation in Mozambique: Reconciling the social, economic and environmental agenda	• Social Accounting Matrix (SAM)	• Sectoral policy	• Number of jobs
• Ernst; Peters. 2012. Employment dimension of trade liberalization with China: Analysis of the case of Indonesia with Dynamic Social Accounting Matrix, Employment Working Paper No. 112	• Social Accounting Matrix (SAM)	• Macro policy	• Number of jobs
• Ernst; Sarabia. 2015. Urgent plan to activate the Egyptian economy: An employment impact assessment, Employment Working Paper 176	• Input-Output Analysis	• Infrastructure project	• Unemployment
• FAO; ILO. 2018. Empleos verdes en el sector de bioenergías en la Provincia de Santa Fe	• Input-Output Analysis	• Sectoral policy	• Number of jobs
• Fiala. 2015. Access to finance and enterprise growth: Evidence from an experiment in Uganda	• Experiments (RCTs)	• ALMP project	• Business performance
• Galindez, R. Forthcoming. Impact of fiscal reforms on the Mongolian labour markets 2017–2021 (ILO, Geneva)	• General Equilibrium	• Macro policy	• Unemployment
• Gardiner; Weidenkaff; Bausch. 2017. Promoting youth employment and empowerment of young women in Jordan: An assessment of active labour market policies	• Mixed methods, applications	• ALMP project	• Other
• Ghali et al. 2018. Women's and youth empowerment in rural Tunisia: An assessment using the Women's Empowerment in Agriculture Index (WEAI)	• Mixed methods, applications	• ALMP project	• Empowerment
• ILO; ADB. 2014. ASEAN community 2015: Managing integration for better jobs and shared prosperity (Bangkok, ILO)	• General Equilibrium	• Macro policy	• Number of jobs

Name	Type of tool	Type of intervention	Indicator (main)
• ILO; EIB. 2014a. Evaluation des impacts sur les emplois indirects et induits des projets financés par la BEI au Maroc	• Input-Output Analysis	• Infrastructure project	• Number of jobs
—, 2014b. Impact macro-économique sur l'emploi des investissements en infrastructure en Tunisie	• Input-Output Analysis	• Infrastructure project	• Number of jobs
—, 2014c. Macroeconomic employment impact of EIB infrastructure investment in Jordan: Impact of the Amman ring road and the Tafila windpark	• Input-Output Analysis	• Infrastructure project	• Labour intensity
—, 2015. Employment impact of EIB infrastructure investments in the Mediterranean partner countries: Egypt study	• Input-Output Analysis	• Infrastructure project	• Number of jobs
• ILO; World Bank. 2018. Assessing employment impact of road sector investments in Lebanon and Jordan	• Mixed methods, applications	• Infrastructure project	• Number of jobs
• ILO. 2014a. Employment impact assessment of infrastructure in three Mediterranean partner countries (Jordan)	• Social Accounting Matrix (SAM)	• Infrastructure project	• Number of jobs
—, 2014b. Employment impact assessment of infrastructure in three Mediterranean partner countries (Morocco)	• Input-Output Analysis	• Infrastructure project	• Number of jobs
—, 2014c. Employment impact assessment of infrastructure in three Mediterranean partner countries (Tunisia)	• Input-Output Analysis	• Infrastructure project	• Number of jobs
—, 2015a. Boosting youth employability in Morocco - I: Qualitative assessment of MEDA Maroc's 100 hours to success programme, September 2015	• Qualitative assessments	• ALMP project	• Qualitative assessment
—, 2015b. Employment impact infrastructure investments in the Mediterranean partner countries: Study summary report (Geneva)	• Input-Output Analysis	• Infrastructure project	• Number of jobs
—, 2016. Employment Policy Brief "Investment in infrastructure – Assessment of employment outcomes using macro-level analysis: Approach and indicators" (Geneva)	• Mixed methods, applications	• Infrastructure project	• Labour intensity
—, 2017a. Employment impact assessment of infrastructure in four Mediterranean partner countries (Egypt)	• Mixed methods, applications	• Infrastructure project	• Number of jobs
—, 2017b. Evaluating the results of an agricultural cooperative support programme: Business practices, access to finance, youth employment (Geneva)	• Quasi-experiments	• ALMP project	• Business performance
—, 2017c. Fortalecimiento de impacto en el empleo de las políticas sectoriales de Guatemala: Agricultura, construcción y suministro de energía	• Mixed methods, applications	• Sectoral policy	• Labour intensity

Name	Type of tool	Type of intervention	Indicator (main)
—. 2017d. Fortalecimiento de impacto en el empleo de las políticas sectoriales de Honduras: Agricultura, construcción y suministro de energía	• Mixed methods, applications	• Sectoral policy	• Labour intensity
—. 2017e. Skill needs anticipation. Systems and approaches. Analysis of stakeholder survey on skill needs assessment and anticipation (Geneva)	• Mixed methods, applications	• Skills project	• Qualitative assessment
—. 2017f. Towards evidence-based active labour market programmes in Egypt: Challenges and way forward	• Qualitative assessments	• ALMP project	• Qualitative assessment
• Isaza-Castro, J. Forthcoming. Assessing the impacts of large-scale macroeconomic reforms on labour markets, poverty and income distribution: The case of Colombia (Geneva, ILO)	• Partial Equilibrium	• Macro policy	• Number of jobs
• Jiménez. 2018. La calidad del empleo en el sector de energía derivada de la biomasa en la provincia de Salta	• Qualitative assessments	• Sectoral policy	• Qualitative assessment
• Khadr. 2018. Assessing the impact on employability and quality of employment of non-formal apprenticeships in agriculture-related trades (in Egypt)	• Quasi-experiments	• Skills project	• Other
• Kherfi et al. 2018. Labour market challenges of Palestinian refugees in Lebanon: A qualitative assessment of Employment Service Centres	• Qualitative assessments	• ALMP project	• Qualitative assessment
• Kluve et al. 2014. Boosting youth employability in Morocco - II: Randomized controlled trial baseline report, December 2014	• Experiments (RCTs)	• ALMP project	• Other
• Kucera; Jiang. 2017. China and the great trade collapse: Employment effects of falling exports to the EU and US	• Social Accounting Matrix (SAM)	• Sectoral policy	• Number of jobs
—. 2018. "Structural transformation in emerging economies: Leading sectors and the balanced growth hypothesis", under review at academic journal	• Sectorial analysis	• Sectoral policy	• Productivity
• Kucera; Roncolato. 2011. Trade liberalization, employment and inequality in India and South Africa, International Labour Review, Vol. 150, Nos. 1-2	• Social Accounting Matrix (SAM)	• Macro policy	• Number of jobs
—. 2016. "The manufacturing-services dynamic in economic development", in International Labour Review, Vol. 255, No. 2, pp. 171-199	• Sectorial analysis	• Sectoral policy	• Productivity
• Kucera; Tejani. 2014. "Feminization, defeminization, and structural change in manufacturing", in World Development, Vol. 64, pp. 569-582	• Sectoral analysis	• Sectoral policy	• Change in composition of employment

Name	Type of tool	Type of intervention	Indicator (main)
• Kucera; Roncolato; Uexkull. 2011. Trade contraction and employment in India and South Africa during the global crisis	• Social Accounting Matrix (SAM)	• Sectoral policy	• Number of jobs
• Lachaud et al. 2018. The impact of agri-business skills training in Zimbabwe: An evaluation of the Training for Rural Economic Empowerment (TREE) programme	• Quasi-experiments	• Skills project	• Business performance
• Lieuw-Kie-Song; Abebe. 2018. "Analysis of the employment effects of infrastructure investment in Rwanda using Multiplier Analysis of Construction sub-sectors", mimeo (Geneva, ILO)	• Social Accounting Matrix (SAM)	• Infrastructure project	• Labour intensity
• Malunda; Kiberu. 2016. Employment diagnostic analysis and geographical estimation of the deficit of productive jobs in selected districts in Rwanda, ILO/MIFOTRA	• Partial Equilibrium	• ALMP project	• NA
• O'Higgins; Pica. 2017. Complementarities between labour market institutions and their causal impact on youth labour market outcomes. Employment Policies Department Discussion Paper Series. No. 224. (Geneva, ILO)	• Quasi-experiments	• Labour market reform	• Number of jobs
• Oriana et al. 2015. Women's economic empowerment in action: Evidence from a randomized control trial in Africa, Employment Working Paper No. 187	• Experiments (RCTs)	• ALMP project	• Empowerment
• Roncolato; Kucera. 2014. "Structural drivers of productivity and employment growth: A decomposition analysis for 81 countries", in Cambridge Journal of Economics, Vol. 38, No. 2, pp. 399–424	• Sectorial analysis	• Sectoral policy	• Productivity
• Schwarz. 2017. Empleo verde de la bioenergía en la provincia de Misiones	• Qualitative assessments	• Sectoral policy	• Qualitative assessment
• Shaffer. 2018. Improving impact assessment of the effects of trade on employment: Study on qualitative and mixed method approaches, Employment Working Paper No. 178 (Geneva, ILO)	• Mixed methods, applications	• Macro policy	• NA
• Sinha, A. et al. 2015. Employment dimension of infrastructure investment: State level input-output analysis, Employment Working Paper No. 168 (Geneva, ILO)	• Input-Output Analysis	• Infrastructure project	• Labour intensity
• Stangl et al. 2015. Enhancing women's entrepreneurship in Kenya: Initial qualitative assessment of the ILO's GET Ahead business training programme (Geneva, ILO)	• Qualitative assessments	• ALMP project	• Qualitative assessment
• Yoonyoung, C. et al. 2015. Differences in the effects of vocational training on men and women: Constraints on women and drop-out behaviour	• Quasi-experiments	• Skills project	• Business performance

**Reference guide
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Impact
Assessment (EIA)**

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