

Impacts of international trade on the labour market:

Common methodological approaches for macro- and meso-level assessments

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► Introduction

It is generally acknowledged that, by driving structural change as well as productivity, international trade influences the level of employment, income and other labour market outcomes (McMillan, Rodrik and Verduzco-Gallo 2014; UNCTAD 2013a). Given that GSCs have been operating for several decades,¹ it is not surprising that the effects of trade on labour markets have manifested themselves in countries of all income levels (Baldwin and Okubo 2019; Gereffi, Fernandez-Stark and Psilos 2011; Milberg 2004; UNCTAD 2013b). Excessive and increasing income inequality (ILO 2015, 2017a, 2019a; UNCTAD 2019d) within a context of hyperglobalization (Rodrik 2012; UNCTAD 2018b) has also raised concerns over the effects of trade on working conditions.

It is important to consider whether the tools used for evaluating the labour market impact of international trade are the most adequate, as such evaluations inform policy design. This chapter analyses methodological approaches for the empirical assessment of the labour market impact of international trade at the macro and meso levels.² It considers the underlying assumptions, data requirements and the advantages and limitations associated with each approach. A major takeaway is that the approaches commonly used for such assessments tend to focus on changes in the level of wages and employment, while paying less attention to job quality and to other working conditions associated with decent work. At the same time, it is worth noting that, despite these limitations, frameworks are continually adjusted to include new improvements.

The general equilibrium (GE) and partial equilibrium (PE) models covered in section 2.1 below are commonly employed for assessing the labour impact of trade at the macro and sectoral level of analysis, respectively.³ When

1 GSCs refer to production and related processes that take place across several countries. GSCs are also known as GVCs, or as “trade in value-added, production sharing, supply chains, outsourcing, offshoring, vertical integration, or fragmented production” (Elms and Low 2013, xv).

2 While the choice of methodology depends on the research question and the purpose of the study, rather than the other way round, it is also worth noting here that data availability and related constraints affect this choice.

3 GE is increasingly also being used at the micro level, using structural estimations based on micro-level data.

considering changes in trade policy,⁴ both types of models can be used to assess the impact of changes on the level of wages and employment. They can also be used to analyse the impact on informality; however, the impact on other labour conditions is more difficult to capture under these frameworks. Input-output (I-O) multiplier analysis is another common method for assessing the impact of trade on similar labour market outcomes, and it is particularly useful in the context of GSCs (ILO 2015). This framework is discussed in section 2.2.

Econometric techniques⁵ are also frequently used for the empirical assessment of the labour impact of trade at the macro and meso level of analysis. In general, econometrics offer a flexible framework that has been used to assess the impact of trade in relation to issues such as wage inequality, informality, wage growth and child labour. Although econometric techniques are not further discussed here, they are addressed in a different chapter of this compendium.⁶

Qualitative and mixed-methods approaches (see section 2.3) have also been used, albeit less frequently, to assess the labour impact of trade. Even though these approaches are context-specific and often require a substantial investment of time and financial resources to collect and analyse the information, they are able to provide a detailed account of how labour impacts are experienced by workers, including in dimensions of decent work. Another important aspect worth noticing is that the methodological approaches presented here can be, and are, normally combined to assess the labour impact of trade, as will be discussed in the following sections.

Finally, despite the improvement and evolution of the available frameworks, there is still a need for methodological approaches to take into account a broader set of questions and indicators of decent work. This is essential for future research and the adoption of appropriate policies. This discussion is presented in section 2.4, which is followed by the conclusion.

4 Trade policy is understood here as the regulations that govern exports and imports between countries. It includes both tariff measures (taxes on imports or exports) and NTMs, commonly defined as policy measures that can have an effect “on international trade in goods, changing quantities traded, or prices or both” (UNCTAD 2010a, xvi). Among other things, NTMs include TBTs, in addition to SPS measures (UNCTAD 2019a).

5 Such as instrumental variables, regression discontinuity and difference-in-difference, which are used in quasi-experimental studies.

6 See also Aleman-Castilla (2020) and Aleman-Castilla and Rodríguez-Pueblita in this volume, on the use of structural and quasi-experimental approaches, and Hernandez (2020), on econometric approaches and their use for the empirical assessment of the labour impact of international trade policy. The latter paper is a longer version of the present chapter.

► 2.1 General and partial equilibrium approaches

The most common methodological approaches for the ex ante assessment of the impact of trade policy changes are the GE and PE approaches, specifically the CGE and PE models (Cheong 2010a; François 2004; Plummer, Cheong and Hamanaka 2010). While GE is used for the study of impacts at the macro level, PE is used for assessments at the sectoral level of analysis.⁷ The underlying assumptions, data requirements, strengths and weaknesses of the two approaches are considered in this section.

2.1.1 General and partial equilibrium models for assessing the labour market impact of changes in trade policy

A characteristic of GE models is that they consider how policy changes affect not only the market in which the policy shock takes place, but also interrelated markets (such as markets of substitutes and complementary goods and input markets). An example of this type of model is computable general equilibrium (CGE) models, which are widely used for the analysis⁸ of the macroeconomic impact of changes in trade policy. These models can be defined as computer-based simulations that are able to run counterfactual scenarios.⁹ Notably, different CGE models have been developed to analyse the impact of trade policies, such as the GTAP model¹⁰ (and those based on the GTAP Data Base, such as the Modelling International Relationships in Applied General Equilibrium (MIRAGE) model), in addition to various toolboxes based on CGE models.¹¹

7 See Hernandez (2020) for more detail on both approaches. See also Cheong (2010a and 2010b), Cheong, Jansen and Peters (2013), WTO and UNCTAD (2012) and Yotov et al. (2016).

8 The analysis is commonly ex ante, but the framework can be used for ex post analysis too. It is worth noting that ex ante assessments tend to yield more optimistic results concerning the labour market impact of changes in trade policy than ex post assessments (see, for example, Grumiller (2014) and O'Leary, Eberts and Pittelko (2012), both of which examine NAFTA).

9 A counterfactual scenario refers to a hypothetical situation in which changes in policy have not occurred and which can therefore be compared with a situation in which the changes have already taken effect.

10 The latest version of the GTAP model is version 7 (for details, see GTAP (2019) and Corong et al. (2017)).

11 UNCTAD (2017), for example, has designed a trade and gender toolbox for assessing the impact of trade from a gender perspective based on a CGE model (see also UNCTAD (2019b)).

Table 2.1 shows a typical question, theoretical assumptions and an overview of the labour impact of trade based on a standard CGE model. Some examples of the use of CGE models for ex ante and ex post impact assessments can be found in the longer version of this chapter (Hernandez 2020) and in ILO (2021). It is important to note that many empirical studies are based on the GTAP model (Hertel 1997), which is a multiregional and multisectoral model (see Cheong, Jansen and Peters (2013) for examples). It incorporates a global banking sector and also takes into account international trade and transport margins. GTAP also includes a database (see Aguiar et al. (2019a)) on bilateral trade, production and consumption of final and intermediate goods and services.

It is also worth bearing in mind that trade and economic models in general (and the results obtained by using them) depend on economic theories, and, in that sense, they cannot be said to be ideologically neutral. As seen in table 2.1, standard CGE models, for instance, are grounded in neoclassical economic theories, as may be seen from their underlying assumptions.¹² In the most basic standard setting, when the overall economic impacts (on GDP and welfare) are considered, the labour market is represented in a way that treats the labour supply as fixed, while a uniform and flexible wage allows labour supply and demand to reach equilibrium. Neoclassical CGE models, which assume full employment, postulate that wages can fall until everyone who wants to work is employed. This assumption has been criticized severely for its lack of realism, as seen in section 2.1.2.

Structuralist CGE models share some of the underlying assumptions of neoclassical CGE models, but they differ in critical aspects.¹³ For instance, structuralist CGE models assume that competition is imperfect¹⁴ and that income and employment are determined by aggregate demand (see, for instance, Raza et al. (2016)). If an economy is demand-constrained, an increase in exports, independently of a rise in imports, will increase employment. The production technology in structuralist models features underutilized resources, while installed capital equipment features excess capacities. This means that, if aggregate demand increases, there will be an increase in the use of capital, which implies an increase in labour demand too. Despite these characteristics, structuralist CGE models do not overcome all the limitations of their neoclassical counterparts, as discussed in section 2.1.2.

¹² For details, see Burfisher (2021).

¹³ See also Gibson and Van Seventer (2000) and Taylor (1990) for a discussion of the differences between neoclassical and structuralist CGE models.

¹⁴ For a critique of both the perfect and the imperfect competition assumption, see Shaikh (1980).

► **Table 2.1 Overview of the labour impact of trade in standard CGE models**

Typical question: What are the effects of a change in trade policy on real GDP, trade flows and aggregate employment?

Trade policy: Tariffs (e.g. ad valorem tariff or percentage of price); non-tariff measures (NTMs) (ad valorem equivalents (AVEs))¹

Typical theoretical assumptions:

- Perfect competition
- Optimizing economic agents
- Full employment
- Supply-constrained output and employment
- Flexible prices (including wages)
- Traded goods are imperfect substitutes (Armington assumption)
- Tariffs and NTMs treated as costs

Impact overview:

- The interdependence among sectors implies that a trade policy shock would be propagated throughout the economy, leading to a new equilibrium (a new level of GDP, trade flows and aggregate employment).
- In the model, the economy and the interactions among its sectors are represented by a system of equations. These equations are solved simultaneously to find the new equilibrium where, at a particular set of prices, supply and demand are equal in each sector.

Data and parameters: Trade flows; policy changes (e.g. ad valorem tariffs and AVEs); elasticities of substitution regarding goods and factors of production (typically based on previous studies); social accounting matrices for model calibration. The GTAP Data Base is a common source of data for CGE models. The World Integrated Trade Solution database can be used as a source of trade-related data, including tariffs. Common sources of NTMs are the I-TIP Goods database created by the WTO, the Trade Analysis Information System (TRAINS) database,² and the WTO Environmental Database of NTMs with environment-related objectives. The WTO also has two databases that focus on NTMs and specific trade concerns: the Technical Barriers to Trade Information Management System and the Sanitary and Phytosanitary Information Management System.

Note:

¹ Two methods used for the computation of AVEs are the direct method, based on prices, and the indirect method, based on quantities (see Disdier and Fugazza (2019)).

² The TRAINS portal includes data and interactive tools. It is available at: <https://trainsonline.unctad.org/home>.

Source:

Drawn up by the author on the basis of the sources listed in the table and in section 2.1.

It is important to note that a central premise of computable PE and GE models is the Armington assumption (Dixon, Jerie and Rimmer 2018), which emphasizes product heterogeneity by positing that the imported and the local good, albeit similar, are imperfect substitutes for each other. Under this assumption (which gives countries a degree of market power), even if one of the goods is cheaper, consumption is still based on both the imported and the domestic product. Consequently, the labour market impact of changes in trade policy (such as a tariff reduction) depends to a great extent on the value of the elasticity of substitution between the imported and the local good (the Armington elasticity).¹⁵

A high elasticity of substitution indicates that consumers are less attached to local production, meaning that large job losses may occur once trade is liberalized, as competitive imports (those competing with local production) may reduce local production and vice versa. This is not uncontroversial because the whole assessment of the labour market impact of trade hinges on the quality of the estimation of the elasticity of substitution, which is not always easy to achieve (Gibson 2011; Feenstra et al. 2018).

As seen in table 2.1, the impact of a trade policy change, such as changes in tariffs and NTMs, in the context of these equilibrium approaches is reflected in changes in prices and costs, trade flows (exports and imports of goods and services), tariff revenue and welfare (Van den Berg 2014; Krugman, Obstfeld and Melitz 2017; Plummer, Cheong and Hamanaka 2010). In theory, if a tariff is reduced or eliminated, for instance, the effect is a reduction in the price of the related imported good and an increase in overall welfare (Krugman, Obstfeld and Melitz 2017; Gandolfo 1994). Paradoxically, neoclassical economic theory considers that, while imports may lead to job losses, as noted in the last paragraph, prices for consumers are likely to decrease with trade deregulation, which puts consumers in a “better” position than when trade had not yet been liberalized.

It is important to note that, with the general reduction in tariff rates that has taken place in recent decades, the use of NTMs has been gaining importance in international trade policy. In CGE models, both tariffs and NTMs are important when assessing the overall impact of international trade. NTMs are not represented by a specific number (a percentage of price or amount per unit) as in the case of tariffs, but, in a CGE model, such policies are introduced in a similar way to tariff measures (for example, they are incorporated into

15 While less common, these models can also be used to assess the employment effects of export increases. As with imports, the elasticity of substitution plays a major part in determining such effects.

the model as AVEs of NTMs) and treated as a cost (Disdier and Fugazza 2019) (see table 2.1 for information on databases focused on NTMs).

Treating NTMs only as costs, however, and omitting their potential positive effects leads to an overestimation of the benefits of their elimination (Hernandez 2019). Such a view understates the role of NTMs in supporting national development strategies and even in achieving the SDGs.¹⁶ Among others, NTMs include measures designed to protect the environment and consumer health, in addition to measures that affect labour (such as those included in production or post-production requirements) (see UNCTAD (2018a) and (2019a)). Also, as demonstrated by UNFSS (2019), voluntary sustainability standards can be a catalyst for sustainable development, in particular in terms of decent work and responsible production and consumption (see also Disdier and Fugazza (2019) and Maertens and Swinnen (2008)).¹⁷ A more balanced account of NTMs in impact assessments is therefore necessary. Caution should also be exercised when considering what drives the usually positive economic impact of trade deregulation predicted by CGE models (see Hernandez (2019) and Raza et al. (2016)).¹⁸

Another important element for the implementation of CGE models generally is social accounting matrices, which represent the economy at a specific point in time and which include data on consumption, investment, government spending, exports and imports. Such matrices are used to calibrate the models, defining both the structural parameters and the baseline values of most of the endogenous variables.¹⁹ Once this step and a replication check have been concluded,²⁰ a simulation of the overall economic impact of changes in trade policy can be conducted. A change of policy will lead to a

16 See Kravchenko et al. (2019) for a consideration of a concordance matrix of NTMs with direct links to the SDGs.

17 Similarly, it is important to note that labour clauses in trade agreements do not necessarily have protectionist effects or are negatively correlated with international trade. Labour clauses do not necessarily decrease the exports of low- and middle-income countries towards high-income countries. Indeed, because of their effects on labour conditions, they have the potential to lead to more bilateral trade (Carrère, Olarreaga and Raess 2022). Labour clauses in trade agreements do not necessarily divert trade flows to non-members of the agreement (ILO 2016a).

18 See also the study by Porto (2018), who analyses the effect of the removal of NTMs on labour markets in Latin America using a different type of GE setting. The author finds that the reduction of NTMs leads to lower consumer prices but that the overall effect on social welfare depends on whether the impact on prices dominates the impact on nominal wages or the other way round.

19 Values for parameters may be calibrated, but they are commonly adopted from previous studies. It is worth noting that a wide variety of models can be calibrated using the same social accounting matrix (SAM).

20 A replication to verify that the equilibrium solution reproduces the matrix data for the baseline year (see Cheong (2010a)).

new equilibrium. If tariffs are already low, a further reduction may result in only small changes in employment, and vice versa.

It is important to emphasize that, when assessing the overall economic impact of changes in trade policy, CGE models consider only a basic version of the labour market. According to Boeters and Savard (2013), an important reason to go beyond a simple labour market setting is where a policy change does not originate in the labour market but triggers consequences that have a direct bearing on that market (for example, the labour impact of a trade policy).²¹ In this case, it is possible to use CGE models to look at the effects of trade deregulation on wages and employment, for example. Notably, CGE models are also useful for studying the impact of changes in trade policy on the informal sector (see Bautista, Lofgren and Thomas (1998) and Sinha (2011)).

At the macro level of analysis, an alternative to CGE models is available for assessing the labour impact of trade, namely the United Nations Global Policy Model (GPM),²² which is a dynamic macroeconomic model that has been used to analyse the impact of policies at the global level while considering global and regional interactions (Cripps and Izurieta 2014; Michell 2016). The GPM allows one to consider global international trade and its links with growth and income distribution (UNCTAD 2018b). Notably, and in contrast to other models with a global perspective, the GPM is distinguished by the fact that it allows for the possibility of persistent involuntary unemployment and for changes in income distribution.²³ Recent examples of the use of the GPM are provided by Kohler and Storm (2016), Capaldo (2015) and UNCTAD (2014, 2018b, 2019c).

In contrast to the above-mentioned models, the PE approach can be used to analyse the economic impact of policy changes at the meso level in the industry, market or sector that is directly affected.²⁴ When

21 Boeters and Savard also point out that, compared with other aspects related to the modelling of labour markets in CGE models, the labour demand offers the fewest conceptual choices. They have also developed a classification of typical CGE models with a labour market focus and have identified strands in the development of labour market modelling.

22 The GPM was developed by the United Nations Department of Economic and Social Affairs in 2007. Responsibility for its maintenance and further development was transferred to UNCTAD in 2013, with the ILO providing support. Technical documents on the GPM may be found at: <https://www.un.org/development/desa/dpad/publication/united-nations-global-policy-model/>.

23 In this sense, the GPM may be said to be demand-constrained. For further detail, see Onaran (2016). See also Lavoie (2016), who compares the GPM with other models, including structuralist CGE models.

24 The overall effects captured through the PE approach are disaggregated by bilateral trade flows effects (trade creation and diversion), tariff revenue effects and welfare effects.

considering the labour impact of trade, researchers can, for instance, consider the question of how much employment may be lost in a specific industry as import prices fall after a reduction in import tariffs. With the PE approach, it is possible to obtain detailed results on employment levels, labour force by group, and wages. It is important to note that, just as in the case of GE, ready-made models have been developed to simplify the process of implementing PE analysis. Examples include the Software for Market Analysis and Restrictions on Trade (SMART) model (see Cheong (2010a); Plummer, Cheong and Hamanaka (2010)), the Global Simulation Analysis of Industry-Level Trade Policy (GSIM) model, the Tariff Reform Impact Simulation Tool (TRIST) and the Agricultural Trade Policy Simulation Model (ATPSM) (see Cheong (2010a); WTO and UNCTAD (2012)). The Trade Intelligence and Negotiation Adviser (TINA) model was developed recently by the United Nations Economic and Social Commission for Asia and the Pacific as a tool for assessing the impact of the reduction of tariffs and NTMs in the context of trade negotiations using a PE approach.²⁵

When the labour market is made the focus of attention in assessing the impact of changes in trade policy through the PE approach, the interactions of the labour market with other markets and the non-economic aspects that may influence the sector are disregarded. This means that the PE approach is less complex in terms of data and processing requirements than the GE approach, in which all markets are considered.²⁶ The lack of interaction with other markets is one of its main limitations, however (see section 2.1.2). Accordingly, it is widely acknowledged that PE and GE approaches, while complementary, are not necessarily substitutes for each other. In fact, similarly to the rest of the frameworks presented in this chapter, these two approaches can be combined to assess the labour impact of trade (see, for example, Ahmed (2010, 2011)).

2.1.2 Strengths and weaknesses

Since the PE approach does not consider the whole economy, a drawback is that it may overestimate the negative impact of a policy change on employment (an increase in imports after trade deregulation may negatively affect local production, reducing the demand for labour and also wages), leading to an anti-trade bias or vice versa. Since it is not possible to take

²⁵ Available at: <https://tina.trade/>.

²⁶ The PE model can be extended to more complex versions that consider more than one market. Analysing more than one market should not be confused with a GE analysis, however, in which all markets in the economy are considered. In addition, the use of a PE approach does not preclude an analysis that takes into account GSCs (as in de Soyres et al. (2018) and Barbe and Riker (2017)).

into account other relevant inter-industry interactions and the net impact on labour, feedback effects among markets are also omitted (price reductions due to the removal of tariffs could prompt an increase in local production and in demand for inputs and labour in other sectors). In the case of GE models, these take into account prices, competition and interactions between sectors after policy changes have taken place, which makes them suitable for studying the macroeconomic impact of changes in trade policy. In contrast to PE, CGE models take feedback effects, in addition to interactions, into account and capture long-term effects.

The need of GE models for large and expensive datasets also imposes certain constraints on their use with respect to the labour market, limiting, for instance, the modelling of more complex structures (de Vet et al. 2010). In the case of PE models, because of their sectoral focus, they can be used to identify, relatively easily, which jobs are likely to be lost when a country opens to trade and starts deregulating imports (WTO 2017). This can help to provide guidance on the trade adjustment assistance measures that might need to be introduced, and also on job training and other forms of transfer from the public sector (Gibson 2011).

The reliance of these models on the Armington assumption has been criticized, as imperfect substitutability understates the possibility of trade diversion and of complete substitution of local production with imports. The use of this assumption in the GTAP model has also been criticized because it may create a bias in favour of particular trade policies, such as the adoption of free trade agreements (Cheong 2010a). Studies by Taylor and von Arnim (2006) and Hammouda and Osakwe (2008) have identified the vulnerabilities associated with the Armington function and its estimated elasticities, which are critical for the models' results.

The assumptions of full employment, optimizing agents and perfect competition are a limitation of standard CGE models and indicative of their lack of correspondence to the real world (Ackerman and Nadal 2004). Similarly, Hendy and Zaki (2013), Ackerman and Gallagher (2008) and other authors have pointed out that one major problem with CGE models is their dependence on the assumption that only free, self-regulated markets can lead to equilibrium, which is the "optimal" state. With such an unrealistic target, trade regulations can never be welfare-improving. Since regulations, including NTMs, are treated only as bearers of costs, reducing or eliminating them is essential to bring about economic benefits in this model (Burfisher 2021; Cadot, Munadi and Ing 2017; Raza et al. 2016; Disdier and Fugazza 2019; UNCTAD and World Bank 2018). However, as seen above, a more balanced account of NTMs in these models is necessary.

Even though fully fledged dynamic GE models do exist, some of the models used to evaluate the economic impact of changes in trade policy rely on a comparatively static framework that omits information on adjustment processes. Such information could be relevant for those negatively affected and is particularly important when assessing labour market outcomes in the context of decent work. The GE and PE approaches have, accordingly, been criticized for not anticipating job losses and the potential need for workers to change jobs after a trade shock has taken place (Ackerman and Nadal 2004). In addition, the focus of the PE and GE approaches is generally on how trade policy changes impact the level of wages and employment. Even though disaggregation by skill level and sex may be incorporated into the analysis, other worker characteristics are more difficult to represent using a supply-and-demand framework alone. The combination of PE and GE models with other approaches, such as I–O models and social accounting matrices (SAMs) models, as mentioned in the next section, may help overcome this limitation. Moreover, the availability of data plays a vital role in such analysis.²⁷

Lastly, it should be stressed that, in contrast to the limitations related to the theoretical assumptions at the core of CGE models (for example, a representative firm and household that respectively maximize profit and utility, thereby bringing the system into equilibrium in standard models) – which are, in this sense, difficult to dispense with if that model is to be used for the analysis – there are other types of limitations which tend to be overcome as new adjustments in theory and data are included in the framework. One example is the GTAP Firm Heterogeneity (GTAP-HET) model (Akgul, Villoria and Hertel 2016), where features of new trade theory (for example, firm heterogeneity) and firm-level data are also considered (Aguilar et al. 2019b; Akgul, Carrico and Tsigas 2021). In relation to this, Nilsson (2018) reflects on the advances in CGE modelling in adapting to modern trade theory, as well as some of its main criticisms (see also Dixon, Jerie and Rimmer (2018)), while Burfisher (2021) discusses the current frontiers and recent innovations in CGE modelling.

27 For instance, data on formal and informal employment are not always available. In addition, while data on other aspects, such as age or region of employment, may be easier to obtain, those data may not always be compatible with the framework used.

► 2.2 Input-output models, social accounting matrices and multiplier analysis

I-O analysis is commonly used for the empirical assessment of the economic impact of changes in trade policy. A basic I-O model considers the interrelations between the sectors in an economic system and draws on the information provided in I-O tables and SAMs. A basic I-O table shows the inter-industry transactions between all sectors in the economy. SAMs build on I-O tables by also recording the non-market monetary transfers between sectors and institutions (household, companies and government), thereby factoring in distributional aspects (Miller and Blair 2009). Notably, regional I-O models link regional data.

I-O and related multiplier analysis can be used to estimate the impact of changes in final demand (private and public consumption, investment and net exports) on production levels. It is also useful for examining the employment effects of policy changes (for example, changes in trade policy). For instance, with this framework, it is possible to address the question of how much employment would be created or destroyed by a positive or negative shock in final demand due to changes in trade policy that affect a specific sector, and how the effect would be expanded to the remaining sectors in an economy. It is important to note that I-O models can also take into account the informal sector by treating it as operating alongside, and trading with, the formal sector (Gibson 2011). I-O models can also consider employment aspects such as gender and skill.

The direct effect and its expansion to all remaining sectors is captured by a multiplier effect. The next section of this chapter discusses the use of I-O models and multiplier analysis for assessing the labour impact of changes in trade policy. In such cases, the employment multiplier quantifies the total change in employment due to changes in final demand that result from changes in trade policy. The analysis can also be performed in the context of GSCs (see, for instance, Moreno-Brid et al. (2021)), and it can also be extended, for example, to consider the impact on skilled and unskilled workers.

Notably, I-O models (and SAMs models) and multiplier analysis have been applied in a way that takes into account workers' characteristics, such as their skill level, when considering the labour impact of trade. Nevertheless, these models are not commonly used to study the impact on other dimensions of

work, even though multiplier analysis allows for the consideration of decent work indicators (see, for example, Alarcón and Ernst (2017)).

2.2.1 Using multiplier analysis to study the labour impact of trade

In I–O models, factors of production such as labour and capital are represented by fixed coefficients under the assumption that their prices do not change. Table 2.2 lists these and other underlying assumptions, together with a typical research question that can be answered using this approach, a representation of the accounting equation of I–O analysis and the employment multiplier, and a summary of the steps and data requirements.

► Table 2.2 Labour impact of trade in input–output models

Typical question: What is the number of jobs created per sector (e.g. in the context of GSCs) as a result of changes in foreign final demand due to changes in trade policy?

I–O model basic theoretical assumptions:

- No factor substitution (inputs used in fixed proportions)¹
- Constant returns to scale
- Fixed prices (including wages)

Accounting equation: $x = Ax + f$

Where x is a column vector of total output, A is the technical coefficients matrix, and f is a column vector representing final demand

The I–O model can be written as $(I - A) \cdot x = f$

Where $(I - A)^{-1}$ is the Leontief inverse matrix, which reflects the direct and indirect impact of changes in final demand (multiplier effect)²

Employment impact:

- Trade policy shock (change in trade policy) affects net exports
- Net exports vector affects production and employment through inter-industry relations

Calculation:

Employment effect: $EE = [L \cdot (I - A)^{-1}] \cdot s$

Where L is the matrix composed of employment–output ratios by sector,³ and s is a vector representing the shock to final demand

Data requirement:

- For a single country: I–O table or SAM and matching sectoral employment data⁴
- Sources of global I–O tables: Inter-Country Input–Output tables and Trade in Value-Added database produced by the OECD; the World Input–Output Database; Asian Development Bank multi-regional input–output (ADB-MRIO) tables; Eora multi-region I–O tables⁵

Note:

¹ In general, production functions reflect the maximum level of output that can be achieved with a given amount of inputs. Linear production functions combine inputs in a fixed proportion (these are also known as fixed-proportion, or Leontief, production functions).

² ILO (2019b) explains how to implement multiplier analysis using SAMs.

³ These are the number of workers per unit of output for a specific sector (L is a matrix that has the labour coefficients as diagonal entries and zeros elsewhere).

⁴ Employment data in satellite accounts (matrices containing the number of workers per sector, which are necessary to compute L).

⁵ An example of the use of the Eora I–O tables is the UNCTAD–Eora GVC database (see Casella et al. (2019)).

Source:

Drawn up by the author on the basis of the sources listed in the table and in this section.

One of the main characteristics of I–O multiplier analysis is that it allows for a multisector perspective so that interactions between sectors can be taken into consideration. This approach is useful for evaluating whether employment changes in one sector after a shock are offset by employment changes in other sectors. In general, the analysis of intersectoral effects is possible because I–O models are based on backward and forward linkages between each sector and the rest of the economy. In other words, they are suitable for examining the direct and indirect employment effects of changes in trade policy.²⁸

Indirect effects can be the result of either consumption linkages or production linkages. Consumption linkages are present if, as a result of the exogenous shock, changes in production affect factor income, which translates into changes in household revenue that trigger other changes in private consumption. These linkages are determined by the distribution of income and by household consumption patterns. Production linkages can be divided into backward and forward linkages. Backward linkages arise from the use that the shock-receiving sector makes of the inputs produced in other sectors. They capture the effect of the shock on final demand in the affected sector. Forward linkages, on the other hand, originate in the distribution of the output generated by the shock-receiving sector to other sectors, which use it as an input in their own production processes.

As seen in table 2.2, to obtain the employment effect (EE) of a particular shock on final demand, it is necessary to first multiply the Leontief inverse matrix by the matrix of labour coefficients (L) composed of the employment–output ratios by sector. The resultant matrix is then multiplied by a vector representing the shock to final demand (s).

An example of the use of an I–O approach is the study by Kucera, Roncolato and von Uexkull (2010), who carried out an ex post evaluation of the labour and distributive impact of trade contraction in India and South Africa during 2008/09.²⁹ The authors use data from SAMs in a Leontief multiplier model to look at aggregate and industry-level employment while also taking into account differences between workers (for example, gender and skill level). Two types of multipliers are considered in this study: Type I multipliers, which

²⁸ The impact of an exogenous shock on final demand (for example, on export demand) can be direct (the effect on the sector where the shock takes place) or indirect (the effect on the rest of the sectors in the economy). The sum of both impacts defines the total multiplier effect, which reflects the extent to which the direct effect is amplified by the endogenous interlinkages between sectors.

²⁹ It is worth noting that this methodology can be used for both ex ante and ex post analysis (Wixted, Yamano and Webb 2006). See also Alarcón and Ernst (2017) for an example of an ex ante study that considers the impact of key public policies on quantitative and qualitative aspects of the labour market.

address the direct effects of trade contraction on incomes and employment and the indirect effects stemming from forward and backward production (I-O) linkages; and Type II multipliers, which, in addition to these direct and indirect effects, include the income-induced effects resulting from changes in household expenditures.³⁰ In this way, the authors show how a shock taking place in one sector can have significant effects in other sectors.

By using global I-O tables, it is possible to estimate the number of sectoral jobs created in different countries as a result of changes in foreign final demand. This application of the I-O approach is very important, given that internationally linked-up production through GSCs has been taking place for more than four decades now (Amador and Cabral 2016; Gereffi, Fernandez-Stark and Psilos 2011; Milberg and Winkler 2013; UNCTAD 2013b). Significantly, the use of global I-O tables also makes it possible to take into account the type of employment (skilled or unskilled) used in the production process. A relevant example is the study by Timmer et al. (2014), who used the 2013 version of the World Input-Output Database (WIOD) to track the flow of products across industries and countries and, consequently, measure the value added in GSCs.³¹ In an earlier study by the same group of authors, Timmer et al. (2013) looked at the changes in the number and skill level of jobs and the distributional effects arising from the internationalization of production.³²

Notably, this approach is used in combination with other approaches. For example, an I-O model can be combined with PE to complete the analysis of the labour impact of trade: a PE model is used to simulate trade policy changes and calculate their net effect on trade, which is necessary to implement multiplier analysis and to compute employment effects. The toolkit developed by the ILO (2019b) provides a step-by-step explanation and hands-on exercises on how to use both approaches together. See also Ernst and Peters (2012) for a study of the employment impact on Indonesia of the free trade agreement between the Association of Southeast Asian Nations (ASEAN) and China; this study combines the SMART model, introduced in section 2.1, with SAMs.

30 This study uses only exports in constructing the demand vector, while other studies have used net exports relative to domestic production for a more precise analysis (see, for example, Kucera and Milberg (2003)).

31 The most recent release of the WIOD database is the 2016 version. See www.wiod.org. It is important to take into account that the database does not include many developing countries. Another example of a global I-O database is the Inter-Country Input-Output Database developed by the OECD. See www.oecd.org/sti/ind/inter-country-input-output-tables.htm.

32 An aspect worth considering in this type of analysis is the actual extent of “global” chains and the implications for the labour market. See Johnson and Noguera (2012) and Los, Timmer and de Vries (2015).

2.2.2 Strengths and weaknesses

I–O and multiplier analysis have the advantage of being a multisector framework, which allows for a comprehensive analysis of the labour market impact of trade. This is a major strength, as interactions at local and international levels, especially as part of GSCs, are a distinguishing feature of real economies. In connection to this, another advantage has to do with the databases used, which include national and global data. In addition, given the assumption of a linear production function, the general I–O model is considered relatively easy to use, since the processing requirements are less demanding than those of models with more complex specifications.

The weaknesses associated with this approach are mainly related to the framework's simplifying assumptions. The assumption that factor content remains fixed over a long period of time, for example, limits the realism of the framework, since it makes factors almost immune to changes in policy (Gibson 2011). Similarly, since productivity is exogenously determined, it is treated as if it were not affected by relative price variations due to changes in trade policy. In a real economy, however, changes in trade policy can influence the organization of production and productivity. In addition, as pointed out by Gretton (2013), multiplier analysis does not consider other types of interaction that are relevant in a real economy. For example, competition for factors of production is generally omitted in the analysis.

► 2.3 Qualitative and mixed-methods approaches

This section looks at some of the most common, albeit underused (Gibson 2011; Shaffer 2018), approaches that have been used to analyse the labour impact of trade, such as qualitative and mixed-methods approaches. In general, these approaches are well known for facilitating an in-depth understanding and interpretation of the underlying motivations behind the processes being studied. In contrast to the methods discussed in sections 2.1 and 2.2, these approaches entail a more intensive data collection process, which makes it possible to capture a large quantity of detailed information from a usually small number of participants. In that sense, the use of qualitative and mixed-methods studies allows for the consideration of questions that go beyond the effect of a change in trade policy on the level of employment. For instance, with these approaches, we can also consider aspects of decent work such as equitable treatment; working time;

combining work, family and personal life; safe working environment; and stability and security of work. This is of critical importance, as their inclusion allows for the consideration of potential trade-offs (Shaffer 2018) between measures of what traditionally constitutes a positive impact (more jobs) and the detriment to labour conditions (regarding workers' safety, excessive working hours and bargaining power, for example).

These frameworks therefore allow for the consideration of accounts of lived experiences regarding decent work. The data can be gathered from different sources and in different ways,³³ such as through observation, unstructured interviews, analysis of public and private documents, and official questionnaires. Because of the complexity of the information thus obtained, it cannot be interpreted without reference to the context in which it originated. When it comes to the labour market impact of trade, it is important to consider the shared meaning of "work" or "employment", for instance, along with the social customs and gender roles in the specific context being analysed, in order to understand how the effects of a change in trade policy are perceived by those who experience the impact. Quantitative data and statistics may also be used for the analysis in such studies, but they tend to play a secondary role.

Shaffer (2018) has identified a non-exhaustive list of potential contributions to impact assessments of policies and programmes by these approaches,³⁴ which he groups into the following four categories according to their value-added in impact assessments: incorporating locally meaningful impact measures and weights; providing estimates of the magnitude of impact; unpacking and integrating processes and mechanisms; and informing model specification. In providing estimates of the magnitude of the impact of trade policy on employment, a central approach is the use of counterfactual thought experiments. These make use of subjunctive conditional ("if/then") questions about a hypothesized link between trade and employment. Accordingly, it is possible to incorporate questions about potential changes in economic activity for ex ante assessments, for instance. In ex post assessments, questions refer to what respondents would have done in the absence of the policy change. Questions can be posed to the participants during household surveys, focus group discussions and

33 Sampling is carried out in different ways too, such as through purposeful sampling, quota sampling and "snowball" sampling.

34 Some of these assessments have been focused on analysing the impact of policy changes on poverty (see Shaffer (2013); Bourguignon and Pereira da Silva (2003)), but in principle, the same methodological approaches can be used to analyse the impact of trade policy changes that affect the labour market (Shaffer 2018).

semi-structured interviews.³⁵ Notably, as pointed out by the same author, counterfactual thought experiments can inform possible mitigation measures since they can give an indication of the magnitude of likely problems stemming from the failure to adjust to changes in trade policy, and they can also point to the reasons for such lack of adjustment.

2.3.1 Case studies

Case studies³⁶ refer to the in-depth examination of a single case or group of cases – for example, a person, the members of a family or a community – who are likely to be affected by the implementation of a trade policy (Creswell and Poth 2017; Jupp 2006; Yin 2017). Case studies may be conducted using various tools, including observation, unstructured interviews (as in Harrison et al. (2019); Tanwir and Sidebottom (2019)), and official and “informal” documents, such as diaries (see Ruwanpura (2016)). The ILO (2016a, 2017b) provides case studies of labour provisions in trade and investment arrangements. Hernandez (2020) provides other relevant examples of the use of case studies in this area. These case studies considered substantive elements of decent work, such as employment opportunities, equal opportunity and treatment in employment, freedom of association, safe work environment, work that should be abolished, and decent working hours.

A qualitative research technique commonly used with case studies is in-depth interviews, which can be divided into one-to-one interviews (also referred to as unstructured interviews) and focus group discussions. In contrast to traditional structured interviews, in which the participants are all asked the same set of predetermined questions in the same order, an unstructured interview does not follow a specific order of questions. Rather, it is a conversational form of interview, in which open questions play an important role in helping to gather detailed information on the participants' unique experiences (see, for example, ILO (2014)). In this sense, unstructured interviews are a more flexible tool for capturing information. In the context of assessments of the labour market impact of trade, the participants of such interviews may talk in detail about how a change in policy (such as the

³⁵ An example of the use of counterfactual thought experiments is provided in Shaffer (2008).

³⁶ It is important to note that case studies are not always subsumed under qualitative research and that different disciplines may treat this issue differently (Yin 2017).

importing of a specific input) has affected their working conditions in various dimensions.

Focus group discussions are based around a specific matter that affects a set of participants, all of whom are interviewed at the same time. The main task of the interviewer is to ensure interaction among the participants and to guide the conversation so that it does not stray from the main topic. As with unstructured individual interviews, focus groups also allow one to capture detailed information and obtain a richer account of the situation and of the way in which the participants as a group have experienced it (ILO 2014; Krueger and Casey 2014). In assessments of the labour market impact of trade, producers of a specific good may, during a focus group discussion, talk about whether and how the introduction of a free trade agreement (with its concomitant deregulation and impact on prices) has displaced them from their traditional roles.

2.3.2 Mixed-methods

Mixed-methods research seeks to combine qualitative approaches with some of the approaches presented in sections 2.1 and 2.2 (such as CGE models) in order to offer a broader perspective of the topic being studied.³⁷ The point of this approach is to draw on a wide array of available quantitative and qualitative methods, where the results obtained through each method can be integrated in order to gain additional insights (Creswell 2014). For example, the results of an econometric study may be supplemented with in-depth interviews in which key stakeholders are asked for their views on the impact of a change in trade policy on work conditions, working time and freedom of association, among other factors.

Different methods can be combined to generate, analyse and interpret the information. When evaluating the labour market impact of trade, data from a survey on the effect of a reduction in tariffs in a region where producers are directly affected by the entry of new imports could be combined with qualitative data obtained from a focus group discussion with some of those producers. In mixed-methods research, the results obtained with one method can also be used to improve the research tools implemented with another method. In that same example, unstructured interviews could be used to capture the individual experiences of those producers, which could

³⁷ As noted by Shaffer (2018), using a mix of approaches that includes CGE models requires specialized knowledge; in that sense, it may be less applicable than when a mix of simpler approaches is used.

then feed into the development of a detailed quantitative survey (Hulme 2007; Shaffer 2018; White 2009; Bamberger 2015).

An interesting example along these lines is found in a study by the United States International Trade Commission (USITC 1993), which combined PE and CGE models with interviews and qualitative analysis to examine the impact of NAFTA on employment and job skills requirements. As pointed out in the report, the qualitative analysis helped with the assessment of sectors for which models could not capture the implications of NAFTA. Interviews with experts and oral testimony were part of the qualitative tools used to capture relevant information for the assessment.³⁸ Shaffer (2018) and Gibson (2011) both provide several examples which illustrate the use of mixed methods to study the relationship between trade and labour market outcomes (see also Hesse-Biber and Johnson (2015); Jefferson et al. (2014)).

2.3.3 Strengths and weaknesses

One major advantage of case studies is that they provide a large amount of detailed information, thereby yielding insights that can stimulate and inform future research. Case studies are also known for providing a basis for analytic generalization, that is, they are generalizable to theoretical propositions, although not to populations or universes (Yin 2017). However, they are also known to be time-consuming, difficult to replicate and liable to interference from the analysts' subjective beliefs. These and other concerns have been addressed by Yin.

The flexibility afforded by qualitative research techniques associated with case studies, such as in-depth interviews, makes it possible to capture comprehensive information. The conversational nature of one-on-one interviews and focus group discussions facilitates understanding of the participants' perceptions regarding the impact of the policies being evaluated. Another advantage of in-depth interviews is that they offer a "second chance" to request clarification on the answers provided by the participants, which also ensures a certain degree of validation of the information. The disadvantages include the length of time it may take to complete the interview and to systematize and analyse the information collected. Developing the necessary skills for conducting such interviews can also be time-consuming and expensive. In the case of focus groups,

38 A more recent example of the use of a mixed-methods approach to evaluate a free trade agreement may be found in Civic Consulting and Ifo Institute (2018), which includes an in-depth analysis of elements of decent work such as freedom of association, working conditions and equal treatment.

obtaining legitimate consent from participants and addressing issues of confidentiality have been singled out as critical ethical challenges (Sim and Waterfield 2019). Participants may also be influenced by the presence and answers of other participants. Additionally, a drawback common to in-depth interviews in general is the possibility of “interviewer effects”; that is, the influence which interviewers may inadvertently have on interviewees as a result of such factors as gender and age.

An advantage of mixing tools and approaches is the potential for complementarity, which helps to mitigate the weaknesses inherent in each approach. In that sense, a mixed-methods approach allows researchers to collect comprehensive information and to attain a broad perspective of the issue being analysed. Additionally, since conclusions are based on results obtained using different types of methods, they may offer more solid evidence than is the case when only one type of method is used. For this reason, it is often argued that the conclusions from mixed-methods studies are, to a certain degree, validated internally as part of the analysis. Another advantage of combining methods is that it can help to reduce the analysts’ biases, while making it possible to produce reports that appeal to a wider audience. The main disadvantage of a mixed-methods approach is that more time and financial resources need to be invested in order to collect the information. Additionally, a greater range of skills are required to work with tools based on different approaches, which may call for a larger number of researchers to be involved in a given study.

► 2.4 Future avenues of research

As mentioned at the beginning of this chapter, the research question and the main purpose of the study should guide the choice of methodological approach used for the assessment of the labour impact of trade. In some cases, using one of the approaches presented above may be appropriate. In other cases, a mixed-methods approach may be regarded as a superior option as it guides the collection, analysis and interpretation of more comprehensive information. It is, in this sense, a promising option for future research, as it can help to bring to light substantial and detailed information for robust analysis. Moreover, when qualitative research techniques, such as in-depth interviews, are used to generate data that can be combined with quantitative data, their integration can enrich the analysis by bringing new insights and, in that way, provide a better understanding of the implications

for those directly affected by changes in trade policy. Some of the examples of studies that use a mixed-methods approach cited in section 2.3 highlight a further advantage of the approach, namely its ability to take into account a greater range of labour market considerations associated with decent work. This is particularly important given that even the approaches with the most complex “structure” (such as CGE models) focus on changes in the level of employment while disregarding the quality of the jobs concerned.

As mentioned in the introduction, the complex intertwining of international production and globalization in general have had an impact on labour market outcomes in countries of all income levels. Understanding how the populations of countries at different levels of development are affected is another reason why it is essential to extend the analysis to take into account changes not only in the level of employment but also in terms of decent work.

Extending the type of indicators used in the analysis is also important for that purpose. Conventional indicators of labour market outcomes based on employment and wages become less informative if other labour conditions are not considered in the analysis. In general, it is important to undertake studies that create a bridge between trade policy and status in employment, trade union density, hours of work, social security and other labour market outcomes disaggregated by sex, age and other characteristics. Some of these indicators are already available for many countries (see, for instance, ILO (2016b) and the ILOSTAT database³⁹). Such studies may be relatively easy to conduct where sufficient good-quality data for different years are also available. However, obtaining good-quality data is a challenge in itself. The inclusion of more indicators should be explored on a case-by-case basis.

Improving the methodological frameworks that are already available for the analysis of the labour market impact of trade is also important. A relevant step in this regard would be to consider a more balanced account of NTMs in economic models. CGE models, in particular, treat NTMs only as costs. Omitting their potential positive effects overlooks their social role and leads to incomplete and inaccurate conclusions.

Another relevant step towards the improvement of methodological frameworks would be the development of a time dimension in economic models. As noted in section 2.1, analyses of the labour impact of trade have been criticized for not specifying a time dimension during which adjustments in the labour market can take place following a trade shock. Since trade policy is not neutral, it can result in gains for some sectors and for the workers tied to those sectors, while having the opposite effect in other sectors,

39 <https://ilostat.ilo.org/>.

where workers may face job losses or detrimental working conditions. The existing models used to assess the labour market impact of trade provide an estimate of employment gains and losses, but they do not indicate when those changes are likely to take place. Consequently, the incorporation of a time dimension into economic models could help to identify the most appropriate moment for implementing response measures and also to clarify which sectors would benefit most from such measures. Governments would thereby be able to improve their economic and social policy response, particularly for the sectors and workers most negatively affected by changes in trade policy.

► 2.5 Conclusion

The purpose of this chapter was to assess some of the most common methodological approaches used in the empirical assessment of the labour market impact of trade, particularly at the macro and meso level of analysis. The chapter considered a range of approaches, some of which have been used in combination, as well as separately for the same purpose.

Both PE and GE approaches have been extensively used for such assessments. In view of the advantages and limitations of the two approaches – with PE focusing on only one sector and GE on the economy as a whole – it has been argued that combining both types of method can give the most satisfactory results. This, however, depends on the research question. Some serious limitations of these methods are linked to their underlying assumptions, such as optimizing economic agents, the Armington assumption and the full-employment assumption, particularly in the case of neoclassical CGE models. A further limitation, when it comes to the analysis of the labour market impact of trade, is that their focus is on changes in the level of employment and wages; other labour market outcomes are more difficult to capture using a supply-and-demand framework. However, as mentioned, the latter point might be overcome by combining them with other approaches, such as I–O or SAMs models and qualitative methods.

I–O models and multiplier analysis are also widely used to assess the labour market impact of trade. This approach allows researchers to study both the direct effects of trade shocks on employment and the indirect effects, given that it considers the endogenous interlinkages between sectors. This approach can also be used to take into account elements of decent work. As seen in section 2.3, qualitative and mixed-methods approaches are

particularly appropriate when considering various aspects related to working conditions and decent work in assessments of the labour market impact of trade.

All in all, the decision as to which aspects are to be evaluated, and how, will ultimately depend on the research question, the purpose of the study and the availability of data. A shortage of good-quality data, in particular, may influence the selection of the methods used for the analysis.

One of the main criticisms of most of the methodological approaches examined in this chapter is the lack of realism in some of their underlying assumptions, which presents a further argument in favour of including more indicators of decent work in the analysis. Moreover, the use of mixed-methods approaches is desirable because the integration of quantitative and qualitative data allows researchers to gain additional insights into decent work and to validate the results to a certain extent.

Nonetheless, the need for additional time and financial resources can deter analysts from using mixed methods. Depending on the research question, the purpose of the study and the potential data constraints, it may not always be possible to use a combination of methods. In such cases, any one of the main approaches presented in this chapter could be used on its own; it is critical, however, to include an analysis of some of the indicators of decent work, in particular if the study is concerned with the impact of trade policy in low- and middle-income countries.

Lastly, improving economic models so that they are able to consider the positive role of NTMs is critical for creating a balanced account of these measures. Specifying the timeframe between trade shocks and potential changes in the labour market is also a key challenge that needs to be met in economic models. This would strengthen the necessary policy responses, especially those directed at the sectors and workers most negatively affected by changes in trade policy.

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