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Economic Impact Assessment of Structural Reform Measures in Economic Reform Programmes

A MANUAL AND AN IMPACT ASSESSMENT TOOL
FOR ECONOMIC REFORM PROGRAMME TEAMS

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1.

INTRODUCTION

This Manual explains the methods that can be used for assessing the expected economic and employment impact of structural reform measures in Economic Reform Programmes (ERPs), prepared annually by EU candidates and potential candidates. Improving the impact assessment of structural reform measures will facilitate their prioritization within the ERP and motivate their implementation.

The Manual covers both the advanced impact estimation methods that require good technical skills and the simpler methods based on expert judgment, and includes non-technical descriptions as well as examples. The analysis of the measure's intervention logic and the data collection process, a necessary starting point for any quantification, are also explained. The Manual is accompanied by a **spreadsheet-based Impact Assessment Tool,** which allows the ERP teams to perform standardized calculations of the expected impact by entering data related to the measure of interest.

The Manual is intended to support the ERP teams in meeting the requirements of the ERP Guidance Note (**see Box 1**). The terms "economic and employment impact" (or "economic impact" for short) used in the Manual relate to the expected **impact on competitiveness and employment**. However, some ERP measures are focused on environmental or social outcomes with little direct economic impact. In such cases, this should be clearly explained in the ERP section on the expected impact.

BOX 1: IMPACT ASSESSMENT REQUIREMENTS OF THE ERP GUIDANCE NOTE

Expected impact on competitiveness (not relevant for the area "social protection and inclusion")
The purpose of this section is to estimate the expected quantified impact on competitiveness and/or sustainable growth. The ERP should identify 1–3 country-wide high-level outcome indicators that can be applied to each reform measure to estimate and then evaluate the impact. Further information on the selection of indicators can be taken from the OECD ERP Monitoring Tool. Such outcome indicators should help answer the following questions: How do the sectors or businesses etc. targeted by the reform measure contribute to Gross Domestic Product (GDP), GDP growth, the transition to a green economy, exports or export growth, and to what extent is this expected to change after the implementation of the reform? When looking at the potential effect, a longer time horizon should be used; some reforms (e.g. in education) will only fully unfold their impact 10 or 20 years from now.

Expected impact on social outcomes, such as employment, poverty reduction, gender equality and access to healthcare
Estimate the expected qualitative and/or quantitative impact of the measure on social outcomes, such as employment, poverty reduction, equality, gender and access to healthcare in the short, medium and/or long term. If the measure is considered neutral in terms of gender impact, please make this clear. Please indicate the contribution of this measure to relevant Sustainable Development Goals (SDGs), for example #1 (No poverty), #3 (Good health and well-being), #4 (Quality education), #5 (Gender equality), and #8 (Decent work and economic growth).

Expected impact on the environment and climate change
Estimate the expected impact of the measure on the environment and climate change (quantitative) and the green transition in the short, medium and/or long term in line with the targets set by the EU Green Deal/Green Agenda for the Western Balkans and the international commitments of the country (if applicable). If the measure is neutral in terms of green transition and climate impact, please make this clear.

Source: European Commission: Guidance for the Economic Reform Programmes 2023-2025 of the Western Balkans and Türkiye.

The definition of structural reforms and measures in the ERP Guidance Note (**see Box 2**) explains that the reforms are expected to either:

- address the underlying obstacles to growth identified in the ERP, thereby increasing the potential and actual **growth rates of the economy** (GDP), or
- increase efficiency of using the resources and the productive factors (labor force, capital, technology, skills, knowledge etc.), for example by increased efficiency, adaptability, and responsiveness of markets, and thereby improving market outcomes such as **productivity, investment, innovation, job creation** and **employment**, or
- increase inclusiveness of the economy and equality of opportunities.

The definition of structural reforms implies that **the impact should be considered in broader terms than the stated objective of a measure**. For example, a measure's objective may be to simplify the business environment, but the assessment of impact should explain how this will affect economic results such as productivity and growth rates. Support to specific groups in the labor market may be the objective of a measure, but impact assessment needs to show how this will be reflected in the overall employment levels. Impact assessment of public investments should focus on the gains in efficiency and adaptability of markets rather than on the infrastructure built as part of the measure.

Furthermore, the definition explains that **ERP measures are expected to be part of broader sectoral reforms**. The impact assessment should therefore consider not only the expected effects of the measure itself, which may sometimes be small, but also the measure's contribution to the total impact of the reform of which the measure is part.

BOX 2: DEFINITION OF STRUCTURAL REFORMS AND MEASURES IN THE ERP GUIDANCE NOTE

The term structural reform shall be understood to mean public policies that tackle obstacles to the fundamental drivers of growth, that facilitate the use of resources and productive factors as efficiently as possible or that contribute to a more equitable and inclusive economy. This includes policies that modernize labor markets and make them more adaptable and responsive, make product and service markets more efficient, simplify the regulatory environment for businesses while increasing transparency overall in the economy, as well as policies that create equal opportunities and ensure social inclusion. More efficient, innovative and transparent markets will benefit all market players and should encourage decent job creation and investment, and improve productivity.

Public investments in infrastructure can be included as measures if they contribute to reforming a market. For example, a new energy power plant or pipeline may be necessary to bring about a functioning and cost-effective energy market. However, reforms should primarily consist of measures such as adjusting energy tariffs, incentivizing energy efficiency, strengthening regulatory and supervisory bodies, or adjusting legal and regulatory frameworks. Infrastructure projects such as a new or upgraded road, bridge or other should as a rule not be included in the ERP.

Reforms should not be too wide as the purpose of the exercise is to identify specific priorities and focus reform efforts in order to ensure the reform agenda is implementable. At the same time, given the limitations (of maximum 20 reforms), if measures are too narrow it would limit the utility and the impact of the program. A measure should not constitute a full sectoral reform strategy with 20+ activities, but should be more limited in scope. However, in the description of the measure, the sectoral reform of which the measure is part should be explained to put the measure into context.

Source: European Commission: Guidance for the Economic Reform Programmes 2023-2025 of the Western Balkans and Türkiye.

1.1. INSTITUTIONAL AND ORGANIZATIONAL ASPECTS

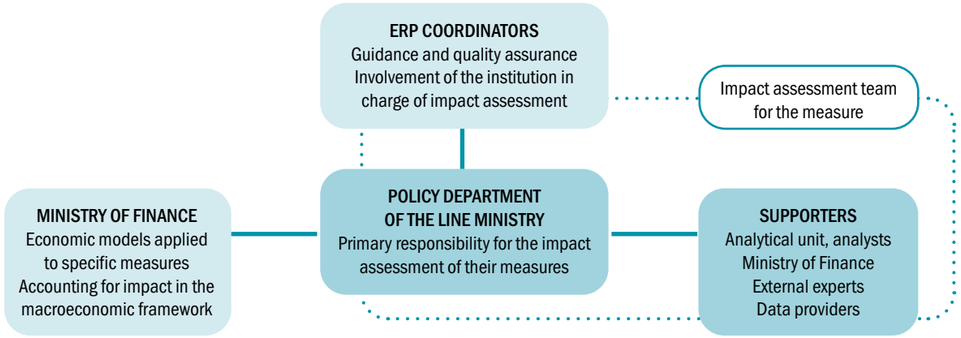
The **institutional responsibility for impact assessment** of structural reform measures should lie with the line ministry that had proposed the measure and will implement it. The quality of the assessment should be checked by the ERP coordinators as part of their feedback on a draft measure. When a specific institution within the government is tasked with overseeing and supporting the impact assessment of policies, their opinion and support should be sought by the ERP coordinators.

The lack of human resources, skills and experience with impact assessment may seriously limit the ability of line ministries to provide quantified impact assessment for their ERP measures. The skills and knowledge of the policy department that proposed and drafted the measure may be sufficient for applying at least the simpler methods presented in this Manual. The policy department may benefit from **cooperation with analytical units**, where such exists within the line ministry, even when they were not involved in drafting the measure itself. It is also useful to consult the **data providers**, in particular the national statistical institute, about the availability and interpretation of data that may be used for impact addition.

A specific limitation is related to using economic models for impact assessment. Economic models are a powerful tool for estimating the potential impact of a wide array of different measures and policies. However, such general-purpose economic models are usually developed and used, if at all, only within the Ministry of Finance (MoF), primarily with the purpose of forecasting economic developments and budget revenues. It would mostly be too demanding to develop and estimate an elaborate economic model only for the purpose of impact assessment of one single ERP measure, unless it is a part of a broader set of sectoral reform measures.

Close cooperation between line ministries and the MoF may therefore benefit the impact assessment of ERP measures. Line ministries may seek methodological support from the skilled staff of the MoF. The modeling and forecasting tools used by the MoF may be applied to estimate the impact of at least some ERP measures. Furthermore, the MoF is expected to explain, in the ERP chapter on the macroeconomic framework, how major reform measures may affect the projected economic developments. In performing this task, the MoF macroeconomic team may benefit from consultations with line ministries during the ERP preparation process, to better understand the intervention logic and the expected impact of proposed structural reform measures.

Impact assessment teams within line ministries and the MoF may benefit from the **support of external experts**. Support by donor-financed technical assistance projects may be provided to line ministries for the development of policy documents, including their impact assessment and results indicators, and to the MoF macroeconomic team for developing forecasting and general-purpose economic models. The key challenge is to retain and share the knowledge and tools provided by such projects. A good way to achieve this is to establish long-term cooperation with national experts who have participated in the implementation of technical assistance projects, and to develop a strategic knowledge management capacity supported by the ERP coordinators.



This Manual does not prescribe a particular institutional setup or procedures for the impact assessment of structural reform measures, but rather presents and explains the methods that may be used for assessing and estimating the economic and employment impact. Nevertheless, the Manual does advocate close cooperation between the policy department proposing the reform measure, the line ministry's analytical unit, the MoF, and national experts.

1.2. IMPACT ASSESSMENT AND RESULTS INDICATORS

The ERP Guidance Note requires the description of each structural reform measure to include "2-3 country-wide or sectoral results indicators for monitoring and evaluating the results of each reform measure on specific segments or sectors in the economy".

In practice, the task of choosing results indicators and setting their targets is often viewed as an exercise completely separated from the impact assessment. However, the two tasks are strongly connected. The underlying questions that need to be asked to set indicator targets and to assess the impact are very much the same:

- How will the measure change the current situation? (Understanding the intervention logic of the measure and how precisely it is supposed to achieve the expected impact)
- Which available data will reflect the changes achieved by the measure? (Choosing the results indicators for the measure)
- How much will the values of selected indicators change due to the implementation of the measure? (Expressing the expected impact by targets for results indicators)
- What other changes can we expect from implementation and how can they be measured? (Estimating the likely impact of the measure on a set of economic and other variables of interest)

In essence, the two tasks of setting results indicators and assessing the expected impact both involve thinking about data that capture the salient features of the current situation and are expected to improve due to the implementation of the measure. Some kind of calculation or estimation of the expected improvement is necessary both for setting achievable indicator targets and for quantifying the expected impact.

This Manual encourages the ERP teams to consider the tasks of choosing the results indicators and assessing the impact as one integrated activity, where the indicators and their targets are selected in a way that reflects the expected impact of the measure.

1.3. OTHER TYPES OF IMPACT ASSESSMENT

This Manual is focused on the economic and employment impact assessment of structural reform measures in the ERPs in line with the ERP Guidance Note. The **requirements of the national normative framework** on impact assessment, where such exist, tend to apply to policy documents as a whole and may prescribe specific forms for presenting the expected impact on different areas of interest. Within the ERP, impact assessment is only required for individual structural reform measures and not for the ERP as a whole. The ERP Guidance Note does not prescribe any specific format for presenting the expected impact and does not require or offer any particular assessment methodology.

In the light of the above, asking the ERP teams to prepare an impact assessment for the entire ERP, following the national normative requirements for policy documents, would impose an unnecessary burden on the ERP drafters – particularly given the fact that the actual practices of impact assessment tend to be far less developed than the normative framework itself. Nevertheless, when methodological tools exist within the national framework, these may be helpful to ERP teams as well.

This section therefore briefly discusses other kinds of impact assessment performed within public administrations and how they may be used for the economic impact assessment of ERP measures.

Impact assessment of public policies. Public policies are planned by public policy documents such as strategies, action plans or programs. Policy initiatives and measures may also be developed outside the framework of existing policy documents, based on the government's political priorities or as a response to unexpected situations. For example, such ad hoc measures were commonly developed to address the economic and social consequences of the recent pandemic and energy crises.

Regulations regarding the preparation of policy documents typically require the drafters to explain the expected impact of the proposed policy, most often at the level of the entire document but not specifically for each measure. Parliamentary and governmental rules of procedure typically require an explanation of the expected impact for proposed normative acts (laws and government regulations). Furthermore, within program budgeting, the budget organizations are required to explain the expected impact of their budget programs and provide performance indicators for monitoring the program's results.

The scope of impact assessment of policy documents and draft normative acts depends on the type of the policy and the requirements of the normative framework. It may be limited to the immediate impact on the sector addressed by the policy; for example, the impact of a judicial reform on the efficiency of court proceedings, or the impact of a health sector reform on the accessibility of services and general health indicators. On the other end, the assessment may be required to cover a broad range of impacts on economic performance, business sector, employment, social situation, gender equality, vulnerable groups, environment, and public finance.

Structural reform measures in the ERP are often taken from, or based on, existing policy documents of the government. Whenever an impact assessment was already performed for the policy document or a normative proposal on which the ERP measure is based, the existing assessment should be consulted by the ERP team as a source for the assessment of the ERP measure. Consulting the explanations of budget programs from which the measure will be financed, or programming documents prepared as a basis for external financing, may also prove helpful.

Ex ante and ex post impact assessment. Impact assessment is required to be performed ex ante, i.e. before the actual implementation of a policy or a normative act. The expected impact is often assessed by expert judgment of policy drafters, reflecting the policy goals, and expressed only by the objectives and targets to be achieved. Such assessment primarily serves as a justification for the policy proposal. More elaborate quantifications and estimations of impact, based on analysis of evidence and data, may be prepared for complex policy proposals that affect the general population, such as pension, social security, or tax reform. In such cases, economic models and other tools may be used to assess the comparative impact of different options while the reform is still being developed and negotiated with the stakeholders.

A more precise assessment is only possible during implementation, when some initial evidence and data on results become available. Estimation of the actual impact of implemented policies, i.e. the ex post assessment, is typically performed within mid-term and final evaluations of strategic documents or as part of other regular policy evaluation efforts of line ministries that go beyond monitoring of output and outcome indicators.

The impact assessment of ERP measures is required to be provided as soon as the measure is introduced in the ERP and before the implementation starts. However, when similar measures were implemented in the past, the results of past evaluations, if available, may be informative for the impact assessment of the present ERP measure. Moreover, when some first evidence on the implementation and results of the ERP measure becomes available, the impact assessment may be reconsidered and refined within the annual ERP re-submission process.

Regulatory impact assessment. The regulatory impact assessment is focused on the impact of proposed normative acts for the business sector, with particular attention to small and medium-sized enterprises. Often this type of assessment is primarily concerned with compliance costs, i.e. the costs of the administrative procedures and other requirements imposed by the new legislation on the business sector. Broader effects on the competitive position and business performance may also be considered and are often established through consultations with business organizations and representative enterprises.

Within this framework, a Standard Cost Model is routinely used to estimate the financial burden of compliance with the new regulation. The time and human resources that a typical enterprise will need to engage for assuring compliance are estimated and expressed in monetary terms. Any other costs, such as fees for newly introduced licenses or permits, or the investments needed to comply with work safety, environmental and other standards, should be included as well.

Many ERPs include structural reform measures aimed at reducing the administrative burden, licensing requirements, or para-fiscal charges. In such cases, the standard cost model can be used to estimate the monetary value of savings brought by the measure to business enterprises of different sizes and sectors. These savings can then be put in relation to the value added created by the sector or size-class of enterprises to estimate the measure's effect on competitiveness.

Budgetary and fiscal impact assessment. In most countries, draft laws submitted by the government to the parliament must include a statement of their budgetary impact, i.e. the estimate of public financial resources required for the implementation. The same rule may apply to regulations and public policy documents submitted by line ministries for government consideration, as well as for new policy initiatives proposed within the mid-term and annual budgeting process.

In addition to the impact on budgetary and other public expenditures, a full fiscal impact assessment should include the direct and indirect revenue effects of the proposed laws, regulations, and policies. Direct effects are related to revenues created by the policy itself, for example revenues from concession fees, user charges or service fees introduced as part of the policy. Direct effects may also include planned privatization receipts and increased tax collection, for example the increase in revenues created by the introduction of fiscal cashiers.

On the other hand, budgetary revenues may also be reduced as a direct effect of a measure. This includes, for example, revenues foregone by introducing tax incentives, reducing tax rates and para-fiscal charges, or abolishing the requirements to obtain payable licenses and permits.

Indirect or second-round revenue effects are related to increased public revenues due to the improved economic and employment situation resulting from the policy, and the behavioral changes caused by the policy. To estimate such effects, an economic impact assessment must first be performed, and only then the impact of improved economic performance on revenues can be estimated. Given the uncertainties of any such estimations, expectations of increased revenues due to second-round effects should not be included in the baseline revenue forecast used for budgetary planning.

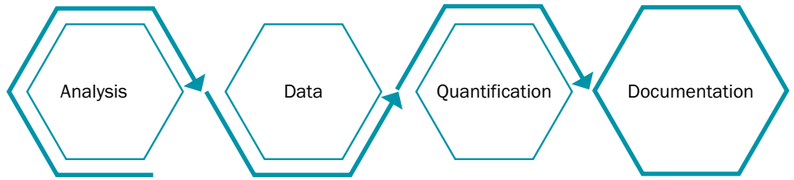
Within the ERP, the budgetary impact of each structural reform measure must be estimated by calculating the costs of implementation and identifying available public financial resources, both national and external. Any direct revenue effects and non-public financial resources should be noted as well. In addition, the ERP chapter on the fiscal framework should explain how the costs of structural reforms were included in the annual and mid-term budgetary projections.

2.

STEPS OF IMPACT ASSESSMENT

The Manual presents the methods and approaches of the economic impact assessment by consecutive steps that the impact assessment teams should take for each structural reform measure.

Regardless of the method, the purpose of the economic impact assessment is always to establish a logical and causal connection between the measure, i.e. the policy intervention and the changes that it may achieve for the targeted segments of the economy and the broader economic outcomes. Other important influences that may affect the desired outcome but are not controlled by the measure (the contextual factors) also need to be taken into account.



STEP 1: LOGICAL ANALYSIS OF IMPACT

The policy drafters and analysts brainstorm and analyze the proposed measure to understand how exactly it is supposed to achieve the expected changes to the current situation. A good understanding of the measure's intervention logic is key for explaining the expected impact in narrative terms and creates a basis for quantification.

STEP 2: ASSEMBLING DATA AND EVIDENCE

Once a solid understanding of the measure's intervention logic is reached, the team collects data related to the economic variables affected by the measure. Other evidence, such as relevant analytical reports, impact assessments of policy documents or normative acts on which the ERP measure is based, or evaluations of similar policies implemented in the past, is also looked for and assembled in this step.

STEP 3: QUANTIFICATION OF IMPACT

Methods for quantification of economic impact may be grouped into three broad categories:

- economic models
- econometric estimations
- calculations based on expert judgment

Each category implies specific skills and resource requirements. The methods, their strengths and limitations are discussed in the following sections.

STEP 4: DOCUMENTATION

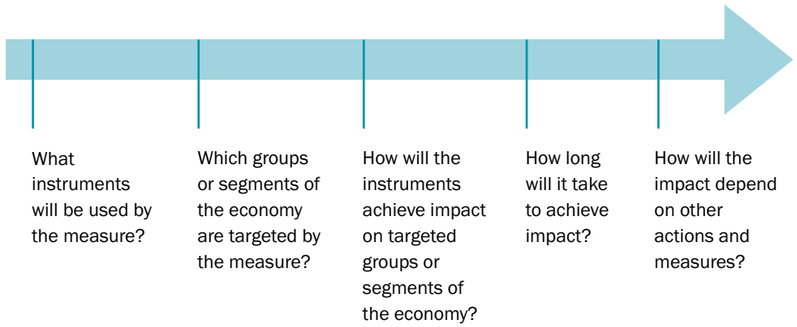
The results of impact assessment and the underlying logical analysis are summarized in a short narrative to be included in the description of the structural reform measure.

As a means of retaining knowledge and facilitating future impact assessment, the data, calculations and estimations used in the assessment process should be documented and stored in a sharable way for future reference and use.

3.

STEP ONE: LOGICAL ANALYSIS OF IMPACT

Impact assessment starts with an understanding of the measure's intervention logic. The graphics below shows the key questions that the impact assessment team should discuss.



3.1. INSTRUMENTS USED BY THE MEASURE

Structural reforms aim at influencing the behavior and interactions of economic agents by changing the incentives and rules under which they operate. Many instruments may be used for this purpose. Each type of instrument works on the economy through different kinds of effects. Identifying the instruments gives us an insight into the channels through which the measure will achieve the expected impact.

Instruments can be grouped into broader categories. The purpose of the grouping and examples used here is to help the impact assessment team with identifying and understanding all the instruments that may contribute to the measure's impact. The exact classification of instruments in groups is not of key importance; if the ERP teams are already accustomed to using an alternative classification from the literature, they should continue using it.

Regulatory instruments. Regulatory instruments are changes to the normative framework (laws and regulations) that set the **rules for conducting economic activity**. In the context of the ERP, measures are frequently aimed at simplifying the business environment, for example by reducing the number of permits and licenses required for conducting business in different sectors. Another prominent example is developing and enforcing the legal framework for liberalized energy and transport markets. Enforcing product quality and safety standards that conform with the EU legislation is another common example of an ERP measure.

Economic instruments. Economic instruments change the costs and benefits of targeted economic activities. On one hand, these are instruments that create **financial incentives** for performing desired activities, i.e. all kinds of subsidies, vouchers or tax allowances offered for certain kinds of activities of businesses and individuals. Common examples include tax allowances for business expenditures on research, development and innovation, subsidies for household or enterprise investments in energy efficiency, or the waiver of employer's social contributions when employing vulnerable job seekers. Privatization of state-owned enterprises may also be seen as an economic instrument aimed at improving the economic efficiency of the enterprise and increasing market competition. On the other hand, economic instruments may also aim at **discouraging certain activities**, for example by introducing charges and taxes on pollution or imposing additional employers' contributions on fixed-term work contracts. Finally, economic instruments may work through **regulating market prices** directly, for example by setting a minimum wage or enforcing a limit on energy prices for vulnerable household.

Knowledge instruments. Knowledge instruments aim at increasing the **awareness, information, and skills** of market participants. For example, an awareness campaign regarding the importance of energy savings, combined with energy labeling of household appliances, may contribute to improving energy efficiency in consumption. Consulting and other support services offered to businesses may help increase their competitiveness in domestic and international markets. Labor market measures often include enhancing the skill set of job seekers. Educational reforms may improve the matching of knowledge and skills gained through education with the needs of the labor market.

Institution building instruments. Measures for strengthening the **capacity of public institutions** to perform their services use instruments such as employing additional specialist staff, training of employees, developing information systems, or enhancing the legal powers of the institution. Common examples featured in ERPs include strengthening the capacity of labor market and tax inspections to address informal economy, setting up and empowering market-regulating institutions during the process of liberalization, or training teachers on implementing a modernized curriculum.

Public investments. Large public investment projects, for example in connectivity of energy and transport markets or in the broadband infrastructure, create direct economic effects by increased public expenditures and job creation during the implementation of the investment. However, investments may only be included in the ERP when they contribute to reforming a market. Impact assessment of such ERP measures should therefore focus on the market reform rather than on direct effects of investments that may be part of the measure.

TABLE 1. Policy instruments used by ERP measures

Category of instruments	How the instruments contribute to the measure's impact
Regulatory	Changes in the rules for conducting economic activities
Economic	Changes in the costs of conducting economic activities
Knowledge	Increasing the information set and skills of market participants
Institution building	Increasing the capacity to efficiently deliver quality public services
Investments	Supporting structural reforms of the markets

To achieve impact, a typical structural reform measure will combine different instruments. For example, a market liberalization reform may include developing the legal framework, setting up a market-regulating institution, investing in connectivity, providing financial incentives for the entry of small producers, and raising awareness of final consumers. A labor market reform may include upgrading the skills of job seekers, providing financial incentives for employing vulnerable workers, adjusting eligibility rules for unemployment benefits, and capacity development for the public employment service. When different instruments are used by a measure, the impact assessment should focus on those instruments that are likely to achieve the strongest impact.

3.2. GROUPS AND SEGMENTS OF THE ECONOMY TARGETED BY THE MEASURE

As is already clear from the examples of instruments provided in the previous section, the same instrument may target different groups of individuals or segments of the economy. For understanding the measure's intervention logic and assessing its impact, it is important not only to identify the instruments but also the target groups, or segments, to which the instruments will be applied. Schematically we can think of four different groups or segments that a measure may address.

Economic entities. Economic entities comprise all forms of enterprises that engage in economic activities, including publicly owned enterprises, individual entrepreneurs, and self-employed persons. Instruments may target entities in a particular sector (for example, financial support to agricultural and food processing enterprises for meeting food safety standards) or a particular segment of the economy (for example, consulting services provided to small and medium-sized enterprises, corporate governance reforms, or allowances offered to foreign investors). When instruments target the entire population of economic entities, the impact assessment team should consider which segment of the economy will benefit most from the measure. For example, a general tax allowance for research, development and innovation expenditures will mostly benefit the technology and knowledge-intensive sectors, while simplifications of the businesses environment will be most beneficial for small enterprises and enterprises in highly regulated activities.

Social groups. Instruments may be directed at specific groups of persons in their different economic roles. For example, labor market reforms may target specific segments of the labor force such as vulnerable job seekers, women, the youth, or precarious workers. Educational reforms generally benefit the younger population but may also target particular groups such as vocational school students or participants in life-long-learning programs. On the other hand, reforms aimed at inducing energy saving or environmentally conscious waste management in households address the population at large.

Markets. Some instruments do not target specific groups or entities but rather intervene directly in the outcomes of their interactions that would otherwise be determined by markets or by agreement. Examples include regulations of minimum wages, severance payments and notice periods, caps on utility prices, pollution taxes, or excises on health-compromising products.

Public institutions. Structural reform measures may also target the capacity of public administration and public sector institutions, for example in education, health, social services, or market regulation. However, while capacity development might be the primary objective of a measure, the measure's impact should be considered in terms of benefits that improved efficiency and quality of public services will create for the performance of economic entities and the situation of social groups.

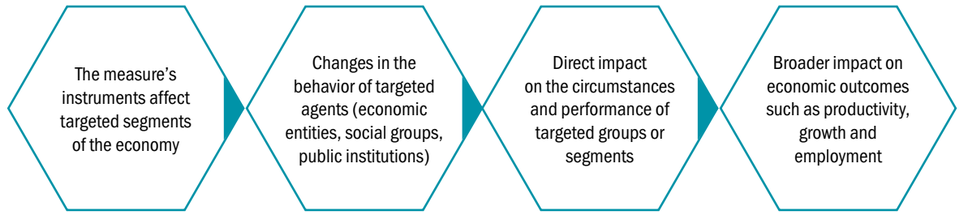
TABLE 2. Target groups or segments of structural reform measures and the expected impact

Targeted group/segment	Main areas of expected impact
Economic entities	Productivity, exports, value added, economic growth
Social groups	Employment, income (poverty) levels, consumption patterns
Markets	Efficiency, price levels, income levels
Public institutions	Performance of economic entities, situation of social groups

Structural reform measures directly affect the situation and performance of the main target group, for example the small and medium-sized enterprises or certain segments of the labor force. The impact on the main beneficiary group should be captured by **results (outcome) indicators of the measure**. In addition to these outcomes, the economic impact assessment should consider **impact at the level of the entire economy or economic sectors** in terms of key economic categories such as productivity, value added, growth and employment.

3.3. IMPACT CHANNEL OF THE MEASURE

Once we understand how the measure's instruments will work on the targeted groups and segments of the economy, the next step is to consider how the changes in behavior of targeted economic agents will impact on broader economic outcomes. Bringing instruments, targeted groups and broader outcomes together in one logical story completes our understanding of the measure's intervention logic and its impact channel.



Three additional aspects of the impact channel need to be considered by the impact assessment team.

The time dimension of impact. The time needed for the impact to be realized and reflected in data depends, inter alia, on the instruments of the measure and their sequencing. Economic agents react quickly to changes in costs and prices. Economic instruments, i.e. financial incentives for desired behavior, may thus achieve impact relatively quickly; some direct results may become visible already during the first or second year of implementation. Regulatory instruments may also need a relatively short time to generate impact, depending on the awareness of the new

rules and the time and costs needed for adjusting to them. Institution-building measures typically take a few years, as time is needed to employ and train the staff and develop good practices. Educational reforms develop the full impact only in the medium to long term, as new generations need to become educated and engaged in the labor market.

Some reforms may result in **negative short-term effects** and only generate a positive impact over a longer period. Reforms that increase market competition and openness may negatively affect the situation of incumbent producers that previously benefited from a strong position in a highly regulated and protected market. In the short run, this may decrease their output and lead them to laying off the labor force. Many reforms require considerable budget expenditures before any tangible results are achieved – for example health sector or pension reforms, subsidies for research and development and investments in education. The negative short-term budgetary effects may create a conflict between such reforms and fiscal stability considerations.

The quantification of impact should, in principle, relate to the total impact over the period that is needed for it to unfold. There is no requirement in the ERP Guidance Note to estimate the impact by years or to limit the assessment to the three-year time horizon of the ERP.

Interdependencies and counter-effects between measures. Achieving the expected impact often depends on the timely implementation of complementary instruments and measures. For example, liberalizing energy or transport markets without at the same time instituting clear rules and an effective market regulator may lead to abuses of market power, unjustified price increases, under-investment in infrastructure and insecurity of supply. Financial incentives for economic entities might not achieve much effect without at the same time removing regulatory obstacles to economic activity. Reforms improving the efficiency of labor market measures may address the negative short-term impact of market liberalization and enhance the employment impact of educational reforms.

Impact assessment as such is not able to solve coordination problems in the design and implementation of reforms. Nevertheless, it should highlight the interdependencies and potential counter-effects in the narrative explanation of the expected impact.

Contextual factors. The policy-making world would be much simpler if economic outcomes depended only on the measures taken and the reforms implemented by the government. However, this is clearly not the case. Employment levels and economic performance depend on many other factors, for example the economic cycle of the domestic economy, the dynamics of the main trading partners, the price developments in international markets, and similar. A particular set of contextual influences is linked with the political economy of reforms. Weak governments and governments facing elections may be reluctant reluctant to introduce with negative short-term effects. The implementation of reforms affecting large portions of the population or strong interest groups often deviates from original plans to accommodate the interest-based opposition or public discontent.

Impact assessment usually assumes that reforms will be implemented as planned, both regarding their content and timing, thereby neglecting the political economy factors. However, the purely economic factors that may influence the impact of reforms should be taken into account.

3.4. EXAMPLES OF LOGICAL IMPACT ANALYSIS

We conclude the chapter by providing some stylized examples of a logical impact analysis for some typical ERP reform measures.

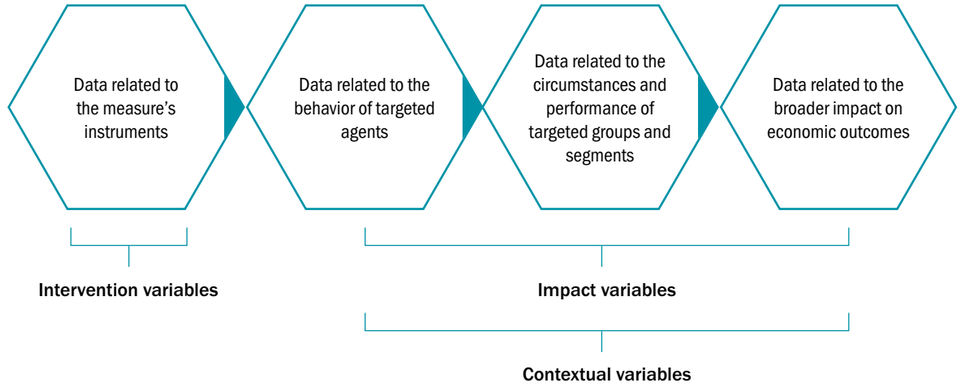
EXAMPLE 1: LOGICAL ANALYSIS OF IMPACT FOR SOME TYPICAL ERP MEASURES

Measure 1	**Reducing the administrative burden**
Instruments	Simplification and reduction of required licenses and permits for businesses. Developing an online portal for filing permit and license applications.
Targeted segment	Business enterprises and self-employed
Impact channel	Reduction of costs and time savings for business entities in the sectors where licenses and permits are required. The proportion of saving compared to total compliance costs will be higher for small and medium-sized enterprises. Stronger competition due to the entry of new businesses into the less regulated sectors. Overall, increased activity (production) and value added of the affected sectors, additional employment to support the increased activity, and reduced prices for consumers due to stronger competition.
Time dimension	1-2 years after the full implementation of the measure.
Interdependencies	The ability of small businesses to take full advantage of the simplified business environment will depend on the timely implementation of complementary measures for improving the access to credit.
Measure 2	**Liberalization of the electricity market**
Instruments	Transposition of relevant EU directives. Establishing the electricity exchange institution. Establishing the market regulator. Building or strengthening transmissions lines with neighboring countries. Gradual liberalization of tariffs for certain classes of consumers.
Targeted segment	Producers and suppliers of electricity, consumers of electricity (the business sector and households)
Impact channel	Increased competition due to the entry of new domestic and foreign suppliers and traders. Increased efficiency of incumbent producers and suppliers facing stronger competition. (Upward or downward) adjustment of prices and the tariff structure for consumers, depending on the level of regulated prices before liberalization and the cost structure of the new supply sources. The short-term effect on incumbent domestic suppliers and consumers may be negative or positive, depending on the market structure before liberalization. Over a medium term, a more efficient electricity sector with a higher value added, market prices reflecting the real costs and international price movements.
Time dimension	5-6 years
Interdependencies	The measure is complemented by financial incentives for investing in electricity production from renewable sources. Poor households faced with higher energy prices will be addressed by social policy measures developed in parallel with the gradual price liberalization.
Measure 3	**Activation measures in the labor market**
Instruments	Introducing conditionally social and unemployment benefits on active job seeking. Two-year waiver of employers' social contributions for the employment of persons from vulnerable groups and social benefit recipients.
Targeted segment	Job seekers, job seekers in vulnerable groups, recipients of social benefits, employers
Impact channel	Conditionally of social and unemployment benefits will incentivize the recipients to actively seek and accept jobs. The waiver of social contributions will induce employers to search for and give preference to potential employees from the targeted groups. Overall, the measure will result in lower unemployment of vulnerable groups, shorter duration of unemployment, and a reduced number of inactive social benefit recipients.
Time dimension	1-2 years after implementation
Interdependencies	The level of impact will depend on the general conditions in the economy and the labor market.

4.

STEP TWO: ASSEMBLING DATA AND EVIDENCE

Impact estimation teams should focus on data related to the instruments used by the measure, the impact channel identified by the logical analysis and the contextual factors. This data will be used as intervention, impact and contextual (control) variables in the quantitative estimations of impact.



In addition to data, the estimation team should search for other evidence and literature that may help quantifying the impact, for example:

- impact evaluations of similar measures implemented in the past
- regulatory impact assessments of normative acts related to the measure
- impact assessment of policy documents related to the measure
- expert analysis of implementation and results of related government policies
- policy and reform impact analysis by international institutions such as the OECD, the IMF, and the European Commission
- policy and reform impact research published in professional journals and books

Some examples of impact estimations from the literature are provided in Section 5 and in the instructions for using the Excel Tool for Impact Assessment.

The set of data and variables needed for the quantification of impact depends on the chosen method of estimation. The search for data and other evidence should therefore be guided by the requirements of the estimation method. Once the estimation begins, the need to collect additional data may emerge. On the other hand, when no adequate data can be found, the envisaged estimation method may need to be adjusted or changed.

EXAMPLE 2: POTENTIAL INTERVENTION, CONTEXTUAL AND IMPACT VARIABLES IN SOME TYPICAL ERP MEASURES

Measure 1	**Reducing the administrative burden**
Intervention variables	Number of licenses and permits in total Estimated costs of obtaining licenses and permits Estimated costs of compliance with the license/permit requirements
Contextual variables	Economic activities/sectors with the highest license/permit requirements Distribution of value added across sectors and enterprises
Impact variables	Value added by economic activities and enterprise size Value added per employee by economic activities and enterprise size Costs related to licenses and permits as a percentage of the value added
	Other data depending on availability and the method of estimation
Measure 2	**Liberalization of the electricity market**
Intervention variables	Transmission capacity Regulated prices and tariffs Subsidies to electricity sector enterprises and consumers
Contextual variables	Time series of electricity prices in relevant international markets Market structure – numbers and market shares of producers, suppliers and traders
Impact variables	Time series of electricity prices for different classes of consumers Time series of domestic electricity production and cross-border trade Employment and value added in the electricity sector
	Other data depending on availability and the method of estimation
Measure 3	**Activation measures in the labor market**
Intervention variables	Current conditions for receiving social and unemployment benefits and the planned changes Average amounts and distribution of unemployment and social benefits Share of employers' social contributions in total labor costs
Contextual variables	Any previous changes in the social contribution rates and the incentives provided for employment Distribution of wages and the average wage paid in the business sector
Impact variables	Time series of the number of the unemployed, unemployed persons from targeted vulnerable groups, and social assistance recipients Time series of the number of the unemployed, unemployed persons from targeted vulnerable groups, and social benefit recipients who transitioned into paid employment
	Other data depending on availability and the method of estimation

5.

STEP THREE: QUANTIFICATION OF IMPACT

The logical analysis as presented in Chapter 3 will inform the drafters of the ERP when writing the narrative explanation of the expected impact for each structural reform measure. It also provides a basis for quantifying the impact. This section presents the three basic approaches to quantification: economic models, econometric estimations and expert judgment.

For most measures, the ERPs currently provide a narrative explanation of the expected impact but no quantification. When the practice of quantification is introduced more broadly, the judgment-based methods will probably be the ones most used by the ERP teams. The **Excel Tool for Impact Assessment** may be used to apply the impact quantifications from the literature to the structural reform measure being analyzed.

5.1. USING ECONOMIC MODELS FOR IMPACT ASSESSMENT

Economic models simulate the functioning of the economy by a set of interconnected equations capturing the relations between economic variables. The relations between variables may be assumed linear or non-linear. They may be modeled as fixed (deterministic), in the sense that a given change in one variable always generates the same change in the affected variable, or they may be modeled as stochastic, in the sense that a given change in one variable generates a range of possible outcomes with different probabilities of occurring.

The key element of any model equation are the parameters expressing the relations between changes in variables in numerical terms. The values of such parameters may be taken from the economic literature (for example, by taking values that are typically occurring in similar models for comparable economies), they may be estimated from the actual past values of variables, or they may be calibrated. Calibration is a trial-and-error process of finding a set of model parameters that generate predictions of the economic system's behavior, which are sufficiently close to the actual data.

Using economic models for impact assessment involves the following steps:

- **identifying the intervention variables**, i.e. understanding, on the basis of the previous logical analysis of the measure, which variables included in the model will be affected by the measure;
- **quantifying the level of change in the intervention variables that the measure will generate**; most often, this is based on expert judgment, previous experience or simply taken by assumption;
- **running the model** to see what changes in the model outcomes will be generated by changing the values of the intervention variables (in the jargon, we say that the model is "shocked" by changes in the intervention or contextual variables). The model outcomes we are most interested in are those related to key impact variables such as the economic growth, the employment rate or the value added of targeted economic sectors;
- **understanding the results**, i.e. the channels by which the intervention variables generated the changes in outcomes; this can be best explained by specialists who are familiar with the model structure;
- **evaluating the results for their logical plausibility** and, if necessary, repeating the exercise with a different set of assumed changes in the intervention variables.

The main advantage of economic models is that, once developed, they can be used for assessing the impact of many different measures and for generating a wide array of results relating to many impact variables of interest. Experienced users can provide results in a relatively short time and take account of different policy options being discussed.

The main limitation is that building and maintaining economic models requires considerable and regular investment of time and highly specialized skills. The model results sometimes strongly depend on the specifications of model equations and the assumptions made when designing the model. This must be considered when interpreting the results.

Given the complexity of developing workable economic models, they are almost never built only for the purposes of assessing the impact of a single measure. Mostly, the models are developed by the MoF for forecasting the economic and budgetary developments, and for assessing the impact of major contextual or policy changes on the economy. Given this general purpose, it may happen that the main intervention variables of a particular structural reform measure cannot be related to the variables included in the model at hand. In such cases, the model needs to be extended or a different assessment method needs to be applied.

This Manual shortly describes the three commonly used types of economic models and provides examples of their application. For the ERP teams, this gives an insight into the logic of the economic models and how they can be used for impact assessment. Specialists who want to improve their skills to develop and run models of their own design are encouraged to take part in specialized training and consult the literature suggested at the end of the section.

Macroeconomic models. The core of this type of models are equations that capture relations between key macroeconomic variables as postulated by economic theory. Modern versions of such models attempt at linking these macro-level relations with equations representing the behavior of economic agents (enterprises, households, sometimes even the economic policy makers). Inclusion of behavioral relations in the model enables a better understanding and interpretation of results.

BOX 3: USING A MACROECONOMIC MODEL TO ASSESS THE IMPACT OF INVESTMENT AND LABOR MARKET MEASURES IN THE NATIONAL REFORM PROGRAMME OF ITALY

The Treasury Department of the Italian MoF has developed a set of models with different approaches and purposes. The macroeconomic model ITEM was used to assess the impact of selected measures from the 2019 National Reform Programme:

- two measures aimed at **stimulating investment**, i.e. the Growth Decree-Law stimulating private investment and the territorial administrations and the Unlock Sites Decree-Law simplifying the procedures for the approval of public works and private construction projects. It was estimated that each of the two measures would increase the 2019 real GDP by 0.1 percentage point;
- introduction of the **"Citizen's income"** for poor households, accompanied by measures to encourage the beneficiaries to engage in the labor market and increased funding for job centers and active labor market measures. The measure's logical analysis identified the following impact channels: higher consumption expenditures from additional income, decreasing average wages due to a higher number of job seekers, and increased demand for labor due to lower wages and the improved matching services of job centers. The medium-term impact was estimated as an increase in the employment rate by 1.1 percentage point and an increase in the GDP level by 0.5 percentage points. In the short term, the unemployment rate would also increase by 1.3 percentage points due to a higher number of job seekers;
- introduction of a new option for **early retirement**, which would reduce the employment of the older generation but at the same time open up their jobs for the currently unemployed. The overall impact was estimated as a 2.5 percentage point decrease in the unemployment rate over a medium term, with the total employment rate first declining and then gradually picking up.

Sources: Website with description of the models used by the Italian Treasury and the summary of the estimates included in the Italy's 2019 Stability Programme.

BOX 4: USING A MACROECONOMIC MODEL TO ASSESS THE IMPACT OF MEASURES IN THE ERP 2023-2025 OF MONTENEGRO

With the support of an EU-funded technical assistance project, the MoF of Montenegro developed the Montenegrin Macroeconomic Model (MMM). The model is now being used independently by the MoF to assess the macroeconomic impact of structural reform measures and related investments.

For the 2023-2025 ERP, the economic impact of 12 structural reform measures was estimated. Results were presented in a special section of the ERP chapter on the macroeconomic framework. Specifically, the following investments and structural reform measures were included in the estimation:

- investments (public and private) in renewable **energy** sources and energy efficiency, including the structural reform measure for supporting households' energy efficiency investments;

- investments in high-end **tourism** facilities and municipal infrastructure projects;
- the structural reform measure for strengthening the national **research and innovation** ecosystem;
- structural reform measures for **digitalizing** public administration and education, strengthening cyber security and rolling out the broadband infrastructure;
- **employment** and **social** inclusion measures (strengthening the Employment Agency, reforming the social and child protection system);
- **trade** integration measures (implementing the CEFTA protocols, upgrading a border crossing);
- measures aimed at reducing the informal economy and improving the management of **state-owned enterprises**.

The model estimated the combined annual impact of all these measures and investments over the 2021-2024 period, with 2020 as the baseline year. The main result is that the GDP would be 4.9% higher in 2024 without the reforms and investments. This impact would mainly result from significantly higher levels of investment (by 26%) and exports (by 9.5%, compared with the 8.0% increase in imports). The employment level would increase by 1.3%, while the unemployment level would decline by 1%. According to the explanation provided in the ERP, the strongest economic impact on competitiveness is expected from digitalization and innovation reforms.

Sources: Montenegro's Economic Reform Program 2023-2025, Section 3.4. Presently only the Montenegrin version is available online. A presentation of the model is available in the CEF's FISR library.

General equilibrium models. The theoretical idea behind this type of models is that the competitive market forces will eventually generate a set of prices under which the supply would exactly match the demand in all the markets for traded goods and services. Today the purpose of such models is not in finding the equilibrium prices, but rather in simulating the dynamic (inter-temporal) adjustment process taking place after the model has been shocked by changes in external variables. When the shocks are related to policy intervention variables, the changes in the model results can be used for impact assessment.

General equilibrium models are typically structured in blocks of equations representing the behavior of economic agents and the market outcomes in particular segments of the economy. These segments may include the labor market, the markets for consumption, intermediate and capital goods, the financial markets, and even the behavior of fiscal and monetary policy makers. The level of detail in modeling a particular segment depends on the model's purpose and the data available. When the relevant intervention variables are not included in the model at hand, it is often possible to extend the model with additional blocks needed for capturing the impact of a particular structural reform measure.

BOX 5: USING A GENERAL EQUILIBRIUM MODEL FOR ESTIMATING THE IMPACT OF STRUCTURAL REFORMS IN THE EU MEMBER STATES

The European Commission's Directorate-General for Economic and Financial Affairs (DG ECFIN) developed a general equilibrium model QUEST which is both dynamic (accounts for adjustments over time) and stochastic (the relations between variables are not deterministic). The model has been used for the impact assessment of structural reforms in the EU member states. For example, in 2016, the DG ECFIN published the impact assessment of the National Reform Programs of Italy, Spain, Portugal and France.

The table below explains **how the reforms were translated into shocks to the model variables**. The table exemplifies both the wide array of reforms that can be estimated by the model and the complexity of mapping reforms onto the variables included in the model. Often, the reform was captured by changes in related policy indices and the impact of these changes on the model variables was taken from the literature, i.e. relevant econometric studies. Some reforms were not assessed due to the lack of precise information or the inability to translate them into model variables (for example, the judicial and insolvency reforms).

Type of reform	Intervention variable in the QUEST model
Reducing the cost of starting a business	Entry cost of businesses
Simplifying the administrative framework	Reduction of the overhead labor
Reducing product market regulation	Impact of the reduction in the OECD Product Market Regulation (PMR) index on the mark-up in final goods' prices Increase in labor productivity due to improved allocative efficiency
Improving access to finance	Represented by changing the corporate income tax
Tax reforms	Changes in the implicit tax rates on labor, capital and consumption, calculated from the expected change in budgetary revenues
Unemployment benefit reforms	The OECD indicator of benefit generosity
Reforms of the active labor market policy	Spending on active labor market measures
Reforms of the employment protection legislation	Impact of the reduction in the OECD Employment Protection Legislation (EPL) index on the labor productivity
Pension reforms	Gradual increase in the older generation's labor participation
Education reforms	Spending on education, changes in skill shares

For the estimation, the reforms planned in a given country were entered into the model at the same time. This way the interdependencies between the reforms were accounted for but only an estimate of their combined impact was generated. The results showed that the reforms had the potential to increase the GDP by 1–2% over the medium term. The authors warned that the results may be sensitive to some model assumptions, the speed and the degree of implementation, and the method used for translating the reforms into the model variables.

Sources: EC Institutional Paper 023 (April 2016). The Economic Impact of Selected Structural Reform Measures in Italy, France, Spain and Portugal. A presentation based on the paper is available in the CEF's FISR library. The QUEST model is explained on the dedicated DG ECFIN website.

BOX 6: USING A GENERAL EQUILIBRIUM MODEL FOR ESTIMATING THE IMPACT OF STRUCTURAL REFORMS IN THE NATIONAL RECOVERY AND RESILIENCE PROGRAM OF ITALY

Many EU member states have calibrated the DG ECFIN's QUEST model to fit with their national data, economic structure and institutions. For example, the Italian MoF used the calibrated QUEST model for estimating the impact of reforms in their National Recovery and Resilience Program.

For the mapping of product market and education attainment reforms, the same approach was used as in the study presented in Box 5. For other reforms, the following literature-based assumptions were made:

- for the reform increasing the **efficiency of public administration**, the model estimation relied on a study showing that an increase in the public administration efficiency in Italy to the level of the most efficient country would lead to a 3% growth in the economy's output;
- for the **judiciary reform**, the estimation was based on a study showing that a 1% decrease in the civil case disposition time would increase the total factor productivity (TFP) by 0.03%;
- for the **public procurement reform**, the model used the result of a study showing that a 1-point improvement in the public procurement performance indicator of the Single Market Scoreboard triggers off a public investment increase of 0.03–0.07%;
- for the reforms improving the **quality of education**, an estimated elasticity of the TFP to PISA scores (0.8) was used;
- for the **labor market reforms**, the increase in the supply of labor (job seekers) was estimated from the targeted number of the measures' beneficiaries, while the improved matching between demand and supply for labor was assumed to reduce the marginal cost of job search by 10%.

When all planned reforms were introduced into the model, the result was a 3.4% rise in the GDP level in the medium term and a 10% rise in the long run. The highest impact would be achieved by labor market reforms, followed by education and public administration reforms.

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Source: Italy's MoF Working Paper 2 (March 2023). Structural reforms in the Italian National Recovery and Resilience Plan: A macroeconomic assessment.

BOX 7: USING A GENERAL EQUILIBRIUM MODEL FOR ESTIMATING THE IMPACT OF STRUCTURAL REFORM MEASURES IN THE ERP OF KOSOVO*

With support from an EU-funded technical assistance project, Kosovo's* MoF developed a computable general equilibrium model and used it for estimating the impact of four measures in the 2020–2022 ERP:

- the impact of the measure addressing the **informal economy** was modeled as increasing effective direct taxation. On the assumption that additional revenues would increase government savings and hence public and private investments, the reform was estimated to generate a 0.3% medium-term growth in the real GDP;
- the impact of the measure aimed at increased **energy efficiency** was estimated on the assumption that it would enable elimination of the subsidies for the energy sector. Despite an increase in energy tariffs, the reform was estimated to generate a 0.2% medium-term growth in the real GDP;
- the impact of establishing an efficient **commercial court** was modeled through an assumed 5% reduction in the risk premiums, enabling higher investment and consumption spending and resulting in a 2.1% medium-term growth in the real GDP;
- the measure introducing **targeted training of the unemployed** was estimated to increase the employment of persons in the lower half of the income distribution by 1.5% and the overall employment by 1%, resulting in a 0.4% medium-term growth in the real GDP.

In addition, the model generated impact estimates for government revenues and spending, investments, exports, imports, wages, household consumption and the Gini coefficient.

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Source: Kosovo's* Economic Reform Programme 2020–22, Section 2.6.2 (results) and Annex 4 (presentation of the model).
(* This designation is without prejudice to positions on status and is in line with UNSC 1244 and the ICJ Opinion on the Kosovo Declaration of Independence.)

Micro-simulation models. These models consist of equations relating the individual or households' income with the parameters of the tax, pension and social benefit systems. Households or individuals are grouped in classes reflecting their labor market status, the number of household members and dependable children, and other characteristics related to benefit entitlement and tax obligations. The models are used for assessing the impact of reforms directly affecting household incomes, such as tax reforms, pension reforms or reforms of the social and unemployment insurance systems. While the income and fiscal effects of such reforms are in the focus of the public and the policy makers, results of model simulations can be used as inputs into assessment of broader economic and employment impact.

Micro-simulation models have been widely used in Slovenia for estimating distributional and fiscal effects of labor market, social protection, pension and health insurance reforms. Presentations of the models and their application to the pension reform are available in the CEF's FISR library. At the EU level, the EUROMOD micro-simulation model, which can be adjusted to the data for a particular country, has been developed by the Joint Research Centre of the European Commission.

5.2. ECONOMETRIC ESTIMATIONS OF IMPACT

Econometric estimations differ from economic models in two aspects: they focus only on the variables of immediate interest for the impact assessment; the relations between variables, i.e. the key parameters, are always estimated from data (they are not assumed or calibrated). For estimations to be valid, a sufficient quantity of data must be available, with what is "sufficient" depending on the number of variables and the estimation technique. The data must include some variation, for example between the time periods or the observation units to which they refer, to generate meaningful parameter estimates.

The main advantage of econometric estimations, compared to economic models, is that estimations can be designed so that they directly capture the measure's intervention logic and expected impact. Estimations also require less time and less specific skills.

The main limitation is that econometric estimations might not capture all relevant influences on the impact variable, thereby overestimating the effects of the measure's intervention. Another limitation is that when the impact is captured by a variable for which past data are not available (for example, the value of subsidies provided to the business sector when no comparable support was provided before the introduction of the measure), the results of the estimation may suffer from a high degree of uncertainty. Finally, econometric estimations focus on the measure's direct impact, whereas second-round and indirect effects are better captured by economic models.

Using econometric estimations for impact assessment involves the following steps:

- **identifying the intervention, impact and control variables** on the basis of the previous logical analysis of the measure. Intervention variables are those directly affected by the measure. Impact variables are the economic outcomes that are expected to be improved by the measure. Control variables capture the contextual factors influencing the impact variables which are not affected or controlled by the measure itself;
- **identifying and collecting data on the values of the variables**; the data may refer to previous periods or to different observable units (for example, sectors, economic entities, regions, or countries). Sometimes the statistical definitions of data do not fully match the economic concepts behind the variables used in the estimation; this needs to be considered when interpreting the results;
- **formulating the econometric equation(s) to be estimated and choosing the estimation technique**; the equations express the assumed relations between the intervention, control, and impact variables, and include the parameters that need to be estimated. The estimation techniques depend on the type of data available and the specification of equation(s);
- **estimating the values of parameters** that express the relations between the intervention and the impact variables;
- **quantifying the impact of the measure** by, firstly, assessing the changes in the values of intervention variables that the measure will generate (most often based on expert judgment, previous experience, or plausible assumptions), and, secondly, using the estimated parameters to calculate the change in the impact variables resulting from changes in the intervention variables;
- **understanding the results**, i.e. the channels by which the intervention variables generated the changes in the impact variable, considering the chosen estimation technique and specification, the data imperfections and the contextual factors not fully captured by control variables;
- **evaluating the results for their logical plausibility and statistical significance** and, if necessary, repeating the exercise while adjusting the set of variables used, the estimation technique and specification, and the assumed changes in intervention variables.

This Manual shortly describes the commonly used types of econometric estimations and provides examples of their application. For the ERP teams, this gives an insight into the array of options for using econometric estimations in impact assessment. Analysts are encouraged to take part in specialized training and consult the literature suggested at the end of the section.

Production function. The production function is a well-known concept relating the changes in the GDP level with the changes in the quantity of productive factors engaged by the economy. In the simplest formulation, the productive factors include labor and capital. Changes in the GDP levels that cannot be explained by changes in the employment of labor or increases in capital stock (the net investments) are interpreted as resulting from innovations and technological progress, improved knowledge and skills of the labor force, or institutional factors and policies that affect the economy's efficiency in using the productive factors. More advanced formulations of the production function may break down the labor variable by skills or education levels, adjust the capital stock for the actual level of capacity utilization in the economy, or introduce additional variables that directly capture the technological progress or the changes in institutional quality.

Within the ERP, the production function is used by MoFs to estimate the output gap as an indicator of the economic cycle and, from there, the structural position of the general budget or public finance. It may, however, be also used for estimating the impact of structural reform measures on the GDP level. In principle, the production function can be used for impact assessment of any measures that affect the availability of productive factors and the efficiency of their use. For example:

- **labor market reforms** that improve the matching process between employers and job seekers increase employment and thereby the level of the labor input in the production function;
- **health sector reforms** that reduce health-related absenteeism increase the labor input in terms of the actual hours (days) worked;
- **education sector reforms** that raise the working population's skills increase the share of the skilled labor input in the production function;
- **reforms aimed at facilitating innovation or improving the institutional quality** increase the impact on the GDP from productive factors other than labor and capital;
- **reforms aimed at stimulating investments**, for example by providing incentives to private investors or implementing public infrastructure projects, increase the capital input in the production function.

The **The Excel Tool for Impact Assessment**, provided with this Manual and explained in the Annex, includes a spreadsheet with the parameters of a production function. The spreadsheet may be used for a simple impact assessment of structural reform measures affecting the level or the efficiency of productive factors included in the production function specification.

BOX 8: ESTIMATING THE IMPACT OF STRUCTURAL REFORMS ON THE INPUTS OF THE PRODUCTION FUNCTION

The IMF and the OECD have published several studies estimating the impact of structural reforms from regressions, including several reform indicators for wide sets of countries and years. Here we present the results of a study, which used the production function framework for estimating the long-term impact of typical structural reforms, using data for the OECD countries and a sample of emerging economies.

The results reported in the table represent the average impact for the countries in the sample with available data. When using the coefficient, care should be taken of the uncertainty intervals reported in the study. Another assumption behind the estimates is the labor share of 66%, which may differ among countries; the study presents the changes in the main coefficients resulting from a 10 percentage points lower or higher labor.

Reform indicator	Change in the indicator	Impact channel	Impact in %	
			OECD countries	Non-OECD countries
Product market regulation (PMR) indicator	-0.58	MFP	2.27	n.a.
		K/Y	1.55	4.37
		Employment	0.99	1.2
Time for insolvency procedures (Doing Business Report)	-1.23	MFP	10.67	
		Employment	2.26	
Employment protection legislation (EPL) indicator	-0.83	K/Y	3.64	n.a.
		Employment	3.70	2.32
Spending on active labor market policies per unemployed as % of GDP	+3.18	MFP	1.27	n.a.
		Employment	0.27	n.a.
Tax wedge for a couple with 2 children and average earnings, in percentage points	-2.28	Employment	0.67	n.a.
Excess coverage of wage agreements in percentage points	-1.89	Employment	0.15	n.a.
Minimum wage as % of the median wage	-2.48	Employment	0.70	n.a.
Unemployment benefits as % of earnings	-1.42	Employment	0.45	n.a.
Rule of law (World Bank)	+1.01	MFP	35.50	43.40
Cost of contract enforcement (Doing Business Report)	-15.91	MFP	7.96	
		K/Y	11.76	
Business R&D spending as % of GDP	+0.10	MFP	0.40	n.a.
Trade openness as % of GDP	+4.01	MFP	2.80	n.a.
Corporate income tax as % of GDP	-0.98	K/Y	1.25	n.a.

Note: MFP = multi-factor productivity; K/Y = capital to income (GDP) ratio.
Source: Égert, B. (2018). The Quantification of Structural Reforms: Taking Stock of the Results for OECD and non-OECD countries. OECD Economics Department Working Papers, No. 1482.

Regression analysis. The basic idea of any regression analysis is to estimate the parameters that capture the impact of the intervention variables on the selected impact ("dependent") variable, while controlling for the effects of the relevant contextual factors. The parameters can be estimated by a single equation or by a set of interconnected equations. Parameters may be assumed to be deterministic (for example, the increase in the overall credit extended to small and medium-sized enterprises depending on the amount of loan guarantees provided by the measure) or probabilistic (for example, the increase in the probability that an unemployed person will become employed depending on the spending for active labor market measures). Many estimation techniques have been developed to take account of inter-dependencies between variables included in the estimation, data imperfections, unknown influences and other factors that may affect the validity of the estimates.

The most commonly used types of regressions are:

- **time-series regressions**, where the data for the variables are their past values collected from statistical or other credible sources. The modern approach of auto-regressive modeling allows to extract meaningful information even from a single data series. While such analysis is most often used in forecasting, simple extensions (for example, taking account of specific past events that may have affected the dynamics of data or adding one or two variables to the estimation) enable using the auto-regressive models for impact assessment;
- **cross-sectional regressions** based on data for a sufficiently large number of observation units, for example regions, countries, economic sectors or population groups;
- **panel regressions** that combine the cross-sectional and time-series data in one estimation;
- **micro-data regressions** using a large amount of data on individual units of observation; the micro data may be obtained from the financial accounts of business enterprises, personal income tax statements, individual records of the employment registry and other similar sources.

Regression estimations often produce impact coefficients that are statistically insignificant, small or opposite to theoretical expectations. Such estimates may result from the lack of data, the contextual factors not accounted for in the estimation, or the estimation method or regression specification used. Unexpected results may challenge us to rethink our theoretical expectations about the impact channel of the estimated measure. But even when the coefficients turn out as expected, we should keep in mind that the **causality between the intervention and the impact variable** needs to be tested econometrically or at least corroborated by a robust theoretical reasoning. When using results from the literature for a particular structural reform measure, care should be taken not to overestimate the impact; the assumption used in the original study and the reliability of the estimated coefficient should always be considered.

Panel regressions are most often used for impact assessment. **Boxes 9 and 10** present two examples, one with clear results and the other one with less conclusive findings.

BOX 9: USING A PANEL REGRESSION FOR ESTIMATING THE IMPACT OF NON-TRADE BARRIERS ON TRADE BETWEEN WESTERN BALKAN COUNTRIES

The level of trade between two countries is often explained by a well-known gravity model, whereby the trade depends on the "economic mass" (GDP, population) of the two countries and their proximity (physical distance, transport costs). The model can be extended to include policy variables of interest.

A 2018 DG ECFIN study estimated the gravity model by a panel regression including six Western Balkan economies on the data for the 2007-2016 period. The particular interest of the study was to estimate the (negative) impact of non-tariff barriers on trade flows between these countries.

The variable representing the **non-tariff barriers to trade** was constructed from the World Bank's Doing Business Report data regarding the documentation and the time required to export from one country to the other (summing up the scores for export barriers of the exporting country and the scores for import barriers of the importing country). The estimation included several variables that captured other (contextual) factors affecting trade: the GDP, the physical distance, the existence of a common border, and the similarities in language, religion and ethnicity.

The main result of the study was that the elasticity of the total merchandise trade between two countries and the extent of the non-tariff barriers ranged from –0.87 to –1.1, depending on the econometric specification used. The elasticity of exports to non-tariff trade barriers was estimated at –1.2%. This implies that a 1% reduction in the index of non-trade barriers could increase a country's exports by over 1%.

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Source: Kaloyanchev, P., Kusen, I. and Mouzakitis, A. (2018). Untapped Potential: Intra-Regional Trade in the Western Balkans. DG ECFIN Discussion Paper, 080, May 2018.

BOX 10: USING A PANEL REGRESSION FOR ESTIMATING THE IMPACT OF THE SKILLS MISMATCH ON LABOR PRODUCTIVITY IN THE EU MEMBER STATES

Structural reform measures in the ERPs often aim at reducing the skills mismatch, i.e. the difference between the skills searched for by the employers and the skill sets of job seekers. A DG ECFIN study estimated the impact of the mismatch on labor productivity by a panel regression on data for the EU member states.

Four different indicators of the skills mismatch were used in the study:

- the macroeconomic mismatch, i.e. the dispersion of unemployment rates between the three main qualification groups, while considering their shares in the working-age population;
- mismatch as reported by businesses, i.e. an index constructed from the data of the European Business and Consumer Survey on the share of employers reporting labor shortages as a major limiting factor on their production;
- underqualification, i.e. the share in the total employment of low- and medium-qualified workers who hold a job for which they are underqualified;
- overqualification, i.e. the share in the total employment of medium- and highly qualified workers who hold a job for which they are overqualified.

The most conclusive result of the study was that a 10-percentage point increase in the macroeconomic mismatch coincided with a labor productivity reduction between 19–23%. No significant correlation was found between labor productivity and labor shortages reported by businesses. This may be explained by the fact that skill shortages often occur in fast-growing economies with increasing productivity. The impact of under- and overqualification on productivity was found to depend on the level of the educational attainment and the qualification structure of employment.

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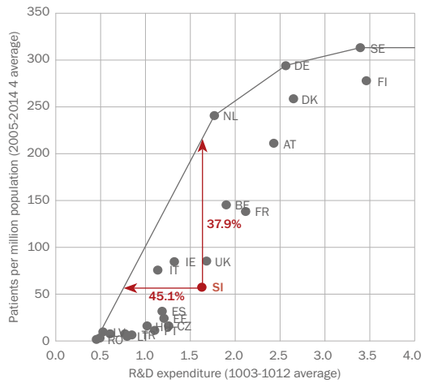
Source: Vandeplas, A. and Thum-Thysen, A. (2019). Skills Mismatch and Productivity in the EU. DG ECFIN Discussion Paper, 100, July 2019.

Efficiency benchmarking. The idea of efficiency benchmarking is to compare the inputs invested in a policy and the policy results over time and a large number of units, usually countries. For example, the level of public expenditures for education may be compared with the desired outcomes, represented by the PISA results or the employability of graduates. Specific econometric techniques (the data envelopment and the stochastic efficiency frontier) may be used for ranking the countries by their efficiency in converting the inputs into the desired results. Assuming that structural reforms could help less successful countries to achieve the efficiency of the best performers, we may simulate the improvement in results that could be generated by well-designed reforms.

BOX 11: USING EFFICIENCY BENCHMARKING FOR ESTIMATING THE POTENTIAL IMPACT OF INNOVATION POLICY REFORMS IN SLOVENIA

The Slovenian Institute of Macroeconomic Analysis and Development (IMAD) used a data envelopment analysis to rank the EU member states by their efficiency in converting the total spending for research and development (as % of GDP) into the number of patents (per million of population).



The results of the efficiency benchmarking were presented by a chart as reproduced here.
The vertical red line in the chart illustrates that, by implementing more efficient innovation policies, the Slovenian policy makers could achieve a 74% increase in the number of patents without any additional spending.
The horizontal red line shows that the current number of patents could be achieved by 55% lower expenditures, had the policies been as efficient as in the best performing countries.

In the next step, the study estimated that innovation policy reforms that would increase the efficiency to the level of the best performers had the potential to increase the country's GDP by 0.3–1.0% over a ten-year period. The estimations were produced by using a country-calibrated version of the QUEST model, the country-calibrated general equilibrium model of the ECB (EAGLE) and the research finding that a 25% increase in the number of patent applications generates a 0.1% annual GDP growth.

Source: IMAD (2016). Assessing the Effects of Some Structural Measures in Slovenia. A related presentation of the IMAD's study, which includes also other reforms and estimation methods, is available in the CEF's FIRS library.

BOX 12: USING EFFICIENCY BENCHMARKING FOR ESTIMATING THE POTENTIAL IMPACT OF EDUCATIONAL REFORMS IN THE EU MEMBER STATES

A DG ECFIN study used the stochastic efficiency frontier analysis to rank the EU member states by their efficiency in converting education spending into PISA science scores. The study then estimated the increase in the PISA score that a country could achieve with the same spending but reforming the education policy in line with the best performers. The impact of potential improvements in the PISA scores on the country's GDP was then calculated by using research finding that a 100 points increase in the PISA science score was associated with a 1.2 percentage points higher average annual GDP growth rate.

The estimation results showed that, by adopting education reforms, less efficient EU member states could increase their annual GDP per capita growth by 0.4 to 1.6 percentage points.

Source: Voigt, P., Thum-Thysen, A. and Simons, W. (2020). The Economic Benefits of Improving Efficiency in Public Spending on Education in the European Union. DG ECFIN Economic Brief, 056, July 2020. A related presentation is available in the CEF's FISR library.

BOX 13: USING EFFICIENCY BENCHMARKING FOR ESTIMATING THE POTENTIAL IMPACT OF A BUNDLE OF STRUCTURAL REFORMS IN THE EU MEMBER STATES

In a benchmarking study, the DG ECFIN compiled a number of numerical indicators of product and labor market reforms. For each indicator, the three countries with the highest values, i.e. the most advanced reformers, were identified. For the rest of the countries, it was assumed that they would implement structural reforms by which they would close half of the gap between the indicator value for their country and the value for the three most advanced countries. In this way, the strength of potential reforms was defined for each country and for each reform indicator.

The expected improvements in the reform indicators were then inserted into the QUEST model to estimate their potential impact (see Box 5 on using the reform indicators for impact assessment with the QUEST model). The estimates showed that the simulated reforms had the potential to increase, on average, the EU countries' GDP by 3.0% in five years and by 6.4% in ten years.

Source: Varga, J. and In t'Veld, J. (2014). The potential growth impact of structural reforms in the EU A benchmarking exercise. DG ECFIN Economic Paper, 541, December 2014.

Estimations based on the matching-pair samples. This approach exploits the old idea of comparing the beneficiary group affected by the policy intervention with a control group of units from the same target group but not affected by the policy. For example, the export performance of enterprises that received state support may be compared with the performance of comparable enterprises that did not receive any support. The success in finding new employment can be compared between the unemployed persons benefiting from the labor market measures and those that are not. The idea behind the matching-pair sampling is that, instead of comparing results at the level of the beneficiary and the control group, each unit in the beneficiary group is assigned a single most comparable unit from the non-beneficiary group. The different estimation techniques that may be applied to such samples are explained in a presentation prepared for a CEF learning event on impact assessment.

The matching-sample estimations are mostly used for evaluations of already implemented measures, simply for the fact that before implementation the measure's effects will not be captured by relevant performance data of the beneficiary units. Nevertheless, when an ERP measure builds on the experience with similar previous interventions, available evaluation results may be used for judging the likely impact of the measures. A pilot evaluation could also be performed during implementation to estimate the impact the measure will achieve upon full implementation.

5.3. IMPACT ASSESSMENT BASED ON THE EXPERT JUDGMENT

The policy experts of the line ministry proposing the ERP measure usually possess good knowledge of developments in their policy sector, trends in data and relevant analytical studies. They may also have previous experience with implementing reforms and policies in the sector. As such, they may be able to use their specific knowledge for a tentative quantification of impact.

The main advantage of the judgmental approach is that it requires less resources and specialist skills than economic modeling or econometric estimations do. The main risk with using this approach is that expert judgments may be highly subjective or goal-driven, i.e. projecting the desired policy results onto the impact assessment. To manage this risk, **the judgment-based assessment must be performed as a cooperative and structured effort of a group of experts**. Critical and creative discussions and the information exchange within the expert group limit the assessment's subjectivity. Moreover, exchanging information and views within the expert group, referencing previous observations, studies and data, generate good rationales (explanations) for the assessed impact and thus increases its credibility, despite not being based on own econometric estimations or economic models.

A well-structured judgment-based impact assessment process should involve the following steps:

- **understanding the measure's intervention logic**, i.e. undertaking the logical analysis of impact as explained in Chapter 4;
- **gathering, analyzing and discussing the information that may be relevant for impact**, i.e. the data, evidence and analytical studies related to the trends in the measure's intervention sector and the results of previously implemented policies. Data experts, in particular from the national statistical institute, may usefully be consulted in this step. The literature on impact of comparable measures should be assembled and analyzed;
- **discussing and agreeing the approach to impact assessment**, considering the relevant information;
- **performing the calculations** to quantify the expected impact;
- **evaluating the results for their logical plausibility** and, if necessary, repeating the exercise.

There are no formalized methods for the judgment-based impact assessment, as this is always a collaborative and creative process tailored to the measure being assessed. This Manual provides some examples to inspire the ERP teams for attempting similar approaches in assessing their measures.

Leveraging results of previous studies. Results of analytical studies that used economic models or econometric estimations to assess the impact of reforms in other contexts may be applied to comparable ERP measures. This should not be done mechanically. Results of previous studies should be analyzed carefully to understand the reforms assessed therein, the interpretation of the reported impact coefficients, the contextual factors taken into consideration, and any caveats regarding the reliability of the results. In the next step, the differences between the previous studies and the reform to be assessed by the ERP team, including the contextual factors in their country, should be identified. Based on such considerations, the team may then form an expert judgment about the way in which the results from the literature are applicable to their measure and carry out the calculations.

The boxes presented in this Manual report several estimates generated by international studies that could be used for impact assessment. The Excel Tool for Imapct Assessment provides additional examples and calculations. Two illustrative example are given below.

EXAMPLE 3: USING A PREVIOUS STUDY TO ESTIMATE THE IMPACT OF INSOLVENCY REFORM

The study presented in Box 8 estimated that a 1.23 points improvement in the Doing Business indicator "time of insolvency procedures" has the potential to increase employment by 2.26% and improve the total (or multi-factor) productivity (TFP) by 10.67%.

To use this result for impact assessment, the ERP team should take the following steps:

- analyze the Doing Business reports and methodological explanations to understand how the indicator is calculated;
- analyze the proposed measure and estimate the improvement in the indicator score that the measure's full implementation would achieve. If this is not possible, then the target for the indicator improvement should be set by benchmarking with other countries in the region;
- calculate the impact of the indicator improvement, based on the previous study. The calculation can be quite straightforward:
  estimated improvement in the indicator/indicator improvement used in the previous study multiplied by the impact estimated in the previous study

  For the purposes of this example, assume that the reform measure is expected to improve the indicator by 1 point. The impact on employment is then: (1/1.23)*2.26%=1.84%, and the impact on the TFP is (1/1.23)*10.67%=8.67%;
- analyze the results for their plausibility and apply the necessary judgmental correction to the estimates. For example, are there any other binding constraints to doing business in the country that could lower the impact of the reform? Is the labor share lower than the 66% used in the previous study, thus reducing the impact on employment? Are there any other studies that could be used for similar calculations, to check the robustness of results?
- insert the results for employment and TFP into the production function to calculate the impact on the GDP. This last step can be done by the MoF who may have already estimated a production function for the economy.

EXAMPLE 4.1: REFERENCES TO PREVIOUS STUDIES IN THE IMPACT ASSESSMENT OF ERP MEASURES

In one of the ERPs, the following information was provided regarding the impact of a broadband roll-out measure:
Referring to the study "The Impact of Digital Transformation on the Western Balkans", broadband investments could potentially contribute to the dynamics of new job openings in Western Balkan economies. It is estimated that broadband investments of 100 million euro could induce new jobs in a range from 3,000 to 10,000. As result of lower labor productivity (more labor is required per unit of output), the employment potential of broadband investments is the highest in our country, about 10,000. According to the study, a demand stimulus through a 100 million euro broadband investments would induce additional GVA (gross value added) up to 0.9%.

This is a good example of using a relevant previous study for impact assessment. The next step could be calculating more precise estimates based on the actual value of the investments planned by the measure. The increase in the gross value added could also be translated into an increase in the country's GDP.

EXAMPLE 4.2: REFERENCES TO PREVIOUS STUDIES IN THE IMPACT ASSESSMENT OF ERP MEASURES

Another ERP referred to a previous evaluation report, related to the measure for supporting innovative start-ups and the digital transformation of businesses:

An assessment of business performance undertaken by the Innovation Project (IPA 2011) between 2012 and 2017 revealed a tangible increase in operating revenues by businesses receiving financial support in this area, from EUR 7.7 million in 2012 to EUR 20.2 million in 2017. The survival rate of new innovative businesses stands at a very high 89.5%, with 34 of the 38 supported companies still operating. From early 2016 to late 2017 (following the completion of the program), the supported companies increased their operating revenues by nearly 60% relative to 2015 (from EUR 4.3 million to EUR 7.4 million).

The ERP team could have compared the new ERP measure with the measure evaluated in the reported study regarding the instruments used, the target group and the value of support provided. This comparison could then be used to form an expert judgment about the likely impact of the new measure on performance and survival of supported businesses.

Benchmarking with comparable countries. Experiences of comparable countries that have implemented similar reforms may be used for a judgment-based impact assessment. Information on comparable reforms may be obtained from case studies, through direct exchange of experience (for example, at regional peer-learning events for ERP teams), and by data analysis. For example, sets of comparable data are often compiled in the process of strategy preparation or a spending review. Comparable data for the Western Balkans are also compiled by the Regional Cooperation Council. Another useful source of data and analysis is the website of Sustainable development indicators and the Sustainable governance indicators.

For an example of possible approaches, consider **Box 11**, which shows a chart combining the input variable representing a policy measure with the achieved result for several countries. In that example, the input variable was the level of Research and Development (R&D) spending, and the result (impact) variable was the number of patents. Econometric estimation was used to draw a full line of the efficiency frontier, i.e. the results achievable at different levels of input variable, assuming the efficiency of the best performing countries.

For a judgment-based assessment, it may be sufficient to simply plot the achieved results against the policy variable for a set of comparable countries in the region, without estimating the full efficiency frontier line. The policy variable may be any intervention variable affected by the analyzed structural reform measure, while the result variable should capture the measure's expected direct impact. Even such a simple plot could help the assessment teams to:

- assess the change in the intervention variable that the reform could achieve, for example by closing a certain portion of the gap towards the countries with more advanced reforms or by increasing the value of the intervention variable by the same increment as achieved by the advanced countries over the recent period;
- assess the change in the result variable that could be achieved by the changes in the intervention variable, on the assumption that the reform measure would be as efficient as it was in the more advanced countries.

EXAMPLE 5: USING CASE STUDIES IN THE IMPACT ASSESSMENT OF ERP MEASURES

Related to the expected impact of the measure that included setting up a science and technology park, one of the ERPs provided the following information:
A similar science and technology park exists in Ljubljana, which has been operating for more than 20 years. The impact of the Technology Park Ljubljana (TPLJ) is the following: 300+ member small and medium-sized enterprise (SME) and start-up companies, 30+ established annually, EUR 350+ million revenue, EUR 80+ million in added value (2015), 400+ new high added value jobs, EUR 15+ million in VAT annually (estimated). TPLJ is self-sustainable and profitable with EUR 20 million in assets.

The ERP team could have compared the key characteristics (amount of funding, size, major programs) of the new science and technology park planned by the ERP measure with the existing park described in the explanation of impact. The comparison of such key characteristics could then be used for a judgment-based impact assessment of the planned science and technology park.

Scenario building. The impact assessment team may analyze the past trends in the data for variables capturing the expected or desired impact of the measure. Knowing the measure's intervention logic and the resources to be invested in the implementation, the team may then try to assess by how much the trends could be improved by the measure's implementation.

For example, assume that the assessment team is analyzing a measure providing vocational training to the unemployed youth. The measure's target is to include 5% of the unemployed young persons in the training over the next three years. The measure's impact on the total youth unemployment will obviously depend on the share of the measure's beneficiaries able to find a job within, for example, six months after participating in the training.

An impact scenario for this measure could be built in four steps:

- **gather evidence on the effectiveness of previous similar measures.** For example, if such training for the youth had been provided in the past, what share of the beneficiaries had a job six months after participation? If such data were not collected, can a survey be made among the previous beneficiaries? If such training was not yet implemented, are there any data on similar measures provided to another target group of the unemployed?
- **make a wide-range of possible "what-if" calculations** to estimate the number of beneficiaries that would find a job after participating in the training. The range of plausible scenarios should be determined by the estimation team, but some "what-ifs" are provided here for illustration. For the baseline, you may assume that the present measure will be as effective as the comparable previous measure. For the positive scenario, you may assume that the present measure will be 10% (20%) more effective than the previous one, because of the experience gained with designing and implementing such measures. For the negative scenario, assume that the present measure will be 10% (20%) less effective, because the more beneficiaries are included, the less likely it becomes that the "marginal ones" find employment. Still another scenario could be built on the assumption that, due to the lack of institutional capacity or funding, only 3% of the target population (instead of 5%) will be included in the training;
- **use expert-judgment to assess the likelihood of the scenarios** and decide which one will be presented as the most plausible one. Alternatively, you may also present a range of possible results, from the lowest to the highest impact scenario;
- **after the first year of implementation**, gather data on the success of the present measure in terms of the beneficiaries who were able to find a job, and recalculate the impact scenario.

Thinking in terms of plausible scenarios may also be useful with other impact estimation methods. For example, several studies may have estimated impact coefficients which, when applied to the analyzed reform measure, may generate different results. Varying assumptions about the changes in intervention variables or their influence on the affected economic agents may also lead to different results. An expert judgment may then be used to select the most likely or plausible result from the alternative estimations.

Using the measure's targets as quantification of impact. The results indicators of ERP measures often include variables related to the impact on the targeted segments of the economy. The targets to be achieved by the measure's full implementation are set for these indicators. The impact assessment team should check the realism of such targets – in the sense of whether there is a plausible scenario of how the measure's instruments could achieve the targeted improvements. When the indicator targets are assessed as realistic, the difference between the target and the baseline indicator value (the value before the implementation started) may be used as a quantification of impact.

For example, assume that an ERP measure uses the employment rate as a result indicator and set the target of increasing from 59.5% in 2022 to 60.0% in 2025. Based on the employment data from the national statistical institute, the number of employed people will have to increase by around 0.9% in the three-year period to meet the target. This calculated increase in the number of the employed can then be inserted in the production function to estimate the impact on GDP.

5.4. THE EXCEL TOOL FOR IMPACT ASSESSMENT

An Excel-based Impact Assessment Tool was developed as part of this Manual. The tool enables the ERP teams to assess the potential impact of a range of structural reforms, including education reforms, labor market reforms and regulatory changes. Using the tool is straightforward and does not require extensive economic knowledge or training. The tool has been designed to be user-friendly, with the intention to be used easily by line ministry officials with little background in economic impact assessment.

The Impact Assessment Tool utilizes several estimation methods. One of the methods is the Cobb-Douglas production function, which is a widely used economic model to estimate the relationship between inputs and outputs in the production process. The tool uses this function to estimate the changes in the GDP resulting from improvements in the TFP, employment levels or capital investment.

Another method supported by the tool is leveraging the results of previous studies. The tool includes simple regression coefficients, based on the results of previous international studies, to assess the impact of structural reforms in specific sectors. Additional coefficients can be added by the ERP teams or experts when using the tool.

Finally, the tool includes a skills mismatch exercise to assess labor market reforms aimed at improving labor market conditions and lowering skills mismatch. The tool uses data on labor market conditions, such as unemployment rates, working age population and education levels, to estimate the degree of skills mismatch in the economy. By inputting data on policy interventions aimed at reducing skills mismatch, the tool can estimate the potential impact of such reforms on labor market outcomes.

For using the Impact Assessment Tool, the intervention logic of the measure must first be analyzed and expressed by the expected changes in the variables that are included in the tool. Once the result is calculated, it should be interpreted with caution. The estimation team should use their sound expert judgment to consider whether the results are directly applicable to their measure or should they be adjusted to reflect specific contextual factors and the design of the measure.

> The current version of the Impact Assessment Tool, as presented in the Annex, was developed to support the impact assessment of capacity development in North Macedonia, and therefore uses the data for this country. In the future, as part of capacity development or on own initiative of the ERP teams, the tool can be adjusted with data for other countries to support the impact estimation of their reforms.

6.

STEP FOUR: DOCUMENTING THE IMPACT ASSESSMENT

Once the impact assessment is completed, the results need to be explained as part of the measure's description in the ERP. Additionally, a short note summarizing the data used, the calculations and estimations made, and the reasoning of the assessment team should be drafted. Ideally, the dataset and calculation files should also be stored for future reference. Documenting the impact assessment process will help sharing the good practices and retaining the knowledge for future use by the same or a different assessment team.

The ERP section on the measure's expected impact should clearly explain the intervention logic of the measure, i.e. how exactly it is supposed to achieve the impact. For example, how the instruments of the measure are expected to affect the targeted segments of the economy, and what improvements this may bring to their performance and to the broader economic outcomes. General statements that are not specific to the measure should be avoided.

When the expected impact has been quantified, the results for the main impact variables should be reported and the method used for the quantification explained. When no quantification of impact was attempted, at least some basic data about the economic importance of the targeted segments should be provided.

EXAMPLE 6: IMPACT DESCRIPTIONS FOR ERP MEASURES

The ERPs presently provide narrative explanations of the expected impact, while attempts at quantifications are rare. Below are four examples of well-written descriptions of the expected economic impact.

For a measure promoting renewable energy sources:
An increasing number of companies are turning to renewable energy to reduce their emissions and to strengthen their future competitiveness. Guarantees of Origin benefit companies by providing proven and verifiable emission reductions. They are efficient, acknowledged and legislation-backed means to document and formalize the commitment to sustainable electricity. Regarding self-consumption, the share of distributed energy sources is rapidly increasing which impacts the energy markets in various aspects that are of regulatory relevance. From a system point of view, self-consumptions as an additional tool to meet renewable energy targets can help to reduce network losses and peak loads, increase energy efficiency, improve demand response and consumer engagements (consumers can choose to produce part of the electricity for their own needs). The indicative plan is expected to improve the planning for construction of renewable energy source (RES) plants, as well as the planning for development of the transmission and distribution network and give investors a better overview of the RES investment potential. The implementation of the Law on Biofuels will enable better conditions for performing energy activities, a stable legal and regulatory framework and a higher potential for investment in the energy sector. Licensing of installers will enable quality service on the market, given that only licensed persons will be able to perform this activity. Construction of new RES power plants will increase the installed capacity and also the domestic electricity generation.

For a measure establishing the Youth Guarantee:
The implementation of the Youth Guarantee, i.e. removing systemic obstacles for better performance of young people in the labor market and continuous implementation of activities that improve their knowledge and skills and ensure the acquisition of recognized qualifications, will enable acquiring work experience, develop youth entrepreneurship, prevent unfavorable migratory flows, and contribute to the development and greater utilization of potential labor.

The reform contributes to the improvement of the quality of young workforce, which consequently affects their better productivity and GDP growth. By facilitating the transition of young people to the labor market and encouraging their employment, the reform will directly affect the increase in employment of this category of persons, while it will also indirectly affect the reduction of poverty.

For a measure promoting sustainable green tourism:
The measure aims to boost the competitiveness of the tourism product of the country, while contributing to the promotion of sustainable and inclusive economic growth, as well as to the broader and more productive employment and creation of adequate workplaces for everyone. The measure reduces the seasonality of tourism industry and regional imbalances, and improves tourists' experience by incorporating innovative solutions and modern technologies in the offer. It will improve destination management, strengthen public-private partnerships, and raise the standard of living of the population. It will also contribute to the improved quality of the country's tourism product, primarily in the north, which will become more competitive compared to tourist destinations with a similar offer, which is why the share of tourism in the GDP is expected to grow up to 25% in 2025.

The implementation of project activities in the framework of the measure will increase the total number of employees; since women account for the largest share of employees in the tourism sector, the measure will contribute to the financial strengthening of women which ultimately helps reduce poverty. Moreover, the positive effects of implementing the measure include the reduction of migratory movements on the north-south route, an increase in the number of young people who remain in rural areas, and the creation of more optimal work conditions.

For a measure aimed at trade facilitation:
According to data from the World Trade Organization, trade facilitation can reduce trade costs by an average of 14.3%. Analysis shows that in many countries, at the macro level, reducing the trading time by just one day can increase trading activity by more than 5%. The reforms in the trade facilitation are expected to reduce the customs clearance time for exports and imports respectively, from about 110 minutes which is currently for imports to be reduced to 90 minutes by 2025 and for exports from about 35 minutes which is currently to be reduced to 25 minutes.

Also, the development of the quality infrastructure will support domestic manufacturers to improve the safety and quality of the products to be competitive with the products that have the CE mark, placing on the market certified products of the same level as the products of the EU countries. More competitive businesses create a better environment for employment growth and thus provide the basis for sustainable growth.

Based on the World Trade Organization and the World Bank report, it is emphasized that trade opening has clear and positive impacts on reducing poverty. According to the International Trade Centre research, women-owned export businesses employ an average of 42 people, compared to an average of just 8 people employed by non-women-owned export businesses. Trade is also associated with higher participation of women in jobs with greater formality and higher wages. Exporters in developing countries employ more women than non-exporters, and women make up to 90% of the workforce in export processing areas. Also, the further development of the regulatory system on industrial products is expected to have an even broader impact in the society by encouraging investments in the private sector, generating new jobs and inciting businesses to apply standards for increasing the security and quality of industrial products and services to stakeholders. Therefore, the implementation of these activities aims to bring a positive impact on the increase in social well-being in the medium term.

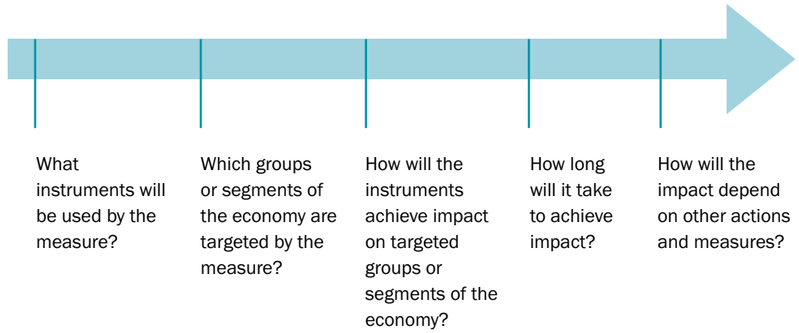
7.

LEARNING EXAMPLES OF IMPACT ASSESSMENT

This section provides full examples of the impact assessment process, starting with the analysis of the measure's intervention logic and then proceeding with data collection and quantification, using the Impact Assessment Tool.

The ERP section on the measure's expected impact should clearly explain the intervention logic of the measure, i.e. how exactly it is supposed to achieve the impact. For example, how the instruments of the measure are expected to affect the targeted segments of the economy, and what improvements this may bring to their performance and to the broader economic outcomes. General statements which are not specific to the measure should be avoided.

When the expected impact has been quantified, the results for the main impact variables should be reported and the method used for the quantification explained. When no quantification of impact was attempted, at least some basic data about the economic importance of the targeted segments should be provided. In order to use the tool to generate structural reform impact results, users should base their judgment on the manual and judge to which extent the reform will make a difference on the selected indicator.



The examples used in this section are based on North Macedonia's ERP 2023–2025.

7.1. EXAMPLE 1. MEASURE 10: BROADENING THE SCOPE OF DIGITAL SERVICES PROVIDED ON THE NATIONAL E-SERVICE PORTAL

Type of instrument: This measure can be classified as using an institution building instrument since it aims at strengthening the capacity of public institutions to perform their services.

Segment/group targeted: This measure is an all-encompassing measure as it affects public services offered to both individuals and businesses. So, it is targeting the economic entities and the social groups, mainly through a greater efficiency of the services provided by public institutions.

Measure description: The goal of the measure is to increase the usage of the National e-Services Portal (the portal) uslugi.gov.mk as a central point for e-service delivery. The e-services that are available on and through the portal: enrolling in primary education, extracts of employment and pension data, claims for non-conviction, extracts from the population register, different certificates related to social security, labor and employment data, recognition of diplomas, etc.

The portal is offering e-services for both individuals and businesses (even though at the beginning the portal was offering only e-services for individuals, it has been upgraded with the functionality to offer e-services for businesses).

The focus in the forthcoming period is to develop at least 135 new e-services for businesses and citizens and deploy them on the National e-Services Portal, such as various licenses and permits in the areas of energy, trade, food, veterinary, pharmacy and agriculture, and decisions for different types of retirement and pension users. Other planned activities will include the digitalization of base registers related to the selected 135 new e-services and the development of the Register of Registers and the Register of Authorization. Re-engineering the business processes for delivering the abovementioned e-services, in order to achieve more efficient and effective e-service delivery, by optimizing the processes of their provision and cutting the administrative burden for their issuance, are also part of the planned activities.

Impact channel:

- E-government reforms involve the use of Information and communication technologies (ICTs) to transform the work of government organizations and their relationship with citizens, businesses, and other arms of government. E-government platforms reduce costs, improve services for citizens and businesses, and increase the effectiveness and efficiency of the public sector (Signore et al., 2005). Indeed, e-government allows the government, citizens, businesses, and customers to work more efficiently. The linkages between the government and citizens (G2C), the government and businesses (G2B), businesses with each other (B2B), and businesses and customers (B2C) would be easier and with lower cost (Dhaoui, 2019) and service time. So, overall, there would be time and cost efficiencies for users. The impact can be greater for SMEs since they will be able complete administrative procedures with fewer personnel in shorter time.
- Furthermore, the reform is believed to have an impact on the ease of doing trade since some of the services that will be developed in the portal are e-services that involve licenses for businesses needed on the national and cross-border level. Additionally, it will assist businesses in the country to integrate better in the market. So, e-government contributes to economic growth through trade openness by providing online availability of government and web connections.

- On another note, the digitalization can also help lower the level of informality in the country through providing everyone the resources needed and the information needed for businesses to understand the benefits of formalizing, i.e. getting credit, benefiting from government funds, etc.
- Thus, digitalization can increase both firm level and individual level productivity by increasing the efficiency of using the resources and productive factors (labor force, capital, technology, skills, knowledge etc.) and the efficiency, adaptability, and responsiveness of markets, thereby improving productivity, job creation and employment.

Time dimension: This reform is planned to be implemented in the medium term, so the impact is also believed to be in the medium term. If the users are aware of the services being digitalized and they are offered support/information on how to use the services, then the measure's impact can be almost immediate with no extensive time lags. The number of services introduced is planned to increase each year from 200 services in 2022 to 380 in 2023, 450 in 2024 and 550 in 2025 (cumulatively, 350 services functionalized by 2025).

Interdependencies: Achieving the expected impact often depends on the timely implementation of complementary instruments and measures. The ability of SMEs and individuals to take full advantage of simplified electronic procedures will depend on digital literacy levels, access to electronic devices, and promotion of such services (awareness that they can be obtained online), among others.

Quantification based on the identified impact channels: Based on numerous studies, e-governance is expected to have a positive impact on the GDP, mainly through an increase in efficiency/productivity. A study by Kotenok et al. (2020) found that if the e-government index rises by 1%, the GDP grows by 0.2%. According to Azim et al. (2020), e-government may stimulate economic growth via enhancing the competitiveness of economic actors.

The methodology of e-government research involves the use of different approaches. For example, two key indicators are used to assess the level of development: the e-Government Development Index (EGDI) and the Electronic Participation Index (EPI). EGDI is defined as the arithmetic mean of the following three sub-indices: Online Service Index, Telecommunication Infrastructure Index, and Human Capital Index. Mathematically, therefore, EDGI is a weighted average of three normalized indices on the most important aspects of e-government, namely the variety and quality of online services, telecommunications, and human capital.[1]

Based on another study by Majeed and Malik (2016), there is a positive and significant relationship between economic growth and e-government. The coefficient of e-government implies that a 1% increase in e-government quality brings a 3.67% increase in economic growth.

One way the impact can be calculated is by using expert judgment to assume the impact this reform will have on the e-Government Development Index and calculate the direct impact on the GDP. Another way is to make an assumption about the increase in the overall productivity (the TFP).

1 https://publicadministration.un.org/egovkb/en-us/Data/Country-Information/id/170-North-Macedonia

Scenario 1: Considering that the number of e-services offered in the portal in 2023 is increasing from 200 to 380 (around 90%), it is safe to assume that the e-Government Development Index would increase by around 2%, if everything else remains constant. This would then result in a 0.4% impact on the GDP.

	Coefficients	Proxy data
E governance	0.20000%	Note: if E-government index improves by 1%, GDP will increase by 0.2%
Completed Construction Work in bln denars	0.00140%	Note:if completed construction work increases by 1 bln Denars, GDP will increase by 0.0014%
Usage of internet (persons as % of population)	0.00054%	Note:if usage of internet increases by 1 percentage point, GDP will increase by 0.00054%
Number of days to start a business	-0.00062%	Note:if the number of days to start a business increases by 1 day, GDP will decrease by 2.8 mln Denars or 0.0006
Reforms on energy	0.09000%	Note: for every 1% increase in energy sector reform index, it is estimated to have an increase of 0.09% in GDP pe
Digitalization	0.02%	Note: for an increase in ICT investment by 1%, GDP per capita is expected to increase by 0.02%
Energy	0.39%	Note: for an increae in Solar PV by 1 %, GDP per capita is expected to increase by 0.39
Digitalization	0.07%	Note : for an increase in ICT investment usage by 1%, GDP per capita is expected to increase 0.07%

		Assumed impact of the reform	Result (a)	Difference in bln MKD	Percent of GDP
Structural Reform impacting E-governance	value improvement	2	450,130.35	1,793.35	0.4000%
Structural Reform impacting Infrastructure	Value in MKD	0	448,337.00	-	0.0000%
Structural Reform impacting usage of internet	Value in percentage point	0	448,337.00	-	0.0000%
Structural Reform impacting the doing business environment	Value in number	0	448,337.00	-	0.0000%
Reforms on energy	Value in number	0	448,337.00	-	0.0000%
Reforms impacting digitalization-ICT investment	Value in number	0	448,337.00	-	0.0000%
Reforms impacting energy- Solar PV	Value in number	0	448,337.00	-	0.0000%
Reforms impacting digitalization-ICT investment usage	Value in number	0	448,337.00	-	0.0000%

Scenario 2: Considering that the number of e-services offered in the portal in 2023 is increasing from 200 to 380 (around 90%), we can assume that TFP would increase by around 2%, if everything else remains constant. Based on the calculation, this increase would result in a GDP impact of around 0.302%.

Assumptions		Economic Impact		
Annual	% increase expected by reform	Impact of reform on potential GDP in bln	Impact of reform on output gap	Impact of reform as % of GDP
Impact on productivity (see note 1)	2.00%	1,439.25	(0.30)	0.302%
Impact on investment (see note 2)	0.00%	-	-	0.000%
Impact on employment (see note 3)	0.00%	-	-	0.000%
Note 1: Please insert your assumption on how much in %, the X reform is expected to increase productivity				
Note 2: Please insert your assumption on how much in bln denar, the X reform is expected to increase investment				
Note 3: Please insert your assumption on how much in %, the X reform is expected to increase the number of employees				

Using these alternative scenarios and calculations, it seems safe to conclude that the measure, once implemented, will result in a GDP increase between 0.3% and 0.4%.

7.2. EXAMPLE 2. MEASURE 2: INCREASING THE FLEXIBILITY AND SECURITY OF THE LABOR MARKET

Type of instrument: This measure uses regulatory instruments (changes in labor market regulations) and economic instruments (increased coverage of vulnerable groups by active labor market measures and the employment service).

Segment/group targeted: This measure primarily targets the vulnerable social groups and affects economic entities and all employees by changing the regulations of the employment relationship.

Description of the measure: The measure aims to contribute to improving the labor market and employment situation in the North Macedonia, through specific interventions that will lead to:

- improving and further promoting labor market flexibility through interventions in the area of labor legislation, which will enable further regulation of the legal framework regarding underrepresented and non-standard forms of work and employment contracts.
- more efficient and more effective functioning of the labor market through modernizing the legal framework that regulates the employment measures and labor market services and the entities that implement them.
- additional expansion of the coverage and access of the youth, women, and various vulnerable groups of citizens to active employment programs and measures and labor market services; in this part, this measure is complementary with the measure “Enhancing the system for social inclusion of vulnerable groups”, that is, the part of the activities that refer to the “Labor Market Activation of Vulnerable Groups”.

Impact channel:

- Labor market policies can influence measured productivity through their impact on employment. Policies that promote market flexibility can have sizeable direct effects on individual productivity levels and/or growth by creating incentives for workers to invest in training, facilitating reallocation of resources to their most productive uses and generating or maintaining high-quality job matches.
- According to Stansel et al. (2019), annual changes in EFNA [Economic Freedom of North America] labor market freedom scores are positively correlated with subsequent annual changes in employment and wages and salaries. Furthermore, based on his reviews of other studies, the total economic freedom score on the EFNA index is correlated with desirable economic performance. Garrett and Rhine (2011) conclude that a good score on labor market freedom is strongly associated with employment growth.
- Other studies, both theory and a wealth of empirical evidence, suggest that more flexible labor markets make it easier for employers and good job candidates to find each other, thereby boosting employment and average pay in the long run. Furthermore, eliminating restrictions on who is allowed to work in specific occupations means that workers can best exploit their specific skills. This results in higher labor productivity and higher wage rates.
- Therefore, besides productivity, other channels include lowering the skills mismatch in the labor market and the time and costs of job search.

Time dimension: This reform is planned to be implemented in the medium term, so the impact is also believed to be in the medium term.

Interdependencies: Achieving the expected impact often depends on the timely implementation of complementary instruments and measures. The ability of businesses to take full advantage of the measure will depend on their willingness to improve employee conditions, overall economic trends that affect employment, demographic trends, and migration trends, among others.

Quantification based on the measure's target:
For this measure, one of the targets is increasing the employment rate in the medium term (from 59.5% in 2022 to 60.0% in 2025). Based on the employment data in the Excel tool, to have this increase, the number of the employed will have to rise by around 0.9% in the three-year period, everything else constant. Since the assumption in the Excel tool is made annually, that means a 0.3% increase per year. In the table below, the assumption is made that this reform will increase employment by 0.3%. Using the production function for calculation, this will have an impact of 0.097% on the annual GDP. The full impact of the measure, once the target is reached, would be an increase of GDP by approximately 0.03%. Nonetheless, it should be noted that this effect is isolated and quantified only based on employment numbers, so it does not take into account improved employment conditions or productivity.

Assumptions		Economic Impact		
Annual	% increase expected by reform	Impact of reform on potential GDP in bln	Impact of reform on output gap	Impact of reform as % of GDP
Impact on productivity (see note 1)	0.00%	-	-	0.000%
Impact on investment (see note 2)	0.00%	-	-	0.000%
Impact on employment (see note 3)	0.30%	459.68	(0.10)	0.097%
Note 1: Please insert your assumption on how much in %, the X reform is expected to increase productivity				
Note 2: Please insert your assumption on how much in bln denar, the X reform is expected to increase investment				
Note 3: Please insert your assumption on how much in %, the X reform is expected to increase the number of employees				

8.

CONCLUDING REMARKS

The Manual gave an overview of the economic impact assessment process and the methods that can be used by the ERP teams. Particular attention was paid to the logical analysis of the measure's intervention logic and impact channel. The logical analysis provides a basis for impact quantification and can by itself serve as a justification for prioritizing a particular measure.

The impact quantification methods explained in the Manual include economic models, econometric estimations, and expert judgment. The methods are presented in non-technical terms and by examples of their application.

Not all methods for impact quantification can be developed at the same time. The ERP teams are therefore advised to develop a strategy for a gradual introduction of different quantification methods and for managing the related knowledge within the ERP team. The steps of this process should reflect the available human resources and skills as well as the presently available assessment tools. In countries where economic models have already been developed and can be used independently, i.e. without external expert support, the first step may be using the models for the quantification of selected reform measures. Where such models have not been developed or are not being used, a combination of judgment-based approaches used by the line ministries proposing the reforms and simple econometric estimations, developed with support from the MoF macroeconomic team or national experts, can be used. The chosen approach to developing impact quantifications should then guide the skills development plan for the institutions involved.

In any case, it is advisable to establish a horizontal impact assessment team from the members of the MoF and the line ministries' analytical units – for the purposes of the ERP or, more broadly, for the impact assessment of government documents. This will enable cooperation, knowledge-sharing, exchange of experiences, and co-creation of workable quantification approaches. It may be helpful to start by focusing on the measures with the strongest expected impact and those where the impact is most easily quantified.

A sound expert judgment is necessary for any impact assessment method, including the logical analysis of the measure. The analysts involved in policy design and reform assessment should therefore closely follow and analyze the statistical and other data related to their sector as well as any relevant analytical studies. Writing short memos on current developments and holding regular expert meetings to review them is a good practice facilitating collaborative learning within expert teams.

ANNEX

GUIDE TO USING THE EXCEL TOOL FOR IMPACT ASSESSMENT

1. USING THE EXCEL TOOL

The Excel tool has eight sheets. Three of them (sheets 2, 3 and 5) are used for estimating the impact of reforms, whereas the other ones contain information, data and equations.

In order to make reading the file easier, the following colors are used for values:

- black: historical data
- blue: formulas from the same sheet
- green: formulas from a different sheet
- red: assumptions

For the impact to be easily understood and presented by the users, the Excel tool measures the impact in a one-year and a three-year timeline (the ERP horizon). The charts show both values but for the ERP purposes the three-year impact would be more appropriate. It should be noted that the medium-term impact does not include year-by-year differences. Even though some measures may have a higher impact in some years, for example in the year when the investment part of the measure is implemented, the impact is calculated for the whole medium term in order to be simple for users and not require additional efforts for making assumptions/expert judgments about the distribution of the impact between years.

For values that need to be inserted by the users, the Excel tool contains small information boxes with instructions.

1.1. INTRODUCING THE EXCEL SHEETS

Sheet 1: Introduction

This sheet is an introduction to the tool and contains the rationale behind the methods used in the tool.

The table contains the rationale behind using the production function for measuring the impact of structural reforms and the types of reforms that could be assessed. The second part contains the rationale behind using simple regression models for certain reforms, and the last one has information on benchmarking, i.e. using literature review to decide on the extent that the structural reform can impact GDP directly or through multi-factor productivity.

Sheet 2: Assessment on production function

This sheet contains the interface where different assumptions that affect the production function items can be made, namely assumptions that change TFP, labor and capital. The table below allows the users to insert their judgment on how much they want to shock each item. The economic impact will then be automatically calculated on the right side of the table in three forms: impact on GDP in billion MKD, impact on output gap, and impact as % of GDP. On this sheet, only the table should be used; the items below are not to be changed by the users.

Assumptions		Economic Impact		
Annual	% increase expected by reform	Impact of reform on potential GDP in bln	Impact of reform on output gap	Impact of reform as % of GDP
Impact on productivity (see note 1)	0%	-	-	0.000%
Impact on investment (see note 2)	0.00	-	-	0.000%
Impact on employment (see note 3)	0%	-	-	0.000%
Note 1: Please insert your assumption on how much in %, the X reform is expected to increase productivity				
Note 2: Please insert your assumption on how much in bln denar, the X reform is expected to increase investment				
Note 3: Please insert your assumption on how much in %, the X reform is expected to increase the number of employees				

n bi	Real Growth R	Investment in bil	Real Growth Rate	Seasonally ad	Seasonally ad	Depreciation rate (delta)
891	2%	40484	32%	118255.74	42484.314	0.041
565	4%	40502	42%	119168.8	45392.156	0.041
656	2%	36817	9%	119437.16	40076.196	0.041
853	1%	49890	-5%	119884.68	39955.01	0.041
891	2%	40484	32%	118255.74	42484.314	0.041
565	4%	40502	42%	119168.8	45392.156	0.041

duction | Assessment on Prod.F | Assessment using SR | Simple regressions | Production Function | Assumption

ess ENTER or choose Paste

Sheet 3: Assessment using other methods

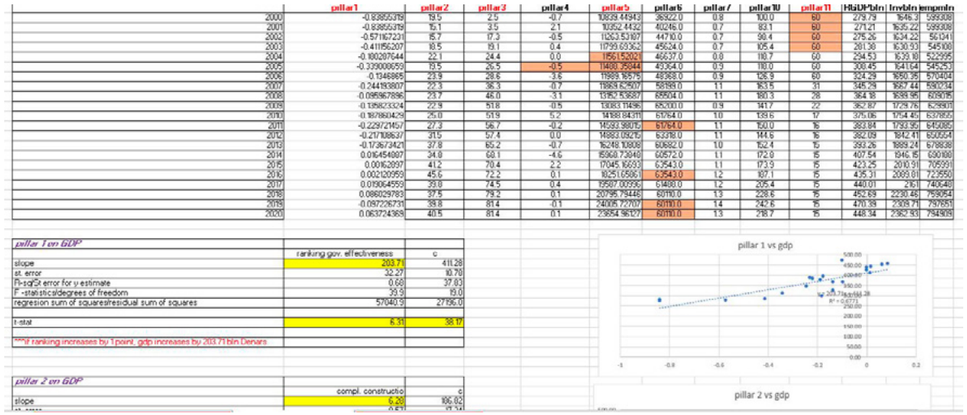
This sheet is the interface where users can use other methods to estimate the impact of the SR. These include the results from the simple regression models for North Macedonia and the results from benchmarking, using different studies summarized in the Manual and this Annex.

	B	C	D	E	F	G
1	Coefficients from Simple regressions and literature review					
2						
3		Coefficients				
4	Government Effectiveness	0.050000%	Note: if assessment in government effectivenes improves by one unit, GDP will increase by 0.05%			
5	Completed Construction Work in bln denar	0.001400%	Note if completed construction work increases by 1 bln Denars, GDP will increase by 0.0014%			
6	Usage of internet (persons as % of populat	0.000540%	Note if usage of internet increases by 1 percentage point, GDP will increase by 0.00054%			
8	Number of days to start a business	-0.000620%	Note if the number of days to start a business increases by 1 day, GDP will decrease by 2.8 bln Denars			
9	Reforms on energy	0.090000%	Note: for every 1% increase in energy sector reform index, it is estimated to have an increase of 0.09% in GDP per capita			
0	Digitalization	0.02%	Note: for an increase in ICT investment by 1%, GDP per capita is expected to increase by 0.02%			
1	Digitalization	0.07%	Note : for an increase in ICT investment usage by 1%, GDP per capita is expected to increase 0.07%			
2						
3						
4			Assumed impact of the reform	Result (a)	Difference in bln MKD	Percent of GDP
5	Structural Reform impacting Government E	value improvement	0	448,337.00	-	0.000%
6	Structural Reform impacting Infrastructure	Value in MKD	0	448,337.00	-	0.000%
7	Structural Reform impacting usage of inter	Value in percentage point	0	448,337.00	-	0.000%
9	Structural Reform impacting the dcing busi	Value in number	0	448,337.00	-	0.000%
0	Reforms on energy	Value in number	0	448,337.00	-	0.000%
1	Reforms impacting digitalization-ICT invest	Value in number	0	448,337.00	-	0.000%
2	Reforms impacting digitalization-ICT invest	Value in number	0	448,337.00	-	0.000%
3						
4				(a) GDP with base year prices in bln MKD in 2020		
5						
6						

... | Assessment using other methods | Simple regressions | Production Function | Assumptions for PF | Data

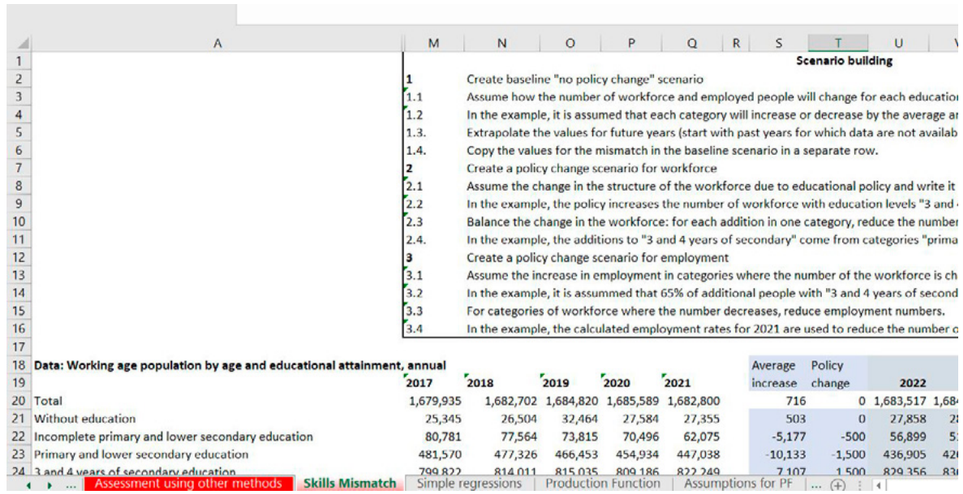
Sheet 4: Calculations of simple regressions used in Sheet 3

This sheet includes the calculations for the simple regressions, using proxy data for the 12-pillar classification developed for the Global Competitiveness Index (WEF). Despite having found proxy data for all 12 pillars, only 5 of them are used and generate somewhat meaningful results: health, digitalization, government effectiveness, doing business environment, and infrastructure. The coefficients resulting from these simple regressions are presented on sheet 3 and can be used to estimate the impact of reforms.



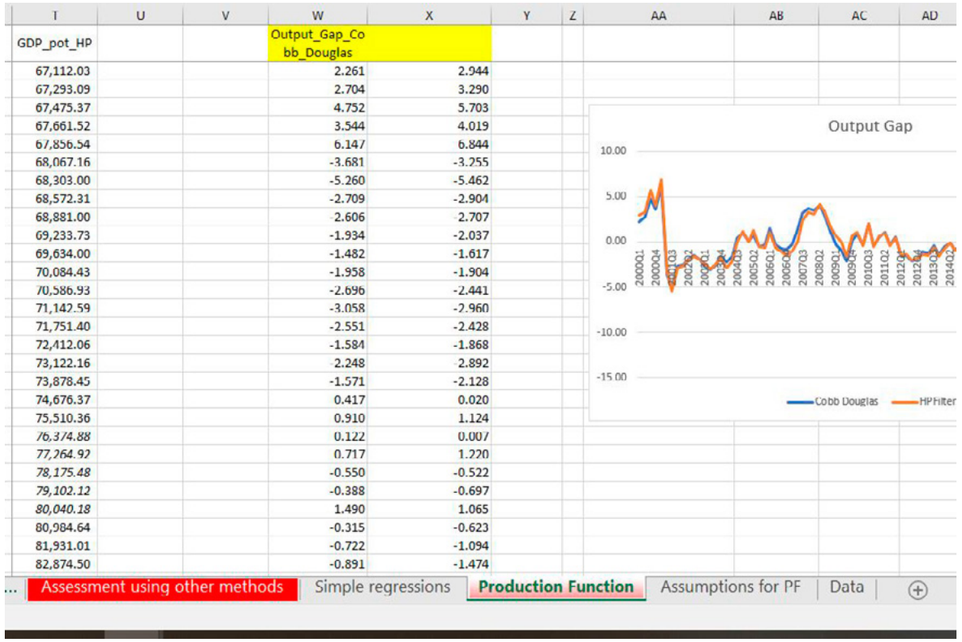
Sheet 5: Skills mismatch

This sheet shows the skills mismatch calculation for North Macedonia, taking into account labor market and educational data. The sheet allows users to insert their assumptions and build a policy scenario that could be compared with the baseline (no policy scenario) in terms of skills mismatch.



Sheet 6: Production function estimation

This sheet presents the Cobb-Douglas production function estimation with data for North Macedonia.



Sheets 7, 8

These sheets contain the background data used to generate the production function, regressions and the skills mismatch sheet. These sheets will have to be updated whenever new data become available. Instructions for updating data and inserting new data will be provided in the Excel tool.

Sheet 9

This sheet includes all tables and graphs with the results from all sheets. The users can use this sheet to import graphs and tables to other documents that they produce and to view all the results in one place.

2. METHODOLOGY USED IN THE EXCEL TOOL

2.1. COBB-DOUGLAS PRODUCTION FUNCTION

The Cobb-Douglas production function has been estimated for North Macedonia. The data representing the supply block in the model has been the most difficult to estimate for two main reasons. First, indicators such as potential output and potential output factors are not directly observable or measurable, and different techniques give very different estimates. Second, in the case of North Macedonia, there is a lack of data on the series of capital stock and the capital depreciation rate; short quarterly time-series data on real GDP (they are available from 2000 onwards), and short employment data on a quarterly basis only available from 2002.

The Cobb-Douglas production function of an economy summarizes the relationship between real GDP and the three factors of production: capital (capital_stock), labor (labor_), and TFP or multi-factor productivity. The latter (known as the Solow residual in growth accounting literature) summarizes everything that affects economic growth but is not explained by the two factors of production: labor and capital.

log_tfp = log(y) – 0.4*log(capital_stock) – 0.6*log(labor_dem)
tfp = exp(log_tfp)

Literature review regarding the magnitudes of shares of production factors suggests values ranging within [0.63: 0.70] and [0.30: 0.37] for labor and capital, respectively (D'Auria et al., 2010; Rõõm, 2001). Other studies find that the share of capital in production is significantly greater than 0.40 (Iradian, 2007). Given such different estimations with regard to output elasticities for labor and capital factors, in the case of North Macedonia two different specifications of the production function have been tried using different shares: 1) the average share of labor compensation in GDP at current national prices of Western Balkan countries; and 2) the average share of labor compensation in GDP of countries with similar GDP per capita (source: Penn World Tables).

In the absence of data on capital stock for the case of North Macedonia, the perpetual inventory method was used. Under this method, the initial value of the capital stock, after applying a quarterly depreciation rate, is added to the quarterly total investment flows, private and public (inv_t). The initial value of the capital stock was generated using the average of capital/GDP share for North Macedonia from the Penn World Table estimation for the initial year (2000). Whereas, for the depreciation rate, the value is based on Penn World Table 10 for North Macedonia per year.

cap_stock = (1-depre.rate)*cap_stock(-1) + inv_t

The labor market indicator is represented by the number of current employees throughout the economy of North Macedonia.

The potential output of an economy is the output that is generated when the production factors are fully employed. In the equation below, the * sign indicates the potential level of indicators.

log(y_pot) = alpha*log(labor_dem_pot) + (1 – alpha)*log(cap_stock*) + log(tfp_hp)

A simple and straightforward approach to obtaining the series of potential GDP and output gap is applying the Hodrick Prescott (HP) filter. This filter allows separating the permanent component (trend) from the transient or cyclical component of the series. If this filter is applied to the GDP

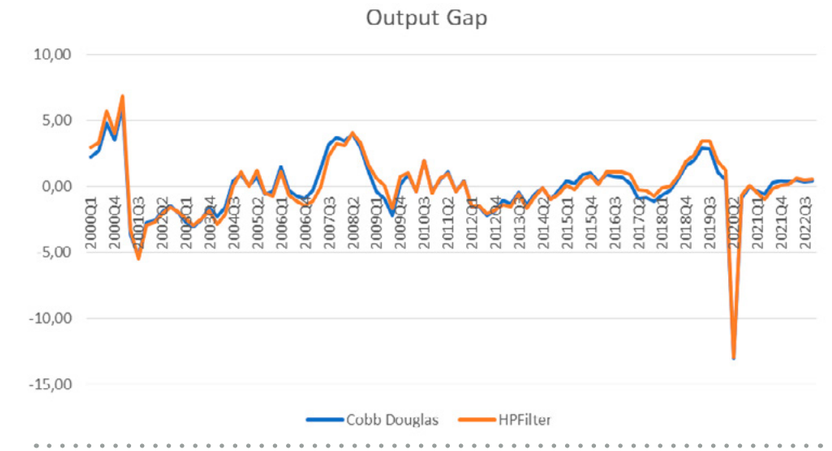
series, the permanent component will represent the potential output while the cyclical component will represent the output gap. Despite the simplicity of using this filter, it is difficult to economically interpret the results obtained. The Cobb-Douglas production function, although requiring a set of expert assumptions or judgments about its parameters or series to be used in this production function, continues to be one of the most preferred techniques for estimating potential GDP and the output gap. This technique allows you to economically interpret the results obtained and to measure the impact of structural shocks on potential output.

Another method for assessing the potential level of capital is based on the relevant literature. D'Auria et al. (2010) has assumed that the current capital stock represents the capacity of the economy and therefore does not need to be "mitigated" or "filtered" (K = K*). Whereas, total factor productivity at potential GDP (TFP*) is generated through the HP static filter, assuming that the potential level of TFP is represented by its long-term trend:

y_pot = exp(log_y_pot)
y_gap = (y/y_pot-1)*100

The following graph shows the output gap estimated by both techniques. In the case of Cobb-Douglas, as explained above two different specifications were used.

Graph 1. Output gap (HP and Cobb-Douglas)



2.2. SIMPLE REGRESSION MODELS

Simple linear regression models are used to describe the relationship between two continuous variables, where one variable (the dependent variable, denoted as Y) is predicted by the other variable (the independent variable, denoted as X) through a linear equation. The basic equation for a simple linear regression model is:

$$Y = \beta 0 + \beta 1X + \varepsilon,$$

where β0 is the intercept (the value of Y when X is equal to 0), β1 is the slope (the change in Y for a one-unit increase in X), and ε is the error term (the difference between the actual value of Y and the predicted value of Y).

The goal of a simple linear regression model is to estimate the values of β0 and β1 that best fit the observed data. This is typically done using a method called least squares estimation, which involves minimizing the sum of the squared differences between the observed values of Y and the predicted values of Y based on the estimated values of β0 and β1.

The accuracy of the model can be assessed by calculating the coefficient of determination (R-squared), which measures the proportion of the variance in Y that can be explained by the variance in X. A value of R-squared close to 1 indicates a good fit between the model and the observed data, while a value close to 0 indicates a poor fit.

Once the values of β0 and β1 have been estimated, the model can be used to make predictions of Y for any value of X. This is done by plugging in the desired value of X into the equation and solving for Y:

$$Y = \beta 0 + \beta 1X$$

The usefulness of simple linear regression models is that they can be used to understand the relationship between two variables and to make predictions based on that relationship. For example, a simple linear regression model can be used to predict how changes in one variable will affect the other variable. Linear regression models can be augmented by additional efforts aimed at making causal inferences about the studied relationship; for example, the search for a valid instrumental variable to induce "random" changes in the explanatory variable.

One drawback of simple linear regression models is that they assume a linear relationship between the two variables, which might not always be the case in real-world scenarios. Additionally, simple linear regression models may be sensitive to outliers and might not capture complex relationships between variables.

In terms of measuring the impact of structural reforms in an economy, simple linear regression models can be used to estimate the effect of a specific policy or reform on an outcome of interest, such as economic growth or unemployment rates. For example, a simple linear regression model can be used to estimate the relationship between a particular structural reform and changes in GDP growth rates over time. By controlling for other factors that may affect GDP growth rates, such as inflation or changes in trade policies, the model can provide an estimate of the specific impact of the reform on economic growth.

However, it is important to note that simple linear regression models have limitations when it comes to measuring the impact of structural reforms in an economy. Other econometric techniques, such as panel data analysis or difference-in-differences analysis, may be more appropriate for measuring the impact of complex policy interventions in the context of an economy. Therefore, the regression analysis coefficients used in the Excel tool are also backed up with studies of panel data analysis.

Nonetheless, the main advantage of linear regression models is that they are relatively simple to implement and interpret, and can provide valuable insights into the relationship between variables. In economics, linear regression models are often used to estimate the effect of policy interventions or other external factors on economic outcomes. For example, a study by Acemoglu et al. (2019) used a linear regression model to estimate the impact of automation on employment and wages in the United States. The study found that while automation had a negative effect on employment in the short term, it had a positive effect on wages in the long term.

In the social sciences, linear regression models are often used to explore the relationship between variables such as income, education, and health outcomes. For example, a study by Cutler and Lleras-Muney (2010) used a linear regression model to estimate the impact of education on health outcomes in the United States. The study found that education had a positive effect on health outcomes, even after controlling for other factors such as income and access to healthcare.

Despite their usefulness, linear regression models have limitations and assumptions that must be considered when interpreting the results. These include the assumption of a linear relationship between variables, the potential for confounding variables to affect the results, and the potential for outliers to influence the model. Despite these limitations, linear regression models continue to be a valuable tool for exploring the relationship between variables in various fields.

3. LITERATURE REVIEW

The following section presents a short list of studies in areas similar to those that North Macedonian structural reforms fall into, namely:

- governance
- energy
- labor market
- digitalization
- education

This section aims to help users in understanding the type of impact several reforms may have, and provide them with potential ideas for impact coefficients these SRs can have.

Summary of studies on government effectiveness and political stability

There are some studies that analyze the impact of political stability or government effectiveness on GDP:

- A study by Şaşmaz and Sağdic (2020) analyzed the impact of government effectiveness on GDP growth in EU transition economies. According to the results, they concluded that government effectiveness has a positive effect (4.8 coefficient) on annual economic growth, and the results indicate unidirectional causality runs from government effectiveness to economic growth. Government effectiveness is a World Bank indicator that has values between −2.5 and 2.5 and as this value approaches 2.5, government effectiveness increases; however, as it approaches −2.5, government effectiveness decreases. A possible explanation is that the causality relationship between government effectiveness and economic growth depends on more effective operation of decision-making processes and prioritization of public expenditures.
- Another study by Al-Naser and Hamdan (2021) explored the impact of public governance on economic growth in the Gulf Cooperation Council (GCC). The study model tests the effects of the independent variables of public governance (the worldwide governance indicators) on the dependent variables (the annual GDP growth in %, the annual GDP per capita growth in %, and the GDP in current USD), using a multiple regression model (the fixed effect approach). In this study, only four worldwide governance indicators were selected: the control of corruption, the government effectiveness, the regulatory quality and the rule of law. The government effectiveness (coefficient 1.47) and the regulatory quality were found to have a positive and statistically significant impact.

- Another study by Alam et al. (2017) uses the system GMM technique to examine the impact of government effectiveness on economic growth in a panel of 81 countries. This study finds that government effectiveness has a significantly positive effect on economic growth in high and low-income countries. The coefficient of government effectiveness on GDP growth for low- and middle-income countries is higher than that for high-income countries (0.679 for all countries), meaning that due to a 1-unit increase in the indicator of government effectiveness, the growth rates increase by 1.17, 1.63 and 1.769 percentage points for the sub-samples of high income, low income and middle-income countries, respectively.
- A micro-econometric study by Giordano et al. (2020) investigates the effect of public sector efficiency on firm productivity, using data from Italian firms and public bodies. Based on the results, bridging the gap between public sector efficiency and the efficiency frontier would increase the output by 3% on average.

Overall, these studies suggest that political stability and government effectiveness can have a significant impact on GDP in developing countries, with political instability leading to lower GDP growth and government effectiveness leading to higher GDP per capita.

Summary of studies in the energy sector

The impact of a reform in the energy sector on GDP can vary depending on the specific reforms implemented and the country context. Therefore, it is not possible to provide a specific percentage that would apply universally to all energy sector reforms.

The estimates used in the Excel tool to assess the impact of reforms in the energy sector are based on several studies, since there are limited data available for North Macedonia to make such assessment. Empirical studies have attempted to estimate the impact of energy sector reforms on economic growth using various methods, such as panel data analysis and other econometric methods.

Additionally, some of these studies find that the impact of electricity sector reforms on economic growth is greater in countries with lower initial levels of electricity access, suggesting that electricity sector reforms can help promote economic growth in countries where access to electricity is limited.

- For example, a study by Azam (2020) found that energy sector reforms had a positive impact on economic growth in developing countries, with an estimated increase of 0.09% in GDP per capita for every 1% increase in energy sector reform index.
- A study by Sen and Jamasb (2012) finds that the stock of electricity infrastructure makes a positive and significant contribution to industrial economic output. So, the results indicate that reforms in the energy sector can create a lasting impact on the economy. Furthermore, based on Ozturk (2010), energy reforms can stimulate economic growth by improving access to energy and energy consumption.
- Studies that directly assess the impact of energy sector reforms on economic growth are limited, but produce the following results. Chisari, Estache and Romero (1999) estimated the macroeconomic effects of the privatization and regulation of utilities including the energy sector that began in 1989 in Argentina. Based on this study, the privatization of electricity generation and distribution and gas all had a positive effect on GDP. The privatization of the gas sector had the greatest effect on GDP, amounting to a 0.31% rise in GDP.
- Another study by Chen et al. (2022) explores the association between the production of various sources of renewable energies (e.g. hydroelectric, wind, photovoltaic (PV), geothermal and biomass power) and economic growth encapsulating capital, government spending and trade openness. This research used a heterogeneous approach for panel data and second generational tools for econometrics, which allow for cross-sectional reliance and slope heterogeneity. This study has revealed a substantial reason to back up the feedback assumptions between renewable energy sources and economic growth, using the Dumitrescu and Hurlin analysis. Based on this, the impact of a 1% increase in each renewable energy category, such as hydroelectric, solar PV, wind, geothermal and biomass power, leads to a boost in GDP per capita by 0.14%, 0.39%, 0.12%, 0.03% and 0.029%, respectively. In fact, the use of non-renewable and green energy adds significantly to the national output of the selected 45 emerging economies, according to AMG estimators' analysis of long-term impacts (Le and Sarkodie, 2020). Given the strong relationship between GDP and the expansion of power demand, the energy sector is critical to economic growth in general (Owusu and Asumadu, 2016).

North Macedonia relies predominantly on fossil fuels (low-grade lignite and gas) and hydropower, and is dependent on electricity imports. Country's transition to renewable sources is still limited as a share to gross energy consumption in 2020. Furthermore, the country made only limited progress towards achieving a circular economy, with the recycling rates being extremely low at less than 1% of solid waste being recycled and almost 99% going to landfill (Eurostat, 2020). However, an increase from 27.08% in 2014 to 47.21% in 2018 has been observed in the recycling of packaging waste, despite the limited economic incentives to promote recycling (MAKStat, 2020). So, having these in mind, reforms towards the green economy and energy sector reforms are expected to have a positive impact on growth. Based on the estimates found in several studies, an average of 1% improvement in the energy sector reform index (by implementing energy reforms) can have a 0.1% impact on GDP.

Summary of studies in the education and labor market

Égert et al. (2022) estimate the elasticity of TPF to the PISA test scores. A 5.1% improvement in PISA scores (equivalent to an improvement of 25.5 points for the median OECD country) would increase TFP by 3.4–4.1% in the long run via an increase in human capital by 1.4%.

A study by Bassanini and Scarpetta (2002) concluded that the long-run elasticity of output per working-age population to average years of education was positive. Its estimated value is in line with the microeconomic literature on private returns to schooling (i.e. one additional year of education is estimated to raise the long-run steady-state level of output per capita by about 6%).

Summary of studies on digitalization and internet usage

Based on the Infra4Dev Conference, jointly organized by the World Bank and the International Growth Centre on March 3-4, 2022, theoretically internet access can drive economic development through its impacts on both the supply side and the demand side of an economy. Digital connectivity can directly affect the productivity of firms, workers, and other inputs in the production process. For example, access to internet-based technologies could help workers carry out tasks more rapidly and to higher standards of quality. On the demand side, internet connection may impact sellers' and buyers' ability to access markets and the availability and quality of information on products and services being traded. For example, e-commerce may allow firms to make their products accessible to a much larger pool of consumers than what would have been possible without internet, especially in rural and remote regions.

- A study by Zhang et al. (2022) constructed an evaluation index system and applied a panel data regression model to assess the impact of digital economy on the economic growth of countries along the "Belt and Road" before COVID-19. Then, the Global Trade Analysis Project (GTAP) model was used to examine the impact of COVID-19 on their digital industries and trade patterns. The results show that the regression coefficient of the digital economy is positive at 1% significance level, indicating that every 1-unit increase in the level of digital economy development will increase the GDP of the sample countries by 0.78%.

- Farhadi et al. (2012) studied the impact of ICT usage on economic growth in 159 countries from 2000 to 2009. They used GDP per capita as a dependent variable and the ICT index, which consists of the numbers of internet users, fixed broadband internet subscribers and mobile subscriptions per 100 inhabitants, as the independent variable. They found that there is a positive and significant effect on GDP per capita, especially in high income countries, with a coefficient of up to 0.11 (for low income, the coefficient was 0.02 coefficient).
- Another study by Toader et al. (2018) identified the effect of ICT usage on economic growth in the EU countries. Using panel data estimation and GDP per capita as the dependent variable, they found that ICT infrastructure has a positive and strongly significant impact. A 1% increase in ICT infrastructure usage would generate growth in GDP per capita between 0.0767% (fixed broadband subscriptions) and 0.396% (mobile cell subscriptions).
- Moreover, Nasab and Aghaei (2009) studied the impact of ICT provision on economic growth in OPEC member countries. With panel data over the 1990-2007 period and using the generalized method of moment (GMM), they found that a 10% increase in ICT investment would increase the average GDP per capita by up to 0.2%.

Based on the literature review, we can conclude that the development of the ICT sector or the digitalization of the country – whether through governmental reforms or self-development – boosts economic growth and opens the door to abundant sector development.

Table 3. Overview of results of the studies estimating the impact of reforms

Measure	Objective	Timing	Variable	Coefficient
Government Effectiveness	Improve ranking in Government Effectiveness Indicator	2023	GDP growth	1.47%
Justice System	Lower Civil Proceedings Duration by 1%	2023	TFP	0.03%
Education Reform	Increase PISA score by 1%	2023	TFP	0.6667%
Digitalization	Increase ICT investment by 1%	2023	GDP per capita	0.02%
Digitalization	Increase ICT investment usage by 1%	2023	GDP per capita	0.07%
Energy	Improve energy reform index by 1%	2023	GDP per capita	0.09%

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MY NOTES

Project: STRUCTURAL REFORMS BETTER INTEGRATED WITHIN FISCAL FRAMEWORKS (FISR2)

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