

Extent of undeclared work in the European Union

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1.0 Executive summary

This report is an update of the 2017 European Platform tackling undeclared work report, [*An evaluation of the scale of undeclared work in the European Union and its structural determinants: Estimates using the Labour Input Method*](#) (Williams et al., 2017), that provided estimates of undeclared work in the private sector for 2013. Employing the same methodology, this study provides estimates on the prevalence of undeclared work in the European Union (EU) in 2019.

This report provides only estimates, and highly conservative ones, of the real size of the undeclared economy which need to be treated with caution and not as indisputable facts. Caution is required because the Labour Input Method (LIM) primarily focuses on detecting undeclared work attributable to the labour input. However, the multifaceted and complex realm of undeclared work embraces many other transactions that do not necessarily include undeclared labour relations such as unregistered employment and envelope wages (e.g., businesses not declaring all their transactions in reported turnover). In general, economic output comes from both labour and capital, with only the former being fully captured by LIM. This method is hence more effective in estimating undeclared work in labour-intensive sectors where capital inputs play a less important role. Contrariwise, many undeclared transactions in capital-intensive sectors most likely remain undetected by LIM. There are also data limitations, with for example agriculture, forestry and fishing excluded from the scope of this study, and whose inclusion (if the data was available) would doubtless lead to higher estimates of undeclared work due to the likely higher prevalence of undeclared work in this sector.

The finding is that in 2019, **11.1 % of total labour input in the private sector in the EU is undeclared** (11.6 % in 2013), and **undeclared work accounts for 14.8 % of gross value added (GVA) in the private sector** (16.4 % in 2013). However, these are unweighted averages, not considering the relative size of the labour force in each Member State. The weighted averages are that **9.7 % of total labour input in the private sector in the EU is undeclared** (10.2 % in 2013), and **undeclared work constitutes 14.6 % of GVA in the private sector** (14.9 % in 2013).

Therefore, between 2013 and 2019, **there has been a decline in undeclared work at the EU level and a decline in 19 of the 26 Member States** (estimates could not be produced for Malta in 2013), the exceptions being Bulgaria, France, Germany, Italy, Lithuania, the Netherlands and Romania. This displays the progress made in tackling undeclared work both in the EU as a whole and in most Member States.

Nevertheless, there remain substantial differences in the level of undeclared work across the EU:

- ▶ **For undeclared work as a proportion of total labour input in the private sector**, undeclared work is most pervasive in Romania (21.7 %), Lithuania (20.8 %), and Bulgaria (19.3 %). The lowest levels are found in Germany (3.9 %), the Netherlands (4.8 %), and Austria (5.1 %). On the whole, countries above the EU average are mostly Member States that joined the EU in or after 2004.
- ▶ **For undeclared work as a proportion of GVA in the private sector**, the distribution is similar, with undeclared work as a proportion of GVA being again highest in Romania (27.1 %), Lithuania (26.0 %), and Bulgaria (23.8 %). The lowest levels are found in Austria (5.3 %), Luxembourg (7.0 %), and Sweden (7.5 %).

There are also significant differences in the pervasiveness of undeclared work in various types of the employment relationship:

- ▶ The proportion of **self-employment** that is undeclared ranges from 3.6 % in Belgium to 65.2 % in Cyprus.
- ▶ The share of **waged employment** that is undeclared ranges from just 0.5 % in the Netherlands to 20.2 % in Bulgaria.
- ▶ The proportion of **family work** that is undeclared is highest in Luxembourg (68.9 %), Malta (63.0 %), Cyprus (62.2 %), and Romania (60.1 %) and lowest in Sweden (2.1 %), Italy (2.4 %), Czechia (2.6 %), and Slovakia (3.3 %).

Analysing the structure of the undeclared labour market in the EU, **62.9 % (61.8 % in 2013) of all undeclared work in the EU is waged employment, 36.3 % (37.3 % in 2013) is self-employment and 0.8 % (0.9 % in 2013) is family work.** Nonetheless, there again exist substantial differences between the Member States. Countries in which the majority of undeclared work is self-employment include the Netherlands (90 %), Cyprus (82.2 %), Ireland (71.4 %), and Finland (68.1 %). Meanwhile, in Poland, Belgium, Bulgaria, and Italy over 90 % of all undeclared work is waged employment.

These differences in the structure of the undeclared workforce have important implications for tackling this practice. Countries where undeclared work is predominantly self-employment may find it more beneficial to prioritise policy initiatives supporting enterprise to start-up legitimately, such as smoothing the transition from unemployment to self-employment, and making it easier and beneficial for enterprises to move towards full legitimacy. On the contrary, countries where undeclared work is mostly waged employment may find it more beneficial to focus on policy measures making unregistered and undeclared employment more expensive and/or less appealing.

Evaluating how these 2019 cross-national variations in the magnitude of undeclared work are associated with differences in various structural conditions, there is found to be¹:

- ▶ **A strong significant negative relationship** (i.e., the higher the value of the indicator, the lower the prevalence of undeclared work) with the Social Progress Index, Democracy Index, government effectiveness, GDP per capita in current prices (euro per capita), Corruption Perceptions Index (high values of this indicator indicated that the public sector is perceived as very clean), Human Development Index, rule of law, control of corruption, regulatory quality, voice and accountability, social capital, judicial independence and reliability of police services and a **strong significant positive relationship** (i.e., the higher the value of the indicator, the higher the prevalence of undeclared work) with severe material deprivation rate.
- ▶ **A moderate negative significant relationship** with Research & Development expenditure, the perceived share of undeclared work (higher value of this indicator indicates a high share of citizens estimates a low share of undeclared work in their society), labour market policy expenditure, trust in parliament, workers' rights, the impact of social transfers on poverty reduction, acceptability of undeclared work by a firm for another firm (higher value of the indicator indicates a high share of citizens finding this form of undeclared work unacceptable) and trust in government and a **strong positive significant relationship** with labour productivity and people at risk of poverty/social exclusion.

¹ The strength of the correlation/ relationship is assessed based on the Spearman's rho coefficient (the descriptors apply to both positive and negative relationships): 0.81 to 1 very strong relationship, 0.61 to 0.80 – strong relationship, 0.41 to 0.60 – moderate relationship, 0.21 to 0.40 – weak relationship, 0.01 to 0.20 – very weak or negligible relationship. The significance of the relationship is given by the p value and it is significant at: *** p<0.01, ** p<0.05, * p<0.1.

- ▶ **A weak negative** but significant relationship with the acceptability of undeclared work by firms for private households (higher value of the indicator indicates a high share of citizens finding this form of undeclared work unacceptable), political stability, trust in labour inspectorate, the burden of government regulation, trust in tax and social security authorities, acceptability of someone partially or completely concealing income and tax compliance, attitudes towards firms hiring workers on an undeclared basis (higher value of the indicator indicates a high share of citizens finding this form of undeclared work unacceptable), and a **weak positive** but significant relationship with inequality of income distribution and Gini coefficient distribution.
- ▶ **A very weak or insignificant negative** relationship with business flexibility index, tax revenue as % of GDP, social contributions as % of revenue, personally knowing people engaged in undeclared work, and attitudes towards undeclared work by individuals for private households and a **very weak or insignificant positive** relationship with the expense of government.

In conclusion, lower levels of undeclared work are found in Member States with:

- i. **Higher government effectiveness** and lower perceived levels of corruption.
- ii. **Higher levels of development** (whether measured in terms of GDP per capita, the Human Development Index or Social Progress Index) and **greater levels of state intervention in work and welfare** (to enhance workers` rights and labour productivity, investments in research and development and implementing measures for reducing poverty and inequalities).
- iii. **Higher quality more powerful formal institutions** (higher reliability of policy services, higher judicial independence, stronger rule of law, stronger voice and accountability, positive perceptions towards the regulatory quality and higher trust in state institutions).
- iv. **Lower levels of instability and uncertainty** in formal institutions (better transparency in policymaking and reduced perception of political instability).
- v. **Greater symmetry between the norms, values and beliefs of citizens, workers, employers and businesses and the formal rules** (termed “vertical trust” and measured by the level of tax compliance, and the acceptability of undeclared work) and a **higher trust in peers to adhere to the formal rules** (termed “horizontal trust” and measured by personally knowing people engaged in undeclared work and their estimates of the share of undeclared work).

2.0 Introduction

This report is an update of the 2017 European Platform tackling undeclared work report, [*An evaluation of the scale of undeclared work in the European Union and its structural determinants: Estimates using the Labour Input Method*](#) (Williams et al., 2017), that provided 2013 estimates of undeclared work in the private sector. Using the same methodology, the aim is to update this report by providing figures on the prevalence of undeclared work in 2019 for all EU Member States.

Given that undeclared work is hidden from and unreported to the authorities, estimating its magnitude is a challenging task. As the European Commission (2007: 4) explains:



“Undeclared work can be measured both directly and indirectly. Indirect methods are based on the comparison of macroeconomic aggregates (such as national accounts, electricity consumption, cash transactions). Indirect (especially monetary) methods often over-estimate the level of undeclared work and say little about its socio-economic characteristics. Direct methods, on the contrary, are based on statistical surveys and have advantages in terms of comparability and detail, but tend to under-report the extent of undeclared work.”

There is a consensus among both practitioners and academics that a direct approach should be used more to explore the nature of undeclared work in terms of who engages in such work, why they do so, which forms of undeclared work they undertake and their reasons for doing so (Eurofound, 2013; Williams and Schneider, 2016; Williams and Horodnic, 2021). When estimating the magnitude of undeclared work, the consensus is supportive of the use of (indirect) methods that search for discrepancies in comparable sets of secondary macroeconomic data (i.e., data constructed and/or collected for other purposes).

In line with this consensus, and replicating the 2017 report, this study again employs the Labour Input Method (LIM) to estimate the scale of undeclared work in the EU. Developed and first applied by the Italian National Institute of Statistics, this indirect measurement technique assesses the gap between the self-reported supply of labour (e.g., through representative national surveys) and the official employment figures reported by businesses (declarations to the tax administration, national statistical offices, labour or social security authorities, etc.). The misalignment between the two sources is ascribed to undeclared work (ISTAT, 2016). However, there are a range of steps that need to be taken to ensure the exhaustiveness and comparability of the datasets used for this purpose.

A detailed description of this methodology is provided in the next section. Section 4 then reports the LIM estimates of undeclared work in all EU Member States for 2019, including a comparison with the 2013 results, along with an analysis of the variations in the level of undeclared work across different types of employment relationship and how the structure of the undeclared workforce varies between Member States. Section 5 then evaluates the relationship between these cross-national variations in the level of undeclared work and various economic and social structural disparities between countries.

3.0 Methodology used for estimating the scale of undeclared work: the Labour Input Method

This section provides an overview of the assumptions and procedures underpinning the Labour Input Method. After discussing the operational definition of undeclared work used in this study, a detailed description is provided of the method, data sources and variables used in the analysis. The section ends with an overview of the key limitations of this estimation approach and suggestions for possible improvements.

Key conclusions

- ▶ The Labour Input Method measures the difference workers' reports of labour supplied and employers' reports of labour used.
- ▶ To analyse this, the Labour Force Survey and Structural Business Statistics are used.
- ▶ The report presents the estimates for 2019, the latest year for which both sources of data were available.
- ▶ Estimates refer to all private sector activities, except for those in the financial sector, agriculture, forestry and fishing, which are excluded due to the lack of data.
- ▶ The scarcity of information provided by Structural Business Statistics is the key obstacle to producing more reliable estimates.
- ▶ The increasing prevalence of atypical forms of employment undermines the credibility of data provided in the Labour Force Survey.

3.1 Operational definition of undeclared work

Undeclared work is defined as “any paid activities that are lawful as regards their nature, but are not declared to the public authorities, taking into account the differences in the regulatory systems of the Member States” (European Commission, 2007: 1). Member States have adopted a variety of different definitions focusing upon non-compliance with either labour, tax and/or social security legislation or regulations.²

If there are additional forms of non-compliance, it is not undeclared work. If the goods and services provided are unlawful (e.g., trafficking of drugs, firearms, persons, or money laundering forbidden by law), it is part of the wider criminal economy i.e., the shadow economy (often defined as including both the undeclared economy and the criminal economy), and if there is no monetary payment, it is part of the unpaid sphere. As such, illegal economic activities are excluded from the definition of undeclared work. However, sometimes what is lawful in one country is illegal in others. For instance, in some countries, prostitution is legal (e.g., Germany, Greece and Hungary) but not in others, and in some countries (e.g., the Netherlands) some drugs are legal but not in others. Here, therefore, the definition of undeclared work

² For the definitions used in Member States, see <http://ec.europa.eu/social/main.jsp?catId=1322&langId=en>.

excludes these transactions that are legal in some countries but not others. As such, undeclared work excludes all activities that are unlawful as regards their nature, but also some lawful activities in some Member States, but not others, for which data is not collected in survey databases (i.e., EU- LFS and SBS).

In consequence, undeclared work is composed of the following four broad types:³

- ▶ **Unregistered employment:** an employment relationship which is not registered with the authorities when it should be registered. Such employees often do not have written contracts or terms of employment and their remuneration is most probably undeclared in nature.
- ▶ **Under-declared employment:** when formal employers pursue the illegal practice of reducing their tax and social security payments, and therefore labour costs, by under-declaring the remuneration of employees. This occurs when employers pay their formal employees two salaries: an official declared salary and an additional undeclared (“envelope”) wage which is hidden from the authorities for tax and social security purposes. Alternatively, an employer can under-declare the number of hours an employee works, such as to evade paying the minimum wage.
 - ▷ **Envelope wages:** often used in the context of under-declared employment, an envelope wage is a cash-in-hand wage paid by a formal employer to a formal employee in addition to their official declared salary, to reduce their tax and social security payments and therefore labour costs. It arises from an agreement between the employer and employee, and additional conditions may be attached to its payment, which are not in the formal written contract or terms of employment.
- ▶ **Undeclared self-employment:** paid activity conducted by the self-employed where income is not declared for the purpose of evading either tax and/or social insurance contributions owed. The self-employed may not declare either some or all their income.
- ▶ **Unregistered family work:** labour input by individuals who are not directly paid but do contribute to the for-profit family business.

3.2 The Labour Input Method

As mentioned, the Labour Input Method searches for discrepancies between two contrasting sources of information on labour usage: the self-reported labour supply by workers and the reported use of labour by employers (ISTAT, 2016). Although any datasets providing exhaustive figures on these two sides of the same coin would generally serve the purpose, the European Labour Force Survey (LFS) and the Structural Business Statistics (SBS) are the only reasonable options when the goal is to deliver comparable EU-wide figures. LFS is a representative large-scale survey of households, which is conducted on a regular basis by national statistical offices of all Member States (see Eurostat, 2021). Primarily focused on citizens’ participation in the labour force, this survey also provides rich information on other characteristics of the interviewees that can ease the estimation procedure (e.g., country of work, type of work engagement, sector in which activities are pursued, the average number of hours completed during the observed period, the existence of additional jobs, etc.). SBS, on the other hand, represents a compilation of figures that various administrative and statistical bodies collect from enterprises during a year (Eurostat, 2022a).

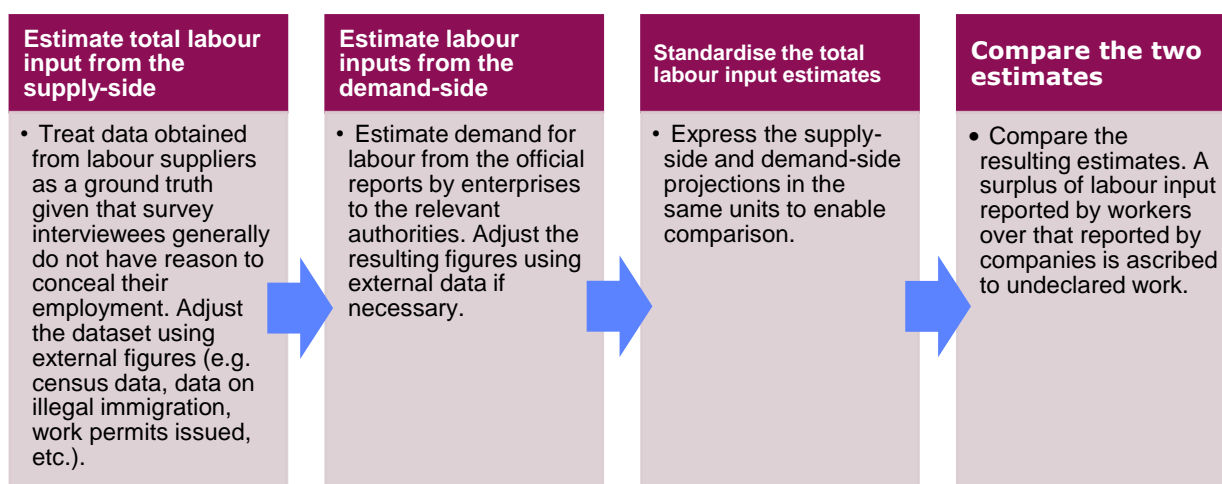
³ https://www.ela.europa.eu/sites/default/files/2021-09/Glossary%20v6-final_0.pdf

In essence, the Labour Input Method treats LFS as a trustworthy source of information on labour input, while SBS is believed to be deficient due to deliberate misreporting. In other words, it is presumed that individuals interviewed as part of LFS have no reason not to report all paid work, given that no question about the legitimacy of their activities is asked in the Survey. More importantly, they are assured not only that the Survey serves strictly statistical purposes, but also that their identity would remain concealed if they accept participation. In contrast, it is highly unlikely that companies employing workers on an undeclared basis would provide any information about them to the relevant authorities. What is more, self-employed individuals operating fully undeclared are not even encompassed by regular data-gathering arrangements on the part of government bodies.

The estimation procedure, which is illustrated in Figure 1, can be hence summarised as follows⁴:

- ▶ Project the figures on labour input from LFS to the total population and for the period of interest (commonly the whole year).
- ▶ Adjust and supplement the obtained results with external figures (e.g., on immigration, cross-border work, and population changes) to ensure exhaustiveness.
- ▶ Take relevant data on labour demand from SBS and make any adjustments if needed.
- ▶ Harmonise the two sets of figures by converting them to the same units (hours worked or work efforts expressed in terms of full-time equivalent employment).
- ▶ Compare the resulting numbers to assess the discrepancies.
- ▶ Put the resulting estimates of undeclared work in the context of economic output.

Figure 1. Overview of the Labour Input Method



The last step above requires the assumption that undeclared work does not differ from declared work in terms of productivity because there is no data on the comparative productivity of declared and undeclared work. To increase the credibility of the resulting estimates, it is thus important to take into account the nature of work and the sector in which an activity takes place. Accordingly, in this study the procedure expressed above is completed separately for each level of economic activity and each type of employment (namely self-employment, waged employment and family work). For both sources of data, a table akin to

⁴ See also OECD (2002).

the one illustrated below (see Table 1) was produced. The figures were then compared on a cell-by-cell basis and the resulting discrepancies were summed to obtain economy-wide estimates.

Table 1. Sample matrix for LIM method, an illustration

Sector	Self-employment	Waged employment	Family work	Total
Sector 1				
Sector 2				
Sector 3				
Sector 4				
⋮				

Source: Authors' illustration

In the rest of this section, an overview is provided of the variables used and the steps taken to reconcile these two data sources and, consequently, assess the extent of undeclared work across the EU.

3.3 Data and variables used

3.3.1 Overview of the datasets and key definitions

For the purpose of this study, national LFS datasets were obtained directly from Eurostat upon request. SBS data, on the other hand, are publicly available on the Eurostat website (Eurostat, 2022a). LFS datasets provide a rich set of employment-related information essential for this task. The central variables in this respect are the type of employment (self-employed, dependent employee, and unpaid family worker), the number of jobs a person holds, the number of hours worked as part of each job, and the sectors in which these jobs are performed. Besides various socioeconomic characteristics of the respondents (such as gender, age, marital status, household size), which are essential for simulating missing values, a range of other auxiliary variables is used to increase the exhaustiveness of the resulting figures. For instance, there is a variable denoting the exact country in which an individual works. It allows the identification and proper classification of cross-border workers and other persons working out of the country of residence. Since they essentially belong to the labour force of another country, these individuals have to be moved from their domicile LFS to that of the country in which they work.

It is important to realize that LFS approaches the matter from the perspective of work completed, while SBS does so in terms of jobs. The problem is that a single individual is counted several times in the business statistics if they work for more than one employer. This means that the figures from the two sources are not directly comparable. To reconcile the employment-based view of LFS with the job-based view of SBS, the information extracted from each of them must be converted into equivalent units. The most obvious candidates in this respect are the total number of hours worked and the number of jobs in full-time equivalents. Only after the harmonisation is properly completed can one proceed with the comparison of the resulting figures.

For this purpose, internationally agreed definitions and accompanying concepts established in the European System of Accounts (ESA 2010) are used. Among other things, ESA 2010 provides a clear and concise

overview of existing employment types. According to this nomenclature, employment covers all individuals involved in productive activities which fall within the production boundary of the national accounts (Eurostat, 2013). Persons in employment are further divided into self-employed individuals and dependent employees. **Employees** are defined as “persons who, by agreement, work for a resident institutional unit and receive a remuneration recorded as compensation of employees” (Eurostat, 2013, p. 307). This definition is in line with the definition of paid employment by the International Labour Organisation (ILO, 1982). On the other hand, **self-employed** are “persons who are the sole owners, or joint owners, of the unincorporated enterprises in which they work, excluding those unincorporated enterprises that are classified as quasi-corporations” (Eurostat, 2013, p. 307). In cases when an individual is engaged in waged employment, but also holds a job that falls within the latter scope, she/he will be classified as self-employed if, and only if, the main part of their income comes from this self-employment. The third important group of individuals, which is sometimes seen as a sub-category of the self-employed (ILO, 1982), are **unpaid family workers** (Eurostat, 2013, p. 308). These are persons either engaged in a family business or working on a family farm, who are not directly paid for their contribution. Instead, they share a household with the owner of the particular business/farm and receive remuneration in the form of in-kind payments or fringe benefits.

When it comes to labour input, ESA 2010 defines **total hours worked** as the “aggregate number of hours actually worked as an employee or self-employed person during the accounting period, when their output is within the production boundary” (Eurostat, 2013, p. 310). Since the definition of employees also includes persons with a formal attachment who are temporarily not at work, as well as part-time workers, total hours worked provide more realistic information about labour productivity than the mere number of persons employed.

Another important concept is employment in **full-time equivalents (FTE)**. This indicator represents a standardized view of the number of existing jobs, given that it takes into account the variability in the efforts invested. Specifically, FTE in a certain sector/type of employment is obtained by dividing the sum of all hours worked (i.e., including all workers) in this sector/type of employment by the average annual number of hours completed per individual worker. Although total hours worked are commonly the most accurate measure of labour input, FTE represents not only a good but sometimes an even desirable alternative. Besides being useful for checking the robustness of the estimates based on the total hours worked, in some situations this proxy actually gives more tangible insight into the workers’ effort. The concept of FTE is particularly useful for sectors that are characterised by a stronger reliance on atypical forms of employment (on-call work, platform work, employee sharing, etc).

Returning to the estimation strategy, it was to a large extent determined by the (limited) availability of data provided as part of SBS. The SBS figures are broken down by size classes and the level of industry (NACE Rev.2 classification). However, while separate figures are provided for the jobs held by dependent employees (including FTE), the remaining two categories of interest are jointly presented. Moreover, data on hours worked are only given for a small number of sectors (namely mining and quarrying; manufacturing; construction; electricity, gas, steam and air conditioning supply; and water supply, sewerage, waste management and remediation activities). It is thus clear that the information provided in SBS is not sufficient to produce projections for either of the two target concepts. On the whole, the scarcity of data available in SBS has remained the main obstacle to producing more robust estimates of undeclared work using the LIM approach. More details about the limitations of SBS and strategies applied to address them are provided in the next section.

Before moving to the industry coverage, it is important to mention that the resultant estimates of undeclared labour input were converted into comparable monetary figures using **value added at factor**

cost. This variable, which is provided by SBS, denotes “the gross income from operating activities after adjusting for operating subsidies and indirect taxes” (Eurostat, 2022b).

3.3.2 Comparable data on covered industries

LFS provides data for a representative sample of the country's population, which makes it possible to project employment figures to the whole economy. On the other hand, SBS covers solely the “business economy”, but not in its entirety. Specifically, besides education and health, which are mainly (but not universally) non-market activities, also excluded are agriculture, forestry and fishing (NACE Rev.2 Section A). In addition, data for financial services (section K) are not directly comparable with those for the remaining parts of the business economy. This is not only because of the specific nature of financial entities (insurance companies, pension funds and credit institutions) but also due to the limited availability of most types of standard business statistics for this sector.

Consequently, SBS provides comparable figures for activities falling into the following sections of the economy: Mining and quarrying (NACE Rev.2 Section B); Manufacturing (C); Electricity, gas, steam and air conditioning supply (D); Water supply, sewerage, waste management and remediation activities (E); Construction (F); Wholesale and retail trade, repair of motor vehicles and motorcycles (G); Transportation and storage (H); Accommodation and food service activities (I); Information and communication (J); Real estate activities (L); Professional, scientific and technical activities (M); and Administrative and support service activities (N). Accordingly, the estimates of undeclared work presented in this study will be restricted to these sectors only⁵. Since the previous wave of the study covered the same scope of activities (see Williams et al., 2017), this will make it possible to directly compare the resulting estimates with those for 2013.

Unfortunately, even this rather limited set of information on the demand side is not free of missing values. The issue is particularly emphasised in small economies given that data for certain sectors could not be made publicly available for confidentiality reasons. This has to do with a rather small number of units operating in these sectors, which implies that provided numbers could be easily matched with individual companies. Due attention to the deficiencies of the datasets used in this study is given in the following section.

3.4 Analytical approach

This section explains the steps taken to produce the estimates of undeclared work in the EU. First, the adjustments made to the LFS dataset and to enumerate the variables used to project the Survey data to the population-level figures for each Member State are described. This is followed by a discussion of the harmonisation procedure, which ensured direct comparability of the results from the two data sources. The last part of this section reports the most important obstacles encountered during the estimation process, alongside suggestions for improvements which would enable more reliable estimates.

3.4.1 Labour input from LFS

As mentioned, LIM treats the projection of LFS data to the population as an irrefutable truth and, accordingly, compares it with “deficient” SBS figures to assess the scale of undeclared work. This rather

⁵ This means that LFS figures referring to these sectors only were taken into consideration during the data reconciliation phase.

strong assumption implies that the quality of the resulting estimates of undeclared work in a certain country is strongly affected by the quality of the accompanying LFS dataset. However, the problem is that LFS cannot capture all labour suppliers. This deficiency is becoming more pronounced owing to the increased dynamics of labour markets across Europe. The core of the problem lies in the fact that the sampling frame for LFS includes only legitimate country residents. Consequently, the LFS of a particular country lacks data about cross-border workers from other countries, non-resident seasonal workers, and employed immigrants who legally entered the country during the year when the survey was conducted. An additional challenge is posed by irregular immigrants (also not captured by LFS), whose contribution to the labour input of certain Member States is far from marginal.

Part of the missing information about cross-border workers and recent legal immigrants could be restored due to possessing datasets for all members of the European Economic Area (EEA) except Liechtenstein. As explained previously, every interviewee who declared themselves as an active worker was asked in which country this work was being performed. Individuals who worked in a country different from the country where the interview was held were hence removed from the LFS of the resident country to the LFS of the country of work. However, this only sorted out the issue for EEA citizens working in another EEA country. There remained a significant portion of third-country nationals legitimately residing in the EU without any permit whose labour input we were not able to effectively capture.⁶

When it comes to third-country nationals who require a valid work permit, their contribution was estimated using the official data on work permits issued by the national authorities (Eurostat, 2022c). Since these numbers refer to people rather than to jobs and hours worked, the exact labour efforts of each individual had to be simulated. This was done under the assumption that the behaviour of these workers does not deviate from that of foreign-national residents and cross-border EEA workers. The same strategy was applied to incorporate irregular immigrants. However, the only comparable source of information in the latter case is the Eurostat database on third-country nationals found to be illegally present on the territory of the Member States (Eurostat, 2022d). Since detected individuals represent only a portion of irregular immigrants, it is obvious that the adjusted LFS datasets are still far from being fully comprehensive.

Once the adjustments were completed, the next step was to project the data from these “refined” LFS datasets to the whole population. Obviously, only survey participants working for pay were considered in this process. Those were identified using the variable WSTATOR (labour status during the reference week). Specifically, retained were only the individuals who either did any work for pay or profit during the reference week or were not working during a reference week but had a job or business from which they were absent (Eurostat, 2021). Their efforts were extrapolated with the help of the variables HWUSUAL and HWACTUAL (Eurostat, 2021), which store the number of hours worked during the observed period. The yearly equivalents were then projected to the whole population using the provided weighting factors. To calculate the number of jobs in FTE, we controlled for the inherent differences not only between sectors

⁶ For instance, many citizens of Bosnia and Herzegovina do not require any special permit to work in Croatia. This is an important, but certainly not the only reason why our estimates for Croatia are unusually low. Since joining the EU in 2013, Croatia has witnessed strong emigration of its citizens to other EU Member States. To fill empty workplaces, the authorities had lessened the immigration procedures for overseas citizens. As the work efforts of many of these newcomers (and this especially applies to seasonal workers in tourism) were not included in LFS nor adequately captured by other relevant statistics, the resultant estimates of undeclared work in Croatia are most likely severely underestimated. Similar issues are pronounced in other countries. For instance, in 2019 citizens of six non-EEA countries (Armenia, Belarus, Georgia, Moldova, Russia and Ukraine) were entitled to perform work in Poland without a work permit under some conditions. Accordingly, the labour input of these individuals remained out of the scope of our adjustment procedures.

and types of employment (as specified in Table 1), but also between different contract types (full-time work vs. part-time work) and nature of the job (main employment vs. auxiliary/occasional work).

For each group of workers defined by these variables, the average number of hours completed during a year were calculated. The total number of hours worked is then divided by these averages to get full-time equivalents for each and every group. In the final step, the resulting figures are summed across contract types and workload arrangements to get two matrices of totals (Table 1). One of these matrices contained the total number of hours worked, while the other expressed the same information in terms of FTE jobs. Besides being a good robustness-checking mechanism, the option with two different tables was, in fact, the only feasible estimation strategy for a great many countries due to the scarcity of information provided by SBS (as discussed previously).

3.4.2 Reconciliation of LFS with SBS on labour input

As explained, SBS figures alone are not sufficient to construct the corresponding matrices that could be compared with LFS projections. The first problem, which affects both estimation approaches is the absence of independent figures for the self-employed and family workers. Since for each covered sector only a single number is available (referring to “unpaid persons employed”), it was first required to split these values. Moreover, these numbers are expressed in absolute terms, which means that each of the two newly generated values had to be further converted into FTE jobs and the total number of work hours.

This was achieved using split-ratios and average figures for work hours obtained from LFS. A matrix of weights specifying the dispersion of the two groups of individuals within every single sector was first developed from LFS data, taking into account the inherent differences between individuals depending on the type of their contract (full-time vs part-time) and the nature of the job (main job vs supplementary/secondary job). These weights were then used to obtain separate figures on the number of jobs held by self-employed and family workers for every single combination of the three variables of interest (i.e., sector, contract type and nature of the job). In the next step, the total number of hours worked during a year was approximated for every subgroup of interest. This was achieved using the information on the structure of the labour market and distributional characteristics of workers’ input (in terms of hours completed) which was again assessed via a comprehensive analysis of the LFS data.

Although breaching the basic requirement that each of the two sides of the equation should provide independent figures on the labour input, this was the only viable solution to the issue. This procedure is, however, justifiable on the same grounds as the Labour Input Method is, given that both perceive the information provided by LFS as an indisputable fact. Still, this only further emphasises the necessity to have as accurate LFS data as possible for each Member State.

The same strategy was applied in the case of dependent employees, but only to produce hour-based results. This is because SBS provide exact figures on total FTE jobs held by dependent employees for sectors covered in this particular dataset. These figures enabled the production of quite robust estimates of undeclared work conducted by persons in waged employment. The same cannot be said for the self-employed and family workers, given the aforementioned assumptions their estimation procedure relies on. Nevertheless, once comparable labour inputs were generated and subtracted, the resulting differences were ascribed to undeclared work. These absolute values then made it possible to assess which proportion of GVA came from undeclared work.

It should be stressed that the procedure described in this section is identical to the one applied in the previous wave (see Williams et al., 2017). This means that results are fully comparable on a country level. The only notable difference relates to the geographical scope of the analysis. Given that it left the EU in

the meanwhile, the United Kingdom was not covered in this round of the study. More importantly, this time we were able to produce estimates for Malta, which was not the case in the previous wave.

Finally, the results were produced for 2019, the last year for which both sources of data were available at the time this study took place. Nevertheless, it must be stated that 2019 would have been chosen even if newer data had been available. The first and most important reason for this is the potential harmful disruption of the data caused by the COVID-19 pandemic. It is likely that for the years 2020 and 2021, discrepancies between the supply- and demand-side data may also be due to the pandemic. Workers interviewed as part of LFS might for instance have reported that they were not in employment because they were receiving short-term financial support under the employment retention schemes developed in response to the pandemic, largely funded by a €100 billion “Support to mitigate Unemployment Risks in an Emergency” (SURE) programme.⁷

Meanwhile, and because these workers were officially employed, SBS data is likely to have reported them as still in employment. Therefore, the short-term financial support schemes most probably would cause an additional discrepancy between the LFS and SBS data that is not due to undeclared work in 2020 and 2021. For the 2020 or 2021 data, then there would be no way of knowing whether the discrepancy between the supply- and demand-side data was due to the misreporting by workers in LFS or whether it was entirely due to undeclared work. In other words, if a portion was due to misreporting by workers of their employment status, this could have led in 2020 and 2021 to an underestimate of the extent of undeclared work compared with other non-pandemic years.

The above explanation illustrates just one of many important limitations of the Labour Input Method and the datasets it relies on. In the next section, the shortcomings of the applied approach and possible remedies are outlined.

3.5 Deficiencies of data sources and suggestions for improvements

Despite a slight improvement in the quality of available data from the time this study was first carried out, the estimation of the extent of undeclared work using LIM remains a complex and challenging task. First of all, it must be stressed that this method provides highly conservative estimates of the real size of the undeclared economy. This is because it is primarily focused on detecting undeclared work attributable to the labour input. This multifaceted and complex realm, however, embraces many other transactions that do not necessarily include undeclared labour relations such as unregistered employment and envelope wages (e.g., businesses not declaring all their transactions in reported turnover). In general, economic output comes from both labour and capital, with only the former being fully captured by LIM. This method is hence more effective in assessing undeclared work in labour-intensive sectors where capital inputs play a less important role. At the same time, many undeclared transactions in capital-intensive sectors most likely remain undetected by LIM.

A further limitation of LIM can be found in its foundational assumption that data on the supply of labour is undisputedly accurate. Undoubtedly, this is an overly optimistic hypothesis as it is highly plausible that a certain portion of the survey participants decided to stay silent about their unregistered activities. Likewise, some of them might have misunderstood the concept of work comprehended by the survey and hence did not bother to mention their sporadic for-profit activities during the interview (e.g., via collaborative

⁷ European Commission 2020. *COVID 19- Economic package – multiannual financial framework 2014-2020*. Brussels: European Commission.

platforms). Finally, there is also unintentional misreporting that is of vital importance for the LIM method. This primarily relates to honest mistakes with respect to the sector in which survey participants work and/or their type of employment. The negative impacts of such mistakes feed through the whole estimation pipeline.

When it comes to the demand side, the bulk of deliberate underreporting of labour input on the part of business owners unquestionably has to do with undeclared work. However, there are also some other important sources of error in this respect. For instance, the authorities might accidentally skip certain units while collecting business data. Honest mistakes in reporting by the companies also cannot be excluded. The risk of inaccurate reporting or mismeasurement due to statistical factors has, however, been significantly decreased in recent years following the endeavours of Eurostat and relevant national bodies to ensure the exhaustiveness of business statistics. In addition, sophisticated techniques for data gathering and processing are increasingly employed to resolve discrepancies across multiple data sources.

Nonetheless, the scarcity of information available in SBS continues to represent the biggest obstacle to producing highly reliable estimates of undeclared work in the EU. Due to the partial availability of data on hours worked and jobs in full-time equivalents, a range of simulations had to be done to obtain harmonised results. These simulations, however, required a number of assumptions to be made by the data analysts. Generally speaking, the more assumptions an estimation technique relies on, the less robust the resulting figures are. Consequently, although we did our best to develop as credible an estimation pipeline as possible, the estimates of the magnitude of undeclared work presented in the subsequent sections should not be treated as undisputable facts, but rather as educated guesstimates.

Given this, some important steps ought to be done in order to increase the reliability of LIM estimates in future waves. The most important issue to address in this respect is the current paucity of data provided by SBS. Besides a more exhaustive overview of the demand side in the private sector, it would be also beneficial if there were comparable figures for the remaining parts of the economy. In this respect, it may be worth considering the option of harmonising and unifying as much administrative and statistical data held by the individual Member States as possible. Furthermore, the reliability of the resultant estimates would be much higher if the Member States improved their statistics on the participation of both regular immigrants from third countries and irregular immigrants in the labour market. This would enable fine-tuning of the figures on the labour supply obtained from LFS.

4.0 Estimates of undeclared work in the EU27 using the Labour Input Method

This section reports the estimates of the extent of undeclared work in EU Member States in 2019 along with how this changed since 2013. It also assesses how the occurrence of undeclared work varies across different types of employment, and how the structure of the undeclared labour market differs across the EU27.

Key conclusions

- ▶ The finding is that in 2019, on average, 11.1 % of total labour input in the private sector in the EU is undeclared (11.6 % in 2013), and undeclared work is on average 14.8 % of GVA (16.4 % in 2013).
- ▶ However, these are unweighted averages, not considering the relative size of the labour force in each Member State. The weighted averages are that 9.7 % of total labour input in the private sector

in the EU is undeclared (10.2 % in 2013), and undeclared work constitutes 14.6 % of GVA in the private sector (14.9 % in 2013).

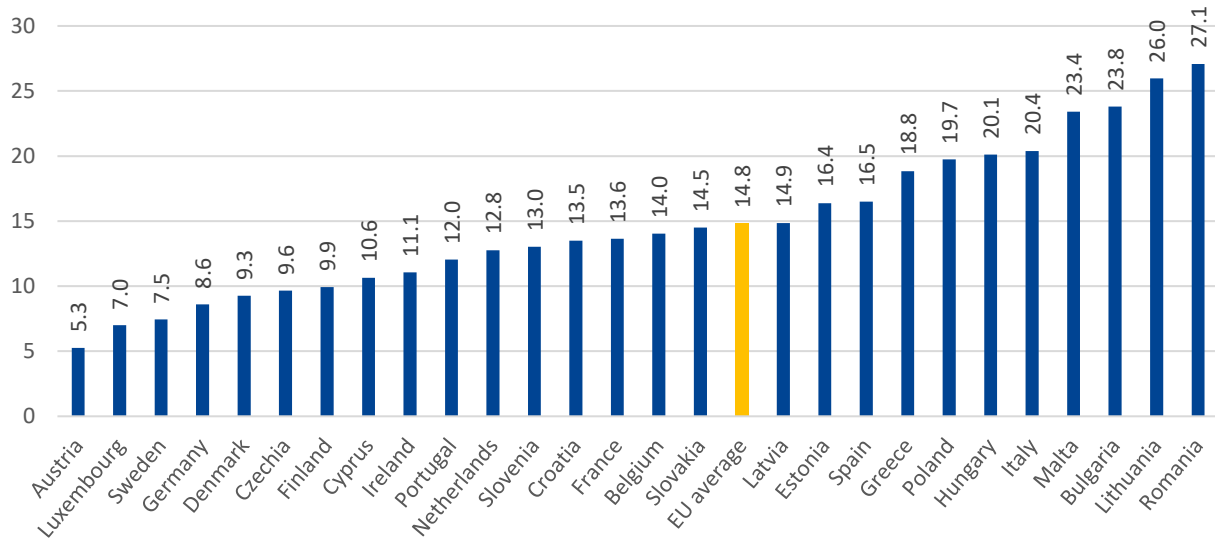
- ▶ Between 2013 and 2019, therefore, there has been a decline in the extent of undeclared work in the EU. Indeed, analysing the changing size of undeclared work between 2013 and 2019 in 26 Member States (estimates could not be produced for Malta in 2013), its magnitude has declined in 19 out of these 26 countries (the exceptions being Romania, Bulgaria, Lithuania, Italy, France, Netherlands and Germany). This displays the progress that has been made in tackling undeclared work both in the EU as a whole and across most Member States.
- ▶ Nevertheless, there remain substantial differences in the relative size of the undeclared economy between the Member States.
 - ▷ Analysing undeclared work as a proportion of total labour input, Romania (21.7 %), Lithuania (20.8 %), and Bulgaria (19.3 %) have the highest levels of undeclared work. The lowest shares were found in Germany (3.9 %), the Netherlands (4.8 %), and Austria (5.1 %). In spite of a few exceptions, countries exceeding the EU average are largely Member States in Central and Eastern Europe.
 - ▷ The ordering of countries is similar when undeclared work is evaluated as a proportion of GVA. The highest shares are evidenced in Romania (27.1 %), Lithuania (26.0 %), and Bulgaria (23.8 %), while the best achievers are Austria (5.3 %), Luxembourg (7.0 %), and Sweden (7.5 %).
- ▶ There are also significant differences in the prevalence of undeclared work in different types of employment relationship.
 - ▷ The proportion of self-employment which is undeclared ranges from as low as 3.6 % in Belgium to as high as 65.2 % in Cyprus.
 - ▷ The proportion of waged employment which is undeclared work is highest in Bulgaria (20.2 %) and lowest in the Netherlands (0.5 %).
 - ▷ The proportion of family work that is undeclared work is highest in Luxembourg (68.9 %), Malta (63.0 %), Cyprus (62.2 %), and Romania (60.1 %) and lowest in Sweden (2.1 %), Italy (2.4 %), Czechia (2.6 %), and Slovakia (3.3 %).
- ▶ Examining the structure of the undeclared labour market in the EU, 62.9 % (61.8 % in 2013) of all undeclared work is waged employment, 36.3 % (37.3 % in 2013) is self-employment and 0.8 % (0.9 % in 2013) is family work. However, there are significant national variations. Countries in which the majority of undeclared work is conducted through self-employment include the Netherlands (90 %), Cyprus (82.2 %), Ireland (71.4 %), and Finland (68.1 %), while those where over 90 % of all undeclared work is waged employment include Poland, Belgium, Bulgaria, and Italy.

4.1 The size of undeclared work in the EU

Figure 2 reveals that **undeclared work represents 14.8 % of GVA in the private sector at the EU level**. However, undeclared work as a proportion of GVA in the private sector varies across the Member States, from as low as 5.3 % of GVA in Austria to as high as 27.1 % in Romania. Despite a few notable exceptions, it is post-socialist and Mediterranean countries that are recording the highest levels of undeclared work as a proportion of GVA. For instance, undeclared work in the private sector accounts for 26.0 % of GVA

in Lithuania, 23.8 % in Bulgaria, 23.4 % in Malta and 20.4 % in Italy. On the other hand, it is lowest in Luxembourg, where only 7.0 % of the official GVA is undeclared work, Sweden (7.5 %) and Germany (8.6 %).

Figure 2. Undeclared work in the private sector as % of total GVA, LIM estimates for 2019



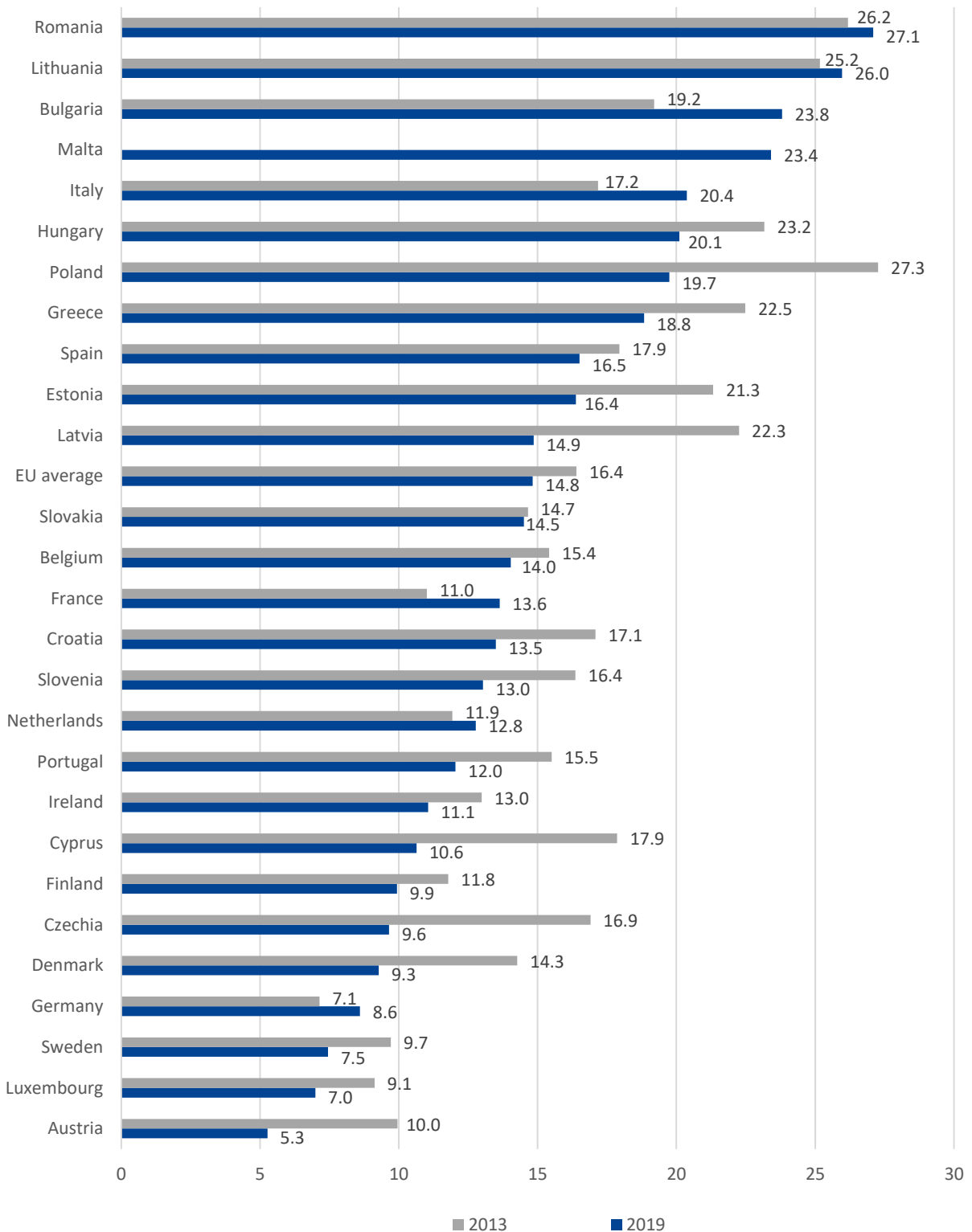
Note: Figure for EU represents an unweighted average
Source: Authors' work

There has been a decline in the extent of undeclared work in the EU from 16.4 % to 14.8 % of GVA between 2013 and 2019. Speaking in terms of weighted averages, which consider the relative size of the labour force in each Member State, **undeclared work in the EU has fallen from 14.9 % to 14.6 % of GVA in the observed period.** Indeed, and as Figure 3 displays, **the magnitude of undeclared work has fallen in 19 out of 26 countries** (note that the earlier wave did not include Malta). **These results display the progress made in tackling undeclared work both in the EU as a whole and across most Member States.**

Romania, Bulgaria, Lithuania, Italy, France, Netherlands and Germany are the only countries in which the portion of GVA which is undeclared work has increased between 2013 and 2019. Nonetheless, some caution is required in interpreting this. As will be shown below, in some of them (namely Italy, Netherlands and Germany), the share of the workforce engaged in undeclared work has decreased, which indicates there has been a structural transformation inside the undeclared economy (i.e., undeclared work has shifted towards more productive sectors and/or towards more productive types of work arrangement).

Figure 3 further reveals that Poland, Latvia, Czechia and Cyprus have been most successful in tackling undeclared work between 2013 and 2019 when measured in terms of its reduction as a proportion of GVA. Undeclared work in Poland accounted for 19.7 % of GVA in 2019, which was 7.6 percentage points less than in 2013. In Latvia the share fell 7.4 percentage points (from 22.3 % to 14.9 %), while in Czechia and Cyprus it fell 7.3 percentage points (from 16.9 % to 9.6 % and from 17.9 % to 10.6 %, respectively).

Figure 3. Undeclared work in the private sector as % of total GVA, 2013 and 2019

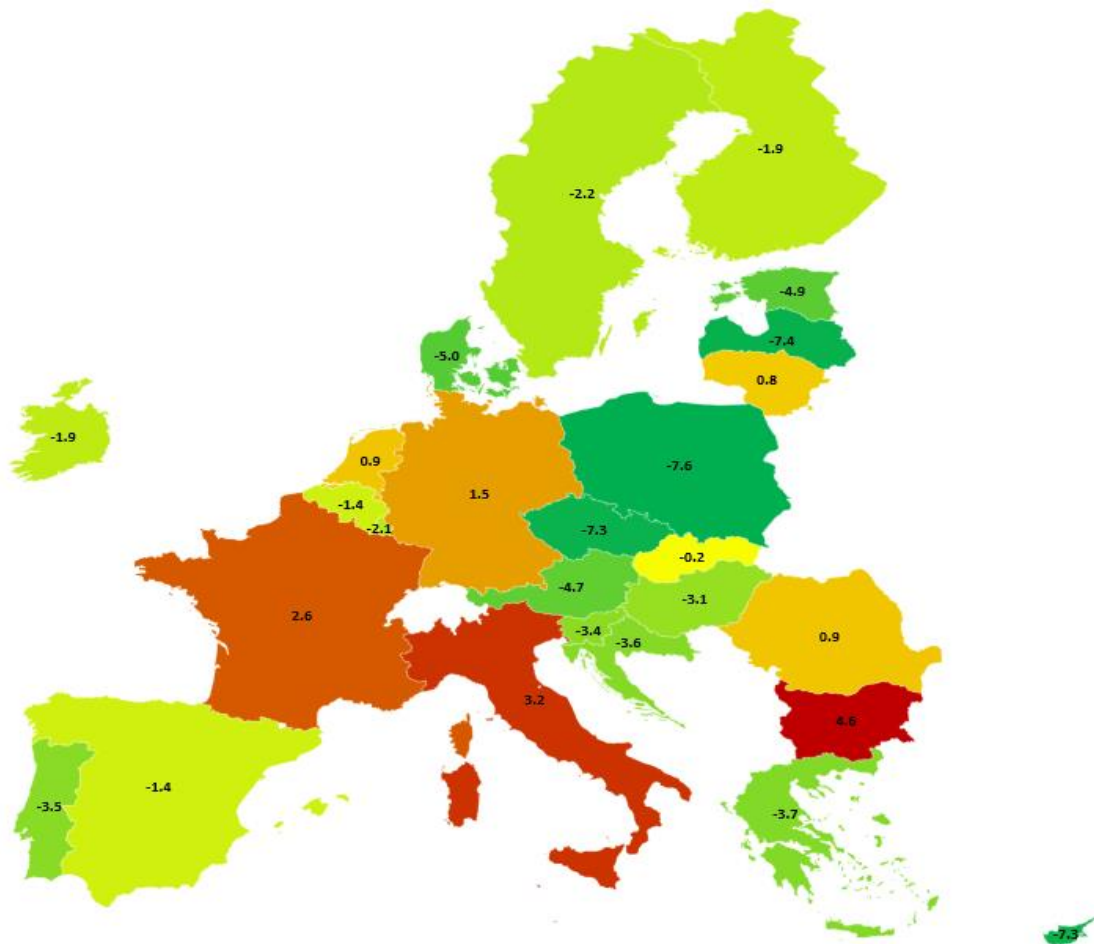


Note: Figures for EU as a whole are unweighted averages

Source: Authors' work

Figure 4 graphically displays these changes between 2013 and 2019 in undeclared work as a proportion of GVA. This shows that besides the ones just mentioned above (namely Poland, Latvia, Czechia and Cyprus), many other Member States in Central and Eastern Europe that have had large undeclared economies have managed to reduce its magnitude to some extent. Some notable examples are Estonia (a -4.9 percentage points decrease), Croatia (-3.6), Slovenia (-3.4) and Hungary (-3.1).

Figure 4. Changes in the share of undeclared work in the private sector (2013-2019), in percentage points



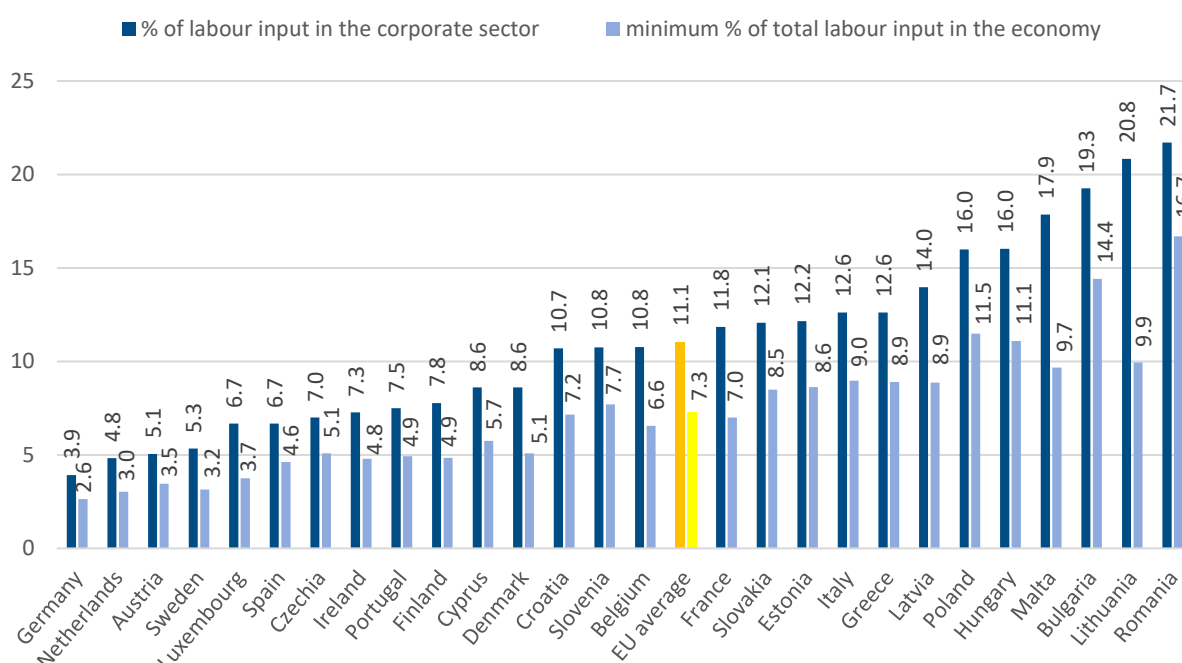
Source: Authors' work

However, this is just one measure of the size of undeclared work and the changes over time. It can also be measured as a percentage of total labour input in the private sector. In 2019, on average, **11.1 % of total labour input in the private sector in the EU is undeclared (compared with 11.6 % in 2013)**. Analysing weighted averages, the share has fallen from 10.2 % to 9.7 % during the observed period. Therefore, there has been a **decline of undeclared work as a proportion of total labour input in the private sector in the EU** between 2013 and 2019.

Figure 5 presents undeclared work as a percentage of total labour input, both for the private sector and for the economy as a whole in each of the Member States⁸. The highest proportions of undeclared work as a percentage of total labour input in the private sector are found in Romania (21.7 %), Lithuania (20.8 %), and Bulgaria (19.3 %), whilst the lowest shares are found in Germany (3.9 %), the Netherlands (4.8 %) and Austria (5.1 %).

Although countries exceeding the EU average of 11.1 % are largely Member States in Central and Eastern Europe, there are some exceptions. Explicitly, Czechia (7.0 %), Croatia (10.7 %) and Slovenia (10.8 %) have below-average shares of undeclared work. At the same time, France (11.8 %), Italy (12.6 %) and Greece (12.6 %) are the only Member States that joined the EU before 2004 in which undeclared work accounts for shares higher than the EU average. However, this is true only when the analysis is restricted to the private sector. The results are different when the whole economy is examined (e.g., France falls below the average).

Figure 5. Undeclared work in the EU in terms of the labour input, LIM estimates for 2019



Note: Figures for EU as a whole are unweighted averages. The word ‘minimum’ signals that the real shares are probably somewhat larger, as explained in section 3.5.

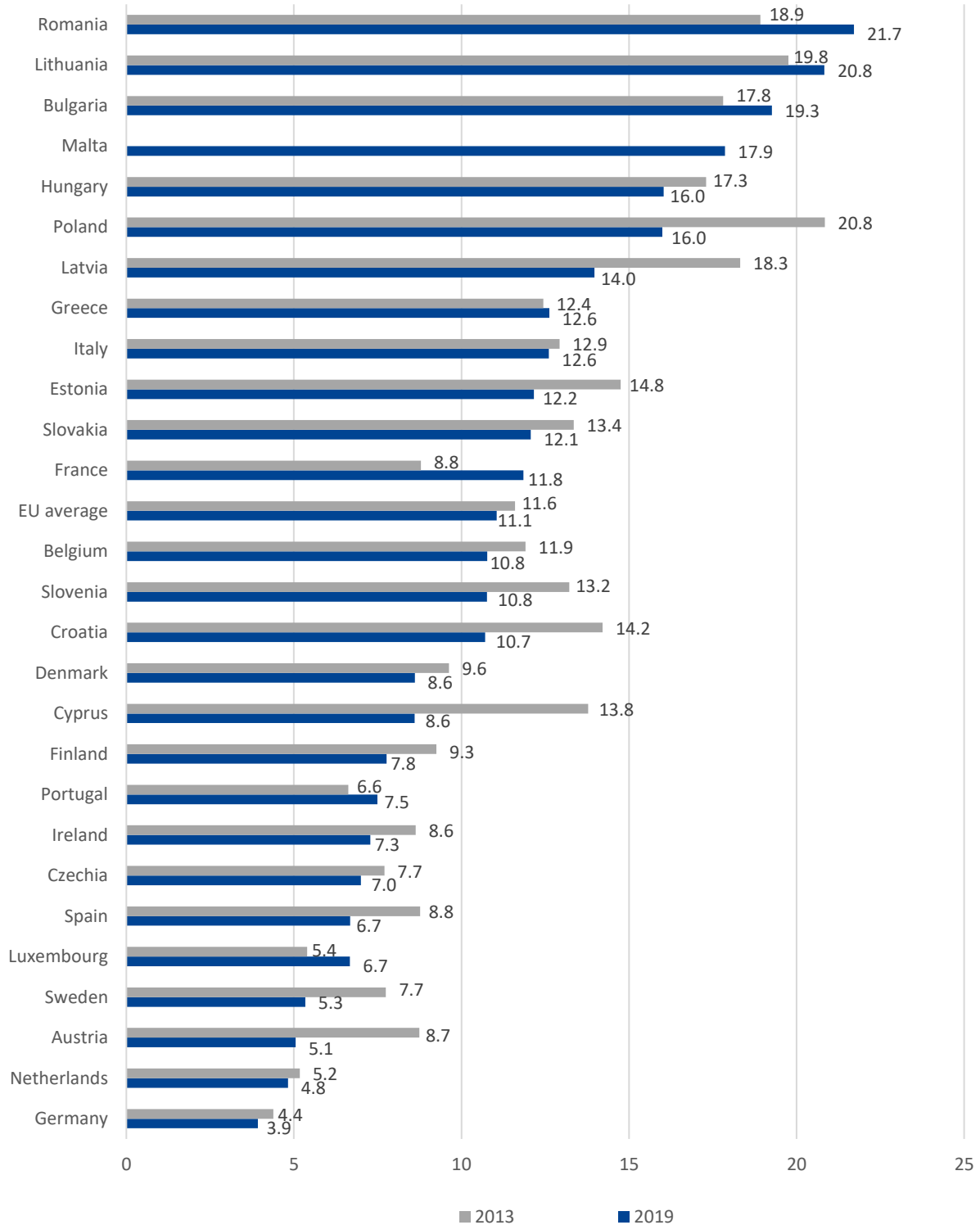
Source: Authors’ work

Comparing the magnitude of undeclared work as a percentage of labour input in the private sector in 2013 and 2019, Figure 6 reveals that **undeclared work has decreased as a percentage of labour input in the private sector in 19 countries**. Those where undeclared work as a percentage of labour input in the private sector increased include France (+3.0 percentage points), Romania (+2.8), Bulgaria (+1.5), Luxembourg (+1.3), Lithuania (+1.0), Portugal (+0.9), and Greece (+0.2). Although the results for Portugal and Luxembourg seem to contradict the findings with respect to the shares of GVA, this is not the case. Productivity differs significantly not only between sectors but also between different types of employment

⁸ The latter was calculated by dividing the estimated undeclared labour input by the total labour input across the economy (i.e., including the public sector). Since undeclared work can appear in the public sector as well, these figures essentially represent lower boundaries of the real extent of undeclared work in the economy.

arrangement. For instance, family workers commonly exhibit lower productivity than self-employed and dependent employees. Any change in the structure of the undeclared workforce therefore manifests itself in the results in terms of the size of undeclared work as a percentage of GVA, even if the numbers with respect to the labour input stay unchanged.

Figure 6. Undeclared work in the private sector as % of the labour input, 2013 and 2019



Note: Figures for EU as a whole are unweighted averages
Source: Authors' work

Figure 7 graphically displays the geography of these changes in undeclared work as a percentage of labour input in the private sector between 2013 and 2019. The highest falls are found in Cyprus (a -5.2 percentage points decline in undeclared work as a percentage of labour input in the private sector), Poland (-4.8), and Latvia (-4.3). Notable improvements are also noticeable in older Member States, with Austria (-3.6), Sweden (-2.4) and Spain (-2.1) having the largest percentage point declines in undeclared work as a proportion of labour input in the private sector.

Figure 7. Changes in the share of undeclared labour input in the private sector (2013-2019), in percentage points



Source: Authors' work

4.2 Undeclared work by type of employment relationship

There are also marked differences in the prevalence of undeclared work in different types of employment relationship. Table 2 gives a detailed overview of the extent of undeclared work in different types of employment relationship, namely self-employment, waged employment, and family work.

Starting with **dependent employees**, the highest share of waged employment in the private sector that is undeclared as a percentage of total labour input is found in Bulgaria (20.2 % of waged employment is undeclared measured as a share of total labour input), Lithuania (19.1 %), Romania (18.8 %), and Poland (18.1 %). It is lowest in the Netherlands (where just 0.5 % of waged employment in the private sector is

undeclared measured as a share of total labour input), Cyprus (1.3 %), Germany (2.4 %), and Ireland (2.4 %). Considering waged employment alone, the proportion that is undeclared is much higher in Central and Eastern Europe. The exceptions are Greece, Italy and Belgium, which are the only Member States that joined the EU before 2004 with incidence rates above 10 %.

Table 2. Undeclared work in the private sector in the EU, LIM estimates 2019

Country	% of total labour input in the private sector				
	Total	Self-employed	Dependent employees	Family workers	% of GVA in the private sector
Romania	21.7	62.5	18.8	60.1	27.1
Lithuania	20.8	35.9	19.1	33.7	26.0
Bulgaria	19.3	12.2	20.2	4.5	23.8
Malta	17.9	45.6	10.4	63.0	23.4
Hungary	16.0	25.0	14.8	35.0	20.1
Poland	16.0	4.6	18.1	5.7	19.7
Latvia	14.0	55.8	10.2	59.9	14.9
Greece	12.6	13.3	12.2	14.9	18.8
Italy	12.6	4.1	16.1	2.4	20.4
Estonia	12.2	43.5	7.8	40.7	16.4
Slovakia	12.1	15.9	11.3	3.3	14.5
France	11.8	48.9	6.3	55.9	13.6
Belgium	10.8	3.6	12.3	14.0	14.0
Slovenia	10.8	9.2	11.0	9.2	13.0
Croatia	10.7	21.4	9.5	34.6	13.5
Denmark	8.6	54.7	3.4	52.0	9.3
Cyprus	8.6	65.2	1.3	62.2	10.6
Finland	7.8	43.7	2.8	39.5	9.9
Portugal	7.5	21.1	4.8	20.2	12.0
Ireland	7.3	31.7	2.4	30.2	11.1
Czechia	7.0	6.8	7.1	2.6	9.6
Spain	6.7	14.5	4.5	14.0	16.5
Luxembourg	6.7	48.0	3.7	68.9	7.0
Sweden	5.3	15.8	3.9	2.1	7.5
Austria	5.1	10.7	4.4	10.9	5.3
Netherlands	4.8	22.0	0.5	16.3	12.8
Germany	3.9	15.9	2.4	5.0	8.6

Source: Authors' work

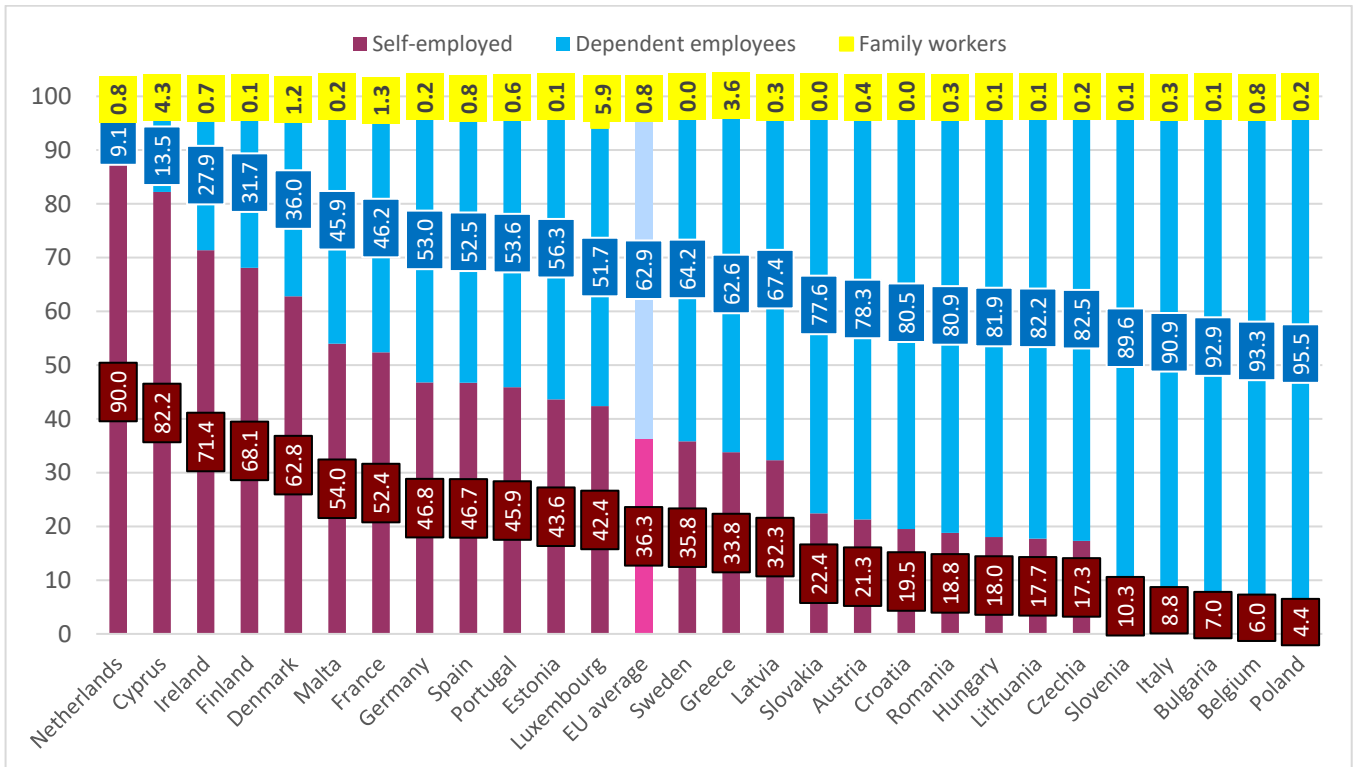
The differences between countries are even more acute when self-employment and family work are considered. The proportion of **self-employment** that is undeclared (measured as a share of their total labour input) ranges from only 3.6 % in Belgium to 65.2 % in Cyprus. Other countries with low levels of undeclared work among the self-employed are Italy (4.1 %), Poland (4.6 %), Czechia (6.8 %), and Slovenia (9.2 %). Undeclared work among the self-employed is higher in Romania (62.5 %), Latvia (55.8 %), and Denmark (54.7 %).

Turning to **family workers**, the proportion declared is lowest in Luxembourg (with 68.9 % of their labour input being undeclared), Malta (63.0 %), Cyprus (62.2 %), and Romania (60.1 %), whilst the proportion declared is highest in Sweden (with just 2.1 % of their labour input being undeclared), Italy (2.4 %), Czechia (2.6 %), and Slovakia (3.3 %).

4.3 Structure of the undeclared labour market

Figure 8 reveals the structure of the undeclared labour market and how this significantly varies across Member States. In the EU, **the proportion of undeclared labour input that is waged employment is 62.9 %**. This is an increase in comparison with 2013 when this share accounted for 61.8 % (Williams et al., 2017). Meanwhile, **36.3 % of undeclared labour input is self-employment** at the EU level, which is one percentage point less than in 2013, and the proportion of undeclared labour input that is **family work is 0.8 %** in 2019 (0.9 % in 2013).

Figure 8. Undeclared work by type of employment, LIM estimates for 2019



Note: Figures for EU as a whole are unweighted averages
Source: Authors' work

Nevertheless, the differences in the structure of the undeclared labour market across Member States are significant. For instance, the bulk of undeclared work is conducted by self-employed individuals in the Netherlands (90 % of all undeclared work), Cyprus (82.2 %), Ireland (71.4 %), and Finland (68.1 %). On the other hand, in Poland, Belgium, Bulgaria, and Italy more than 90 % of undeclared work is undertaken through waged employment. Family work represents a negligible slice of undeclared work in most countries. Luxembourg, Greece, and Cyprus are the only Member States in which this share exceeds 2 %.

These differences in the structure of the undeclared workforce across the EU have significant implications for tackling undeclared work. For instance, countries where undeclared work predominantly occurs through self-employment may find it more beneficial to prioritize policy initiatives encouraging businesses to start-up legitimately and making it easier and more beneficial for businesses to shift towards becoming fully legitimate. In contrast, countries where waged employment is the main contributor to undeclared work will find it more beneficial to focus upon policy measures that make unregistered and under-declared employment more expensive and/or less appealing.

5.0 Correlations between undeclared work and structural conditions

This section evaluates the relationship between cross-national variations in the extent of undeclared work and cross-national variations in economic and social structural conditions.

Key conclusions

- ▶ Various structural conditions are strongly correlated with the growth or decline of undeclared work.
- ▶ The finding is that significantly lower levels of undeclared work are found in Member States where there exist:
 - ▷ Higher government effectiveness and lower perceived levels of corruption.
 - ▷ Higher levels of development (whether measured in terms of GDP per capita, the Human Development Index or Social Progress Index) and greater levels of state intervention in work and welfare (to enhance workers' rights and labour productivity, investments in research and development and implementing measures for reducing poverty and inequalities).
 - ▷ Higher quality more powerful formal institutions (higher reliability of policy services, higher judicial independence, stronger rule of law, stronger voice and accountability, positive perception towards the regulatory quality and higher trust in the state institutions).
 - ▷ Lower levels of instability and uncertainty in formal institutions (better transparency in policymaking and reduced perception of political instability).
 - ▷ Greater symmetry between the norms, values and beliefs of citizens, workers, employers and businesses and the formal rules (sometimes termed "vertical trust" and measured by the level of tax compliance, and the acceptability of undeclared work) and a higher trust in peers to adhere to the formal rules (sometimes termed "horizontal trust" and measured by personally knowing people engaged in undeclared work and their estimates of the share of undeclared work).

5.1 Structural determinants of undeclared work in the EU

In recent years, there has been growing recognition that there are various structural determinants of the scale of undeclared work. In a 2020 Platform report that provides a comprehensive literature review of previous studies on the structural conditions associated with the growth or decline of undeclared work in the EU,⁹ the structural economic and social conditions found to significantly determine the extent of undeclared work were grouped as follows:

- ▶ Formal institutional failings:
 - i. The lack of modernisation of government organisations (measured by government effectiveness) and persistence of public sector corruption (measured by the Corruption Perception Index and control of corruption), or what is termed formal institutional misallocations and inefficiencies.

⁹ Williams, C.C. and Horodnic, I. (2020) *Horizon scanning: early warning signals of future trends in undeclared work*, European Commission, Brussels

- ii. Lower levels of “development” (measured by GDP (current prices, euro per capita), Human Development Index and Social Progress Index); lower levels of state intervention in work and welfare provision (measured by the burden of government regulation, workers’ rights, business flexibility index, expense of government, research & development expenditure, tax revenue, social contributions, impact of social transfers on poverty reduction, labour market policy (LMP) expenditure) and higher levels of poverty and inequality (measured by people at risk of poverty/social exclusion, severe material deprivation rate, inequality of income distribution in terms of the income quintile share ratio, Gini coefficient and labour productivity), or what is termed formal institutional voids and weaknesses.
 - iii. Higher quality more powerful formal institutions, measured by the reliability of police services, judicial independence, rule of law, regulatory quality, voice and accountability, trust in government, trust in parliament, trust in tax and social security authorities and trust in labour inspectorate.
 - iv. Formal institutional instability and uncertainty, measured by the Democracy Index and political stability.
- ▶ Informal institutional failings, including the asymmetry between the norms, values and beliefs of citizens, workers, employers and businesses and the formal rules (sometimes termed “vertical trust” and measured by the level of tax compliance, and the acceptability of undeclared work) and a lack of trust in peers to adhere to the formal rules (sometimes termed “horizontal trust” and measured by personally knowing people engaged in undeclared work and their estimates of the share of undeclared work).

Evaluating whether the cross-national variations in the size of undeclared work (using the LIM estimate of the extent of undeclared work as a percentage of total labour inputs in the private sector) and the cross-national variations in the economic and social structural conditions listed above (see Table A1 in the Annex for the indicators used to measure each), the findings are as follows **ranked in order of the strength of the correlation**¹⁰ (see Table A2 in the Annex for the results).

A “strong” negative significant relationship, ranked in order of the strength of the correlation, is identified between the prevalence of undeclared work and:

- ▶ Social Progress Index ($r_s = -.761^{***}$), as a measure of the lower level of development
- ▶ Democracy Index ($r_s = -.751^{***}$), as a measure of formal institutional uncertainty and instability.
- ▶ GDP per capita ($r_s = -.725^{***}$), as a measure of the lower level of development.
- ▶ Corruption Perceptions Index ($r_s = -.710^{***}$), as a measure of the perceived higher level of public sector corruption.
- ▶ Human Development Index ($r_s = -.706^{***}$), as a measure of the lower level of development.
- ▶ Rule of law ($r_s = -.704^{***}$), as a measure of the powerlessness of formal institutions.
- ▶ Government effectiveness ($r_s = -.699^{***}$), as a measure of the lower level of modernisation of government institutions.
- ▶ Control of corruption ($r_s = -.695^{***}$), as a measure of the higher level of public sector corruption.
- ▶ Regulatory quality ($r_s = -.691^{***}$), as a measure of the lower level of modernisation of government institutions.

¹⁰ The strength of the correlation/ relationship is assessed based on the Spearman’s rho coefficient (the descriptors apply to both, positive and negative relationships): 0.81 to 1 very strong relationship, 0.61 to 0.80 – strong relationship, 0.41 to 0.60 – moderate relationship, 0.21 to 0.40 – weak relationship, 0.01 to 0.20 – very weak or negligible relationship. The significance of the relationship is given by the p value and it is significant at: *** p<0.01, ** p<0.05, * p<0.1.

- ▶ Voice and accountability ($r_s = -.690^{***}$), as a measure of the powerlessness of formal institutions.
- ▶ social capital ($r_s = -.638^{***}$), as a measure of informal institutional failings.
- ▶ Judicial independence ($r_s = -.636^{***}$), as a measure of the powerlessness of formal institutions.
- ▶ Reliability of police services ($r_s = -.610^{***}$), as a measure of the powerlessness of formal institutions.

A **“strong” positive** significant relationship is identified between the prevalence of undeclared work and severe material deprivation rate ($r_s = .701^{***}$), as a measure of the high level of poverty.

A **“moderate” negative** significant relationship between cross-national variations in undeclared work (using the LIM estimates) and the following structural conditions is identified, ranked in order of the strength of the correlation:

- ▶ Research & Development expenditure ($r_s = -.578^{***}$), as a measure of a lower level of state intervention in the economy
- ▶ Estimated share of undeclared work ($r_s = -.574^{***}$), as a measure of trust in one’s peers to act according to the formal rules.
- ▶ Labour productivity ($r_s = .550^{***}$), as a measure of a lower level of state intervention in the economy.
- ▶ Trust in parliament ($r_s = -.502^{***}$), as a measure of trust in formal institutions.
- ▶ Workers’ rights ($r_s = -.460^{**}$), as a measure of a lower level of state intervention in the economy.
- ▶ Impact of social transfers on poverty reduction ($r_s = -.446^{**}$), as a measure of a lower level of state intervention in welfare provision.
- ▶ Acceptability towards undeclared work by firm for firm ($r_s = -.422^{**}$), as a measure of adherence to the formal rules.
- ▶ Trust in government ($r_s = -.420^{**}$), as a measure of trust in formal institutions.

A **“moderate” positive** significant relationship between cross-national variations in undeclared work (using the LIM estimates) and the following structural conditions is identified, ranked in order of the strength of the correlation:

- ▶ Labour productivity ($r_s = .550^{***}$), as a measure of a lower level of state intervention in the economy. People at risk of poverty/social exclusion ($r_s = .516^{***}$), as a measure of higher levels of poverty.

There is a **“weak” negative** but significant relationship between cross-national variations in undeclared work (using the LIM estimates) and the following structural conditions ranked in order of the strength of the correlation:

- ▶ Acceptability of undeclared work by firm for private household ($r_s = -.396^{**}$), as a measure of adherence to the formal rules.
- ▶ Political stability ($r_s = -.392^{**}$), as a measure of formal institutional uncertainty and instability.
- ▶ Trust in Labour inspectorate ($r_s = -.377^{*}$), as a measure of trust in government.
- ▶ Burden of government regulation ($r_s = -.373^{*}$), as a measure of a lower level of state intervention in the economy.
- ▶ Trust in Tax and Social Security authorities ($r_s = -.367^{*}$), as a measure of trust in government.
- ▶ Acceptability towards someone partially or completely conceals their income ($r_s = -.346^{*}$), as a measure of adherence to the formal rules.

- ▶ Tax compliance ($r_s = -.326^*$), as a measure of adherence to the formal rules.
- ▶ Acceptability of firms hiring workers on undeclared basis ($r_s = -.267$), as a measure of adherence to the formal rules.

There is a **“weak” positive** but significant relationship between cross-national variations in undeclared work (using the LIM estimates) and the following structural conditions ranked in order of the strength of the correlation:

- ▶ Inequality of income distribution ($r_s = .370^*$), as a measure of higher levels of inequality.
- ▶ Gini coefficient distribution ($r_s = .364^*$), as a measure of higher levels of inequality.

There is a **very weak negative or no significant relationship** between cross-national variations in undeclared work (using the LIM estimates) and the following structural conditions:

- ▶ Business flexibility index ($r_s = -.178$), as a measure of state intervention in the economy.
- ▶ Tax revenue ($r_s = -.105$), as a measure of state intervention in work and welfare.
- ▶ Social contributions ($r_s = -.098$), as a measure of state intervention in welfare provision.
- ▶ Personally know people engaged in undeclared work ($r_s = -.096$), as a measure of trust in one’s peers to act according to the formal rules.
- ▶ Acceptability of an individual doing undeclared work for a private household ($r_s = -.059$), as a measure of adherence to the formal rules.

There is a **very weak positive or no significant relationship** between cross-national variations in undeclared work (using the LIM estimates) and the expense of government ($r_s = .094$), as a measure of state intervention in work and welfare.

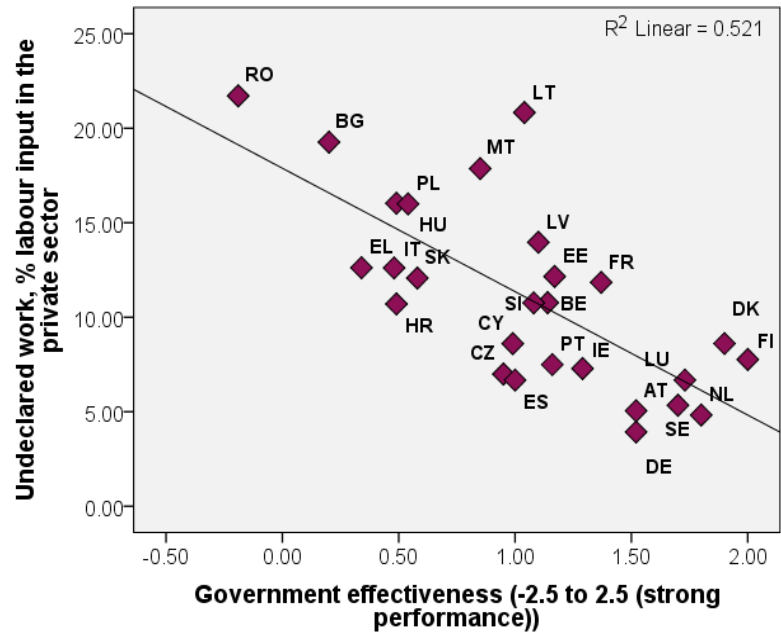
To better understand these results, Figures 9 to 22 below graphically portray the association between the cross-national variations in undeclared work and the cross-national variation in those structural conditions.

5.2 Government ineffectiveness and public sector corruption

Figure 9 charts the cross-national variations in the size of the undeclared economy using the LIM estimates (% of total labour inputs in the private sector) and cross-national variations in government effectiveness (which captures perceptions of the quality of public services, the civil service and their independence from political pressure as well as government commitments to policy formulation and implementation). This reveals a strong correlation between cross-national variations in the perceived government effectiveness and cross-national variations in the prevalence of undeclared work, measured by Spearman’s rank correlation coefficient ($r_s = -.699^{***}$). The greater the perceived effectiveness of the government, the lower is the prevalence of undeclared work. Countries such as Romania, Bulgaria and Greece with a perception of weaker government effectiveness have higher levels of undeclared work, whilst countries where the government effectiveness is perceived as stronger (e.g., Netherlands, Denmark, Finland) have lower levels of undeclared work.

Figure 9. Relationship between undeclared work and government effectiveness, 2019

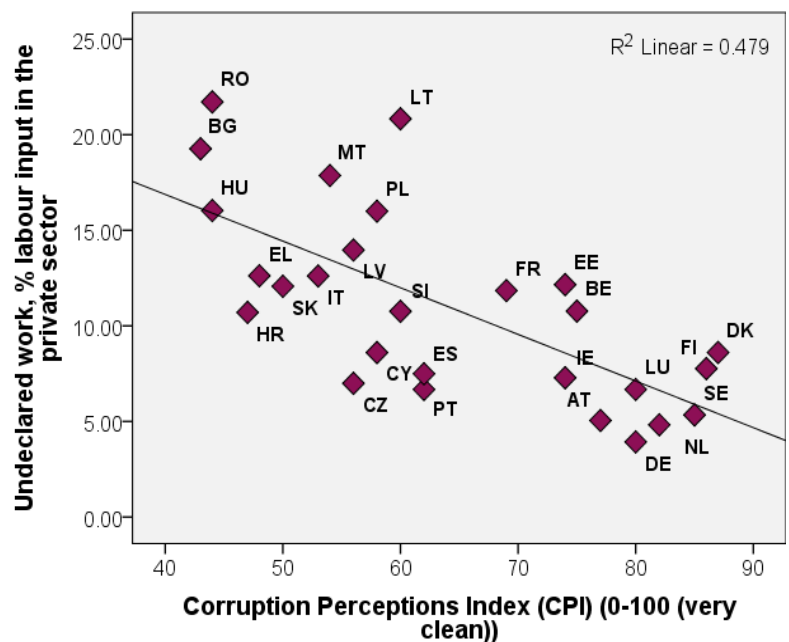
Source: own calculations based on data from World Bank, *The Worldwide Governance Indicators (WGI)*



There is also a strong significant correlation between cross-national variations in the level of undeclared work and cross-national variations in the perceived levels of corruption, measured using Transparency International's Corruption Perceptions Index (see Figure 10). A country's score indicates the perceived level of public sector corruption on a scale of 0 - 100, where 0 means a country is perceived as highly corrupt and 100 means it is perceived as very clean. A country is ranked relative to other countries in the index. The higher is the perceived level of public sector corruption, the higher is the level of undeclared work ($r_s = -.710^{***}$). Countries such as Bulgaria, Romania and Hungary with perceptions of greater public sector corruption have higher levels of undeclared work, whilst countries where the public sector is perceived as rather clean (e.g., Sweden, Finland, Denmark) have relatively lower levels of undeclared work.

Figure 10. Relationship between undeclared work and Corruption Perceptions Index (CPI), 2019

Source: own calculations based on data from Transparency International - *Corruption Perceptions Index (CPI)*



5.3 Level of development and state intervention in work and welfare

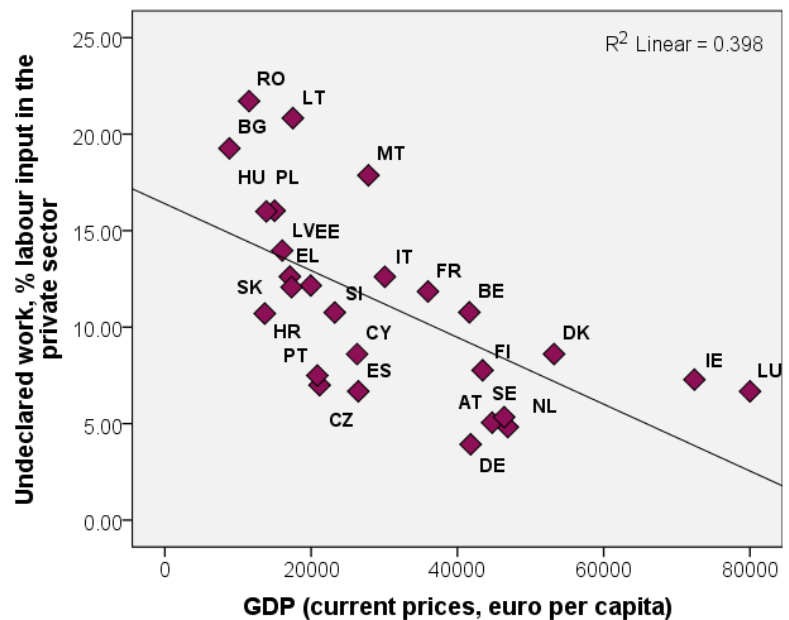
Starting with the level of development, Figure 11 displays the cross-national variations in the size of the undeclared economy (using the LIM estimates of undeclared work as a percentage of total labour inputs in the private sector) and cross-national variations in GDP per capita (current prices, euro per capita). This reveals a strong correlation between cross-national variations in the level of GDP per capita (current prices, euro per capita) and cross-national variations in the prevalence of undeclared work, measured by Spearman’s rank correlation coefficient ($r_s = -.725^{***}$). The greater the level of GDP per capita (current prices, euro per capita), the lower is the prevalence of undeclared work. Countries such as Bulgaria and Romania with relatively lower levels of GDP per capita have higher levels of undeclared work, whilst countries with relatively higher levels of GDP per capita (e.g., Denmark, Ireland, Luxembourg) have relatively lower levels of undeclared work.

The same strong relationship is found for other alternative measures of “development” such as the Social Progress Index ($r_s = -.761^{***}$) and Human Development Index ($r_s = -.706^{***}$).

Figure 11. Relationship between undeclared work and GDP (current prices, euro per capita), 2019

Note: To avoid excessive influence, the GDP of Luxembourg was capped at 80000 (from 100360) in the analyses presented here.

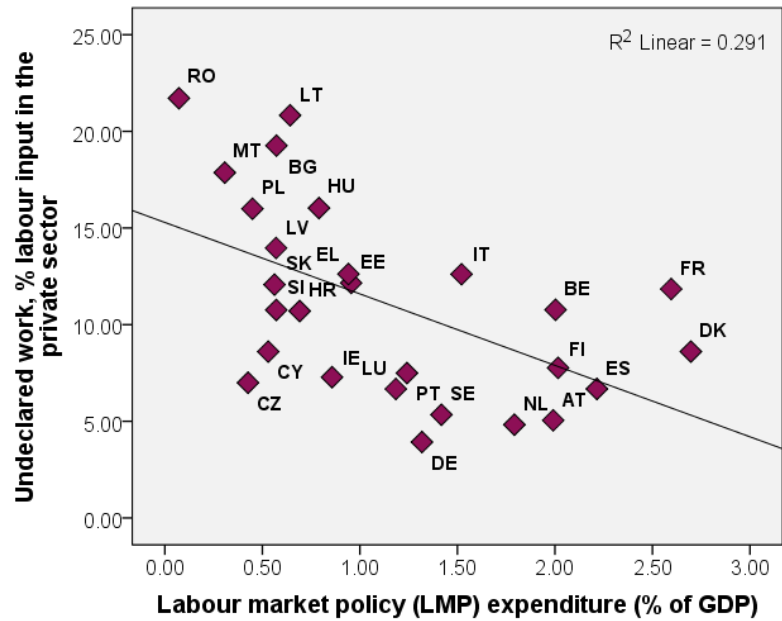
Source: own calculations based on data from Eurostat database



Turning to the association between state intervention in work and welfare and the prevalence of undeclared work, Figure 12 and Figure 13 display the results for two structural determinants, namely active labour market policy expenditure and the severe material deprivation rate. As Figure 12 reveals, Member States in which there are higher levels of state intervention in work and welfare have relatively lower levels of undeclared work. The finding is that the higher the labour market policy expenditure (as a % of GDP) on labour market policy (LMP) interventions covering the range of financial and practical supports offered by governments to people who are unemployed or otherwise disadvantaged in the labour market, the lower is the level of undeclared work ($r_s = -.515^{***}$).

Figure 12. Relationship between undeclared work and Labour market policy (LMP) expenditure (% of GDP), 2019

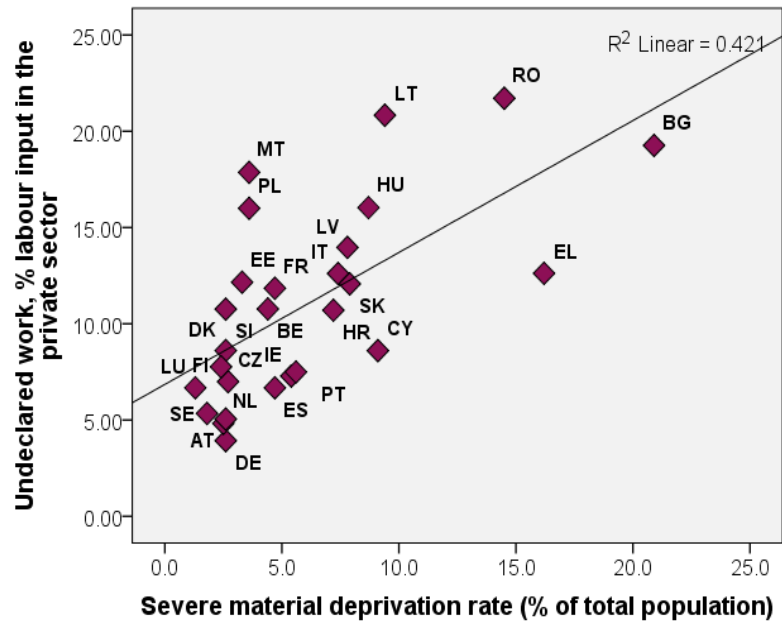
Source: own calculations based on data from European Commission (Directorate-General for Employment, Social Affairs and Inclusion)



There is also a close association between the prevalence of undeclared work and the severe material deprivation rate (as per cent of total population). The finding is that the higher the per cent of the total population facing severe material deprivation, the higher is the level of undeclared work ($r_s = .701^{***}$). Countries such as Bulgaria, Greece and Romania with relatively high per cent of the total population facing severe material deprivation have higher levels of undeclared work, whilst countries with relatively low percentage of people from total population facing severe material deprivation (e.g., Finland, Sweden, Luxembourg) have relatively lower levels of undeclared work (Figure 13).

Figure 13. Relationship between undeclared work and severe material deprivation rate (% of total population), 2019

Source: own calculations based on data from Eurostat database



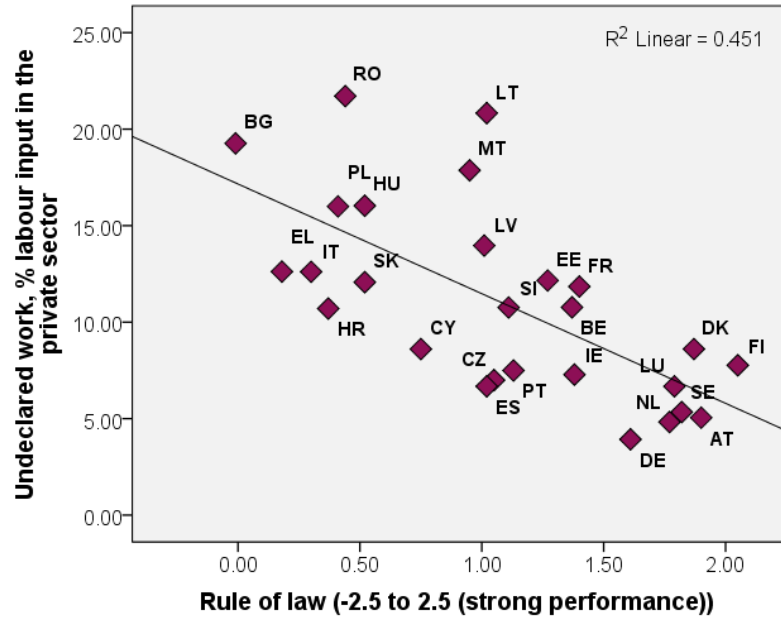
5.4 Quality and power of formal institutions

In terms of the formal institution power in formulating laws and regulations and making people abide by them, many structural conditions are associated with the prevalence of undeclared work. As Figure 14 and Figure 15 display, both the rule of law and regulatory quality are associated with the level of undeclared work. The rule of law reflects perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the

quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence. The finding is that a strong correlation exists between cross-national variations in the perception of the rule of law and cross-national variations in the prevalence of undeclared work, measured by Spearman's rank correlation coefficient ($r_s = -.704^{***}$). Member States such as Bulgaria and Greece where the rule of law is perceived as weaker have higher levels of undeclared work than Member States where the rule of law is perceived as stronger, such as Denmark, Austria and Finland.

Figure 14. Relationship between undeclared work and Rule of law, 2019

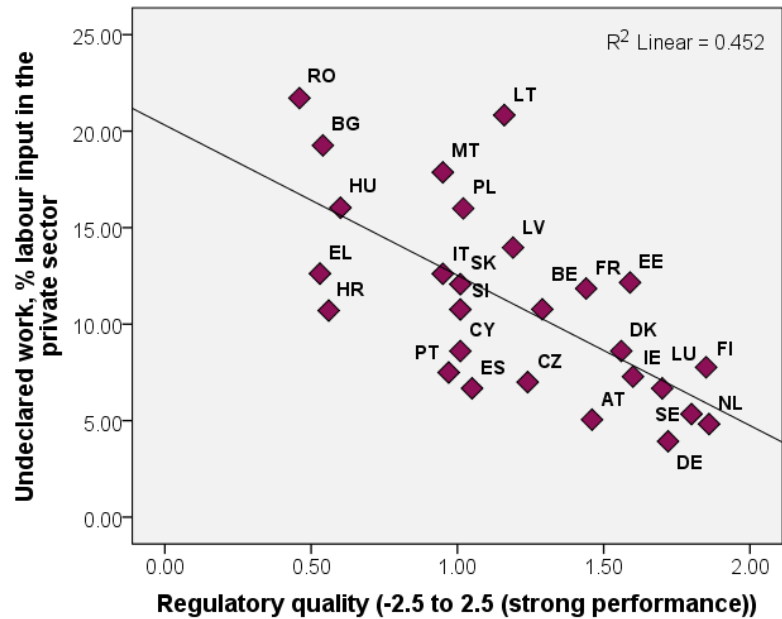
Source: own calculations based on data from World Bank, *The Worldwide Governance Indicators (WGI)*



There is also a close association between the prevalence of undeclared work and regulatory quality, reflecting the perceptions of the ability of government to formulate and implement sound policies and regulations that permit and promote private sector development. The stronger the perceived governance performance in terms of regulatory quality, the lower the level of undeclared work ($r_s = -.691^{***}$). Member States such as Romania, Greece and Bulgaria where governance performance in terms of regulatory quality is perceived as weaker have higher levels of undeclared work than Member States where the governance performance is perceived as stronger, such as Sweden, Finland and the Netherlands (Figure 15).

Figure 15. Relationship between undeclared work and Regulatory quality, 2019

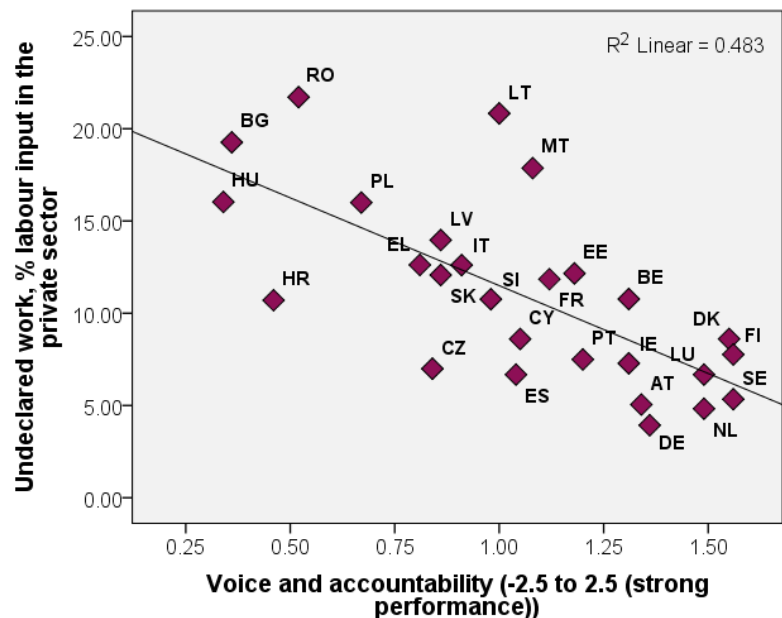
Source: own calculations based on data from World Bank, *The Worldwide Governance Indicators (WGI)*



The prevalence of undeclared work is also strongly correlated with the voice and accountability indicator which reflects perceptions of the extent to which citizens feel able to participate in selecting their government, their freedom of expression, freedom of association, and the perceived existence of a free media ($r_s = -.690^{***}$). As Figure 16 displays, Member States such as Hungary, Bulgaria, Croatia and Romania where the voice and accountability indicator is relatively lower have higher levels of undeclared work, whilst the opposite is the case for the Member States such as Denmark, Sweden and Finland where voice and accountability indicator have relatively higher values.

Figure 16. Relationship between undeclared work and voice and accountability, 2019

Source: own calculations based on data from World Bank, *The Worldwide Governance Indicators (WGI)*

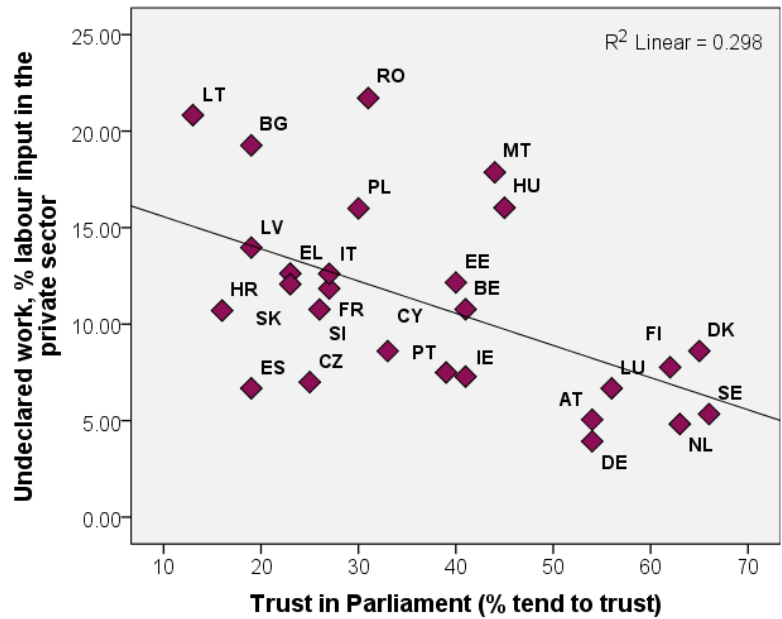


To further compound the view that the power of the formal institutions is an important determinant of undeclared work, and how perceptions of public sector corruption can lead to higher levels of undeclared work by discouraging citizens from adhering the formal rules, the relationship between trust in authorities and level of undeclared work is here analysed. As Figure 17 displays, the level of trust in parliament is significantly correlated with the prevalence of undeclared work (moderate association, $r_s = -.502^{***}$). Member States such as Bulgaria, Croatia and Lithuania

where trust in parliament is lower have higher levels of undeclared work, whilst Member States such as the Netherlands, Denmark and Sweden where trust in parliament is higher have lower levels of undeclared work.

Figure 17. Relationship between undeclared work and trust in Parliament (% tend to trust), 2019

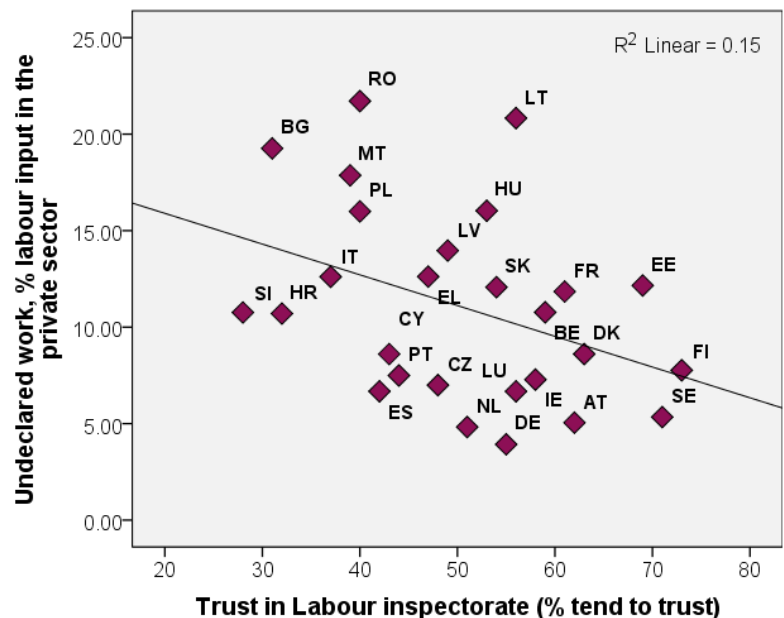
Source: own calculations based on data from Standard Eurobarometer 92 - Public opinion in the European Union, Autumn 2019



Similar results are obtained when analysing the level of trust in the institutions charged with tackling undeclared work, namely labour inspectorates and the levels of undeclared work (weak but significant association, $r_s = -.377^*$). As Figure 18 displays, in countries where there is greater trust in labour inspectorates, the levels of undeclared work are lower.

Figure 18. Relationship between undeclared work and trust in labour inspectorate (% tend to trust), 2019

Source: own calculations based on data from Special Eurobarometer 498 - Undeclared Work in the European Union, 2019



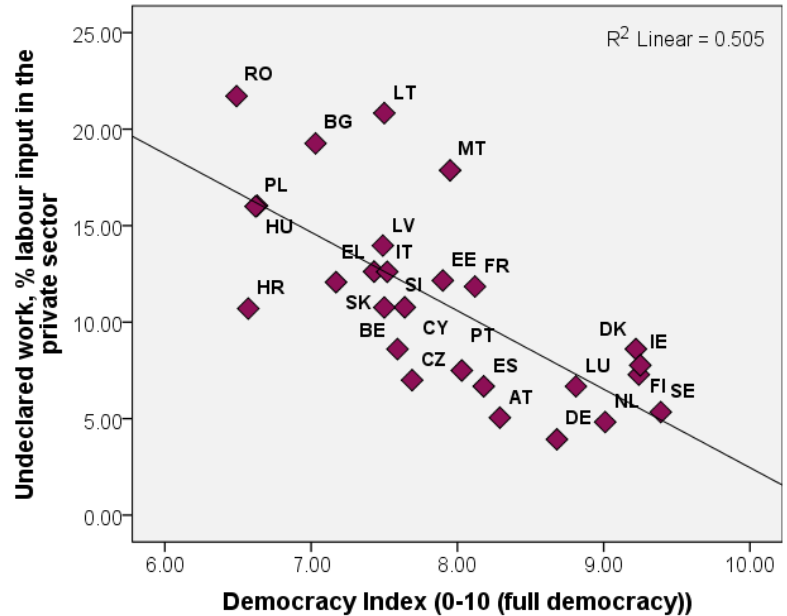
5.5 Instability and uncertainty of formal institutions

Moving to the formal institutional instability and uncertainty, the Democracy Index is analysed. The Economist Intelligence Unit's Democracy Index is based on five categories (electoral process and pluralism, civil liberties, the functioning of government, political participation, and political culture) ranging up to 10 which represents full

democracy. As Figure 19 displays, the finding is that a strong correlation exists between the Democracy Index value and the prevalence of undeclared work ($r_s = -.751^{***}$). Member States such as Romania, Croatia and Poland where the Democracy Index scores lower have higher levels of undeclared work, whilst Member States such as Ireland, Finland and Sweden where the scores are higher have lower levels of undeclared work.

Figure 19. Relationship between undeclared work and Democracy Index, 2019

Source: own calculations based on data from The Economist Intelligence Unit - Democracy Index

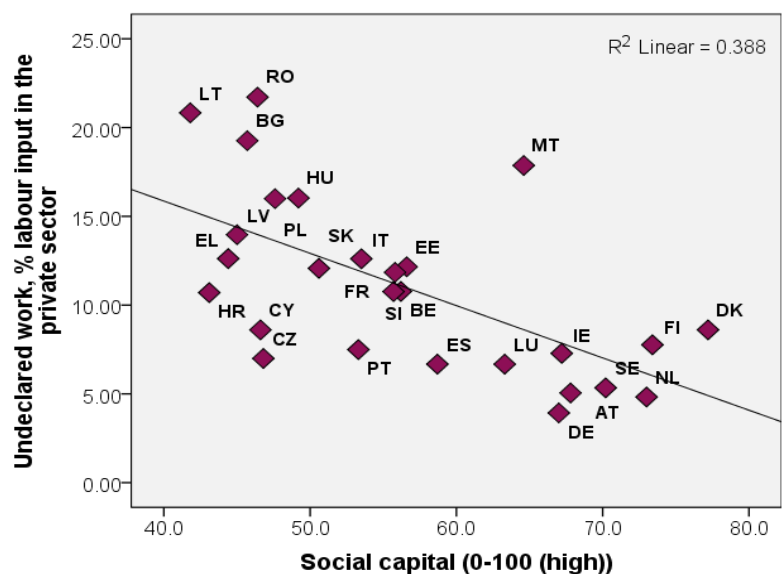


5.6 Lack of adherence to the formal rules and trust in peers

It is also the case that the level of undeclared work is closely associated with structural conditions reflecting the *informal institutions* (values, beliefs and norms) of the Member States' citizens. There is a strong association between the level of undeclared work and the level of social capital, measuring the strength of personal and social relationships, social norms, and civic participation in a country. The greater the level of social capital, the lower is the level of undeclared work ($r_s = -.638^{***}$), as displayed in Figure 20.

Figure 20. Relationship between undeclared work and social capital, 2019

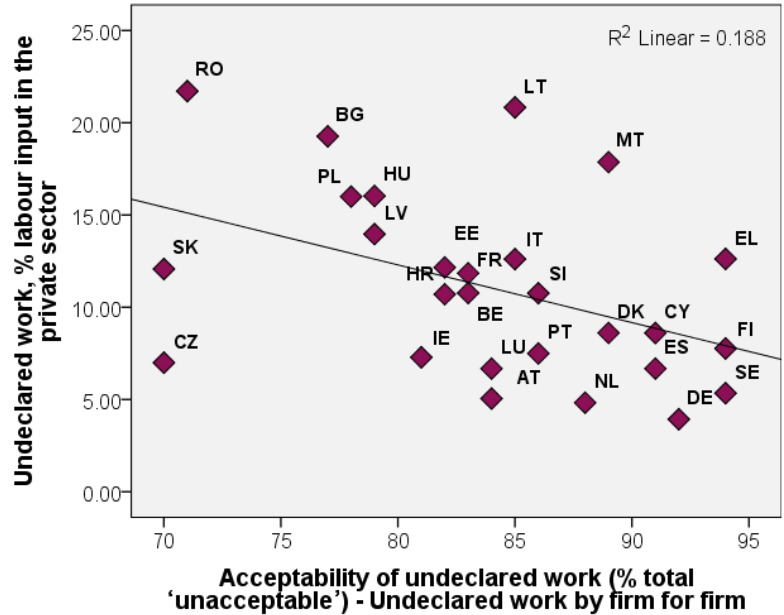
Source: own calculations based on data from Legatum Institute - The Legatum Prosperity Index (Social Capital pillar)



There is also a close association between the level of undeclared work and the acceptability of different forms of tax non-compliant behaviours. For example, as Figure 21 displays, the extent to which undeclared work undertaken by firms for other firms is found acceptable by citizens is significantly correlated with the level of undeclared work ($r_s = -.422^{**}$). The higher the proportion of citizens viewing such non-compliant behaviour as totally unacceptable, the lower is the prevalence of undeclared work.

Figure 21. Relationship between undeclared work and acceptability of undeclared work (% total 'unacceptable') - Undeclared work by firm for firm, 2019

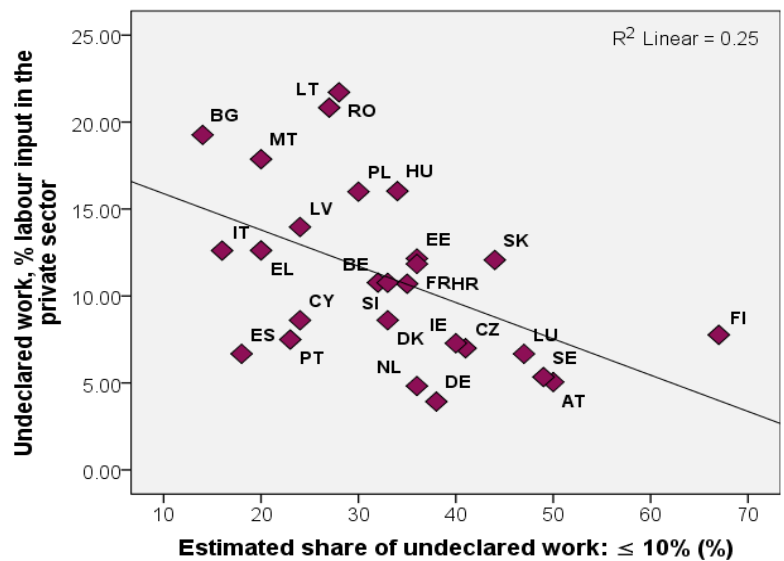
Source: own calculations based on data from Special Eurobarometer 498 - Undeclared Work in the European Union, 2019



Finally, a significant association also exists between the level of undeclared work and citizens' perceptions of the share of undeclared work existing in their society (also known as the level of horizontal trust) ($r_s = -.574^{***}$), which is a measure of their trust in their peers to be compliant. The higher the share of population in a country that estimates that a low number of their peers engage in undeclared work (i.e., the estimated share of undeclared work in the country as less or equal to 10 %), the lower is the prevalence of undeclared work. Figure 22 reveals that Member States with higher proportions of the population who estimate that the share of undeclared work in their country is no more than 10 %, have lower levels of undeclared work.

Figure 22. Relationship between undeclared work and Estimated share of undeclared work, 2019

Source: own calculations based on data from Special Eurobarometer 498 - Undeclared Work in the European Union, 2019



In sum, the structural economic and social conditions associated with lower levels of undeclared work have been here highlighted. Undeclared work is lower in Member States with:

- i. Higher government effectiveness and lower perceived levels of corruption.
- ii. Higher levels of development (whether measured in terms of GDP per capita, the Human Development Index or Social Progress Index) and greater levels of state intervention in work and welfare (to enhance workers' rights and labour productivity, investments in research and development and implementing measures for reducing poverty and inequalities).
- iii. Higher quality more powerful formal institutions (higher reliability of policy services, higher judicial independence, stronger rule of law, stronger voice and accountability, positive perception towards the regulatory quality and higher trust in the state institutions).
- iv. Lower levels of instability and uncertainty in formal institutions (better transparency in policymaking and reduced perception of political instability).
- v. Greater symmetry between the norms, values and beliefs of citizens, workers, employers and businesses and the formal rules (sometimes termed "vertical trust" and measured by the level of tax compliance, and the acceptability of undeclared work) and a higher trust in peers to adhere to the formal rules (sometimes termed "horizontal trust" and measured by personally knowing people engaged in undeclared work and their estimates of the share of undeclared work).

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Annex 1: Data sources of the structural conditions and results

Table A1. Macro Indicators used for bivariate correlation (description and source of data)

Indicator	Description	Source
A. FORMAL INSTITUTIONS		
I. FORMAL INSTITUTIONAL RESOURCE MISALLOCATIONS AND INEFFICIENCIES		
1. Level of modernisation of government		
Government effectiveness	Government effectiveness captures perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies. Estimate of governance ranges from approximately -2.5 (weak) to 2.5 (strong) governance performance.	World Bank - The Worldwide Governance Indicators (WGI), 2019. Available from: https://info.worldbank.org/governance/wgi/
2. Formal institutions acting in a corrupt manner		
Corruption Index (CPI)	Transparency International's Corruption Perceptions Index ranks countries and territories based on how corrupt their public sector is perceived to be. A country or territory's score indicates the perceived level of public sector corruption on a scale of 0 - 100, where 0 means that a country is perceived as highly corrupt and 100 means it is perceived as very clean.	Transparency International - Corruption Perceptions Index (CPI), 2019. Available from: https://www.transparency.org/research/cpi
Control of corruption (index)	Reflects perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as 'capture' of the state by elites and private interests. Estimate of governance ranges from approximately -2.5 (weak) to 2.5 (strong) governance performance.	World Bank - The Worldwide Governance Indicators (WGI), 2019. Available from: https://info.worldbank.org/governance/wgi/
II. FORMAL INSTITUTIONAL VOIDS AND WEAKNESSES		
1. Modernisation Explanation - Level of 'development'		
GDP (current prices, euro per capita)	Gross domestic product at market prices - current prices, euro per capita.	Eurostat - Main GDP aggregates per capita, 2019. Available from: https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nama_10_pc&lang=en
Human Development Index (HDI)	The Human Development Index (HDI) is a summary measure of average achievement in key dimensions of human development: a long and healthy life, being knowledgeable and have a decent standard of living. The HDI is the geometric mean of normalized indices for each of the three dimensions.	United Nations Development Programme, Human Development Reports, 2009-2018. Available from: http://hdr.undp.org/en/data

	HDI is ranked on a scale from 0 to 1.0, with 1.0 being the highest human development.	
Social Progress Index (SPI)	<p>The index doesn't measure people's happiness or life satisfaction, focusing instead on actual life outcomes in areas from shelter and nutrition to rights and education. This exclusive focus on measurable outcomes makes the index a useful policy tool that tracks changes in society over time. The Social Progress Index score is an average across scores for the three broad dimensions: Basic Human Needs, Foundations of Wellbeing, and Opportunity (maximum possible score: 100). Within each dimension, there are four components that further divide the indicators into thematic categories. This diverse selection of indicators allows for granular analysis of the specific underpinnings of social progress in each country, while the broad categories of the index framework helps to better understand global and regional trends.</p>	Social Progress Imperative - Social Progress Index, 2019. Available from: https://www.socialprogress.org/
2. State intervention		
Burden of government regulation	Response to the survey question 'In your country, how burdensome is it for companies to comply with public administration's requirements (e.g., permits, regulations, reporting)?' (1 = extremely burdensome; 7 = not burdensome at all).	World Economic Forum – Global Competitiveness Reports (The Executive Opinion Survey), 2019. Available from: https://www.weforum.org/reports
Workers' rights	Score adapted from the ITUC Global Rights Index, which measures the level of protection of internationally recognized core labour standards. The scale of this indicator ranges from 0 (no protection) to 100 (high protection). Dimensions of labour protection include civil rights, the right to bargain collectively, the right to strike, the right to associate freely, and access to due process rights. The indicator does not consider firing regulations.	World Economic Forum – Global Competitiveness Reports (The Executive Opinion Survey), 2019. Available from: https://www.weforum.org/reports
Business flexibility	Sub-index within Fraser Institute Economic Freedom Index, measuring the degree of economic freedom present in one of the five major areas, namely Regulation. When regulations restrict entry into markets and interfere with the freedom to engage in voluntary exchange, they reduce economic freedom. This major area of the index focuses on regulatory restraints that limit the freedom of exchange in credit, labor, and product markets. Measure: score out of 10.	Fraser Institute – Economic Freedom Index, 2019. Available from: https://www.fraserinstitute.org/economic-freedom/dataset?geozone=world&year=2017&page=dataset&min-year=2&max-year=0&filter=0
Expense of government (% of GDP)	This indicator measures the government size (proxy of the degree of intervention). Expense is cash payments for operating activities of the government in providing goods and services. It includes compensation of employees (such as wages and salaries), interest and subsidies, grants, social benefits, and other expenses such as rent and dividends.	World Bank - World Development Indicators, 2019. Available from: https://data.worldbank.org/indicator/GC.XPN.TOTL.GD.ZS
Research & Development expenditure (% of GDP)	Research and experimental development (R&D, all sectors) comprise creative work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of man, culture and society, and the use	Eurostat - R&D expenditure, 2019. Available from: http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=rd_e_gerd_tot&lang=en



	of this stock of knowledge to devise new applications. R&D expenditure are shown as a percentage of GDP (R&D intensity).	
Tax revenue (% of GDP)	Tax revenue refers to compulsory transfers to the central government for public purposes. Certain compulsory transfers such as fines, penalties, and most social security contributions are excluded. Refunds and corrections of erroneously collected tax revenue are treated as negative revenue.	World Bank - World Development Indicators, 2019. Available from: https://data.worldbank.org/indicator/GC.TAX.TOTL.GD.ZS
Social contributions (% of revenue)	Social contributions include social security contributions by employees, employers, and self-employed individuals, and other contributions whose source cannot be determined. They also include actual or imputed contributions to social insurance schemes operated by governments.	World Bank - World Development Indicators, 2019. Available from: https://data.worldbank.org/indicator/GC.REV.SOCL.ZS
Impact of social transfers on poverty reduction (%)	At risk of poverty rate before social transfers (pensions excluded from social transfers) (cut-off point: 60 % of median equivalised income after social transfers). Reduction in percentage of the risk of poverty rate, due to social transfers (calculated comparing at-risk-of poverty rates before social transfers with those after transfers; pensions are not considered as social transfers in these calculations). The indicator is based on the EU-SILC (statistics on income, social inclusion and living conditions).	Eurostat - Impact of social transfers (excluding pensions) on poverty reduction, 2019. Available from: https://ec.europa.eu/eurostat/databrowser/view/tespm050/default/table?lang=en
Labour market policy (LMP) expenditure (% of GDP)	Labour market policy (LMP) interventions cover the range of financial and practical supports offered by governments to people who are unemployed or otherwise disadvantaged in the labour market.	European Commission (Directorate-General for Employment, Social Affairs and Inclusion) - LMP expenditure. Available from: https://webgate.ec.europa.eu/empl/redisstat/databrowser/view/LM_P_EXPSUMM/default/table?category=imp_expend
People at risk of poverty or social exclusion (% total population)	This indicator corresponds to the sum of persons who are: at risk of poverty after social transfers, severely materially deprived or living in households with very low work intensity. Persons are counted only once even if they are affected by more than one of these phenomena.	Eurostat - People at risk of poverty or social exclusion by age and sex, 2019. Available from: http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=ilc_peps01&lang=en
Severe material deprivation rate (% total population)	The material deprivation rate is an indicator in EU-SILC that expresses the inability to afford some items considered by most people to be desirable or even necessary to lead an adequate life. The indicator distinguishes between individuals who cannot afford a certain good or service, and those who do not have this good or service for another reason, e.g. because they do not want or do not need it. Severe material deprivation rate is defined as the enforced inability to pay for at least four of the deprivation items.	Eurostat - Severe material deprivation rate by age and sex, 2019. Available from: http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=ilc_mdd11&lang=en
Inequality of income distribution (income quintile share ratio S80/S20)	The ratio of total income received by the 20 % of the population with the highest income (top quintile) to that received by the 20 % of the population with the lowest income (lowest quintile). Income must be understood as equivalised disposable income.	Eurostat - Income quintile share ratio S80/S20, 2019. Available from: http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=ilc_di11&lang=en
Gini coefficient	The Gini coefficient (scale from 0 to 100) is defined as the relationship of cumulative shares of the population arranged according to the level of	Eurostat - Gini coefficient of equivalised disposable income, 2019. Available from:

	equivalised disposable income, to the cumulative share of the equivalised total disposable income received by them.	http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=ilc_di12&lang=en
Labour productivity (percentage change on previous period)	Real labour productivity per person employed. The labour productivity = GDP/ETO with GDP = Gross domestic product; ETO = Total employment, all industries, in persons. Data are expressed as percentage change comparing year Y with year Y-3.	Eurostat - Labour productivity and unit labour costs. 2019. Available from: http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nama_10_lp_ulc&lang=en
III. FORMAL INSTITUTIONAL POWERLESSNESS		
Reliability of police services	Response to the survey question 'In your country, to what extent can police services be relied upon to enforce law and order?' (1 = not at all; 7 = to a great extent).	World Economic Forum – Global Competitiveness Reports (The Executive Opinion Survey), 2019. Available from: https://www.weforum.org/reports
Judicial independence	Response to the survey question 'In your country, how independent is the judicial system from influences of the government, individuals, or companies?' (1 = not independent at all; 7 = entirely independent).	World Economic Forum – Global Competitiveness Reports (The Executive Opinion Survey), 2019. Available from: https://www.weforum.org/reports
Rule of law	Reflects perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence. Estimate of governance ranges from approximately -2.5 (weak) to 2.5 (strong) governance performance.	World Bank - The Worldwide Governance Indicators (WGI), 2019. Available from: https://info.worldbank.org/governance/wgi/
Regulatory quality	Reflects perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development. Estimate of governance ranges from approximately -2.5 (weak) to 2.5 (strong) governance performance.	World Bank - The Worldwide Governance Indicators (WGI), 2019. Available from: https://info.worldbank.org/governance/wgi/
Voice and accountability (index)	Reflects perceptions of the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media. Estimate of governance ranges from approximately -2.5 (weak) to 2.5 (strong) governance performance.	World Bank - The Worldwide Governance Indicators (WGI), 2019. Available from: https://info.worldbank.org/governance/wgi/
Trust in Government (% tend to trust)	Standard Eurobarometer question: trust in the (nationality) Government (% tend to trust).	Standard Eurobarometer surveys 92 - Public opinion in the European Union, Autumn 2019. Available from: https://ec.europa.eu/commfrontoffice/publicopinion/index.cfm/Survey/index#p=1&instruments=STANDARD
Trust in Parliament (% tend to trust)	Standard Eurobarometer question: trust in the (nationality) Parliament (% tend to trust).	Standard Eurobarometer survey 92 - Public opinion in the European Union, Autumn 2019. Available from: https://ec.europa.eu/commfrontoffice/publicopinion/index.cfm/Survey/index#p=1&instruments=STANDARD
IV. FORMAL INSTITUTIONAL INSTABILITY AND UNCERTAINTY		
Democracy Index	The EIU Democracy Index is based on five categories: electoral process and pluralism; civil liberties; the functioning of government; political participation;	The Economist Intelligence Unit - Democracy Index, 2019. Available from: https://www.eiu.com/topic/democracy-index



	and political culture. Measure: Index score out of 10, 10 being best (full democracy).	
Political stability	Political stability and absence of violence/terrorism measures perceptions of the likelihood of political instability and/or politically-motivated violence, including terrorism. Estimate of governance ranges from approximately -2.5 (weak) to 2.5 (strong) governance performance.	World Bank - The Worldwide Governance Indicators (WGI), 2019. Available from: https://info.worldbank.org/governance/wgi/
B. INFORMAL INSTITUTIONS		
Social capital	Score on the Social Capital pillar of the Legatum Prosperity Index. The Social Capital pillar measures the strength of personal and social relationships, social norms, and civic participation in a country. The scale ranges from 0 (low) to 100 (high). The index is used by World Economic Forum in Global Competitiveness Reports.	Legatum Institute - The Legatum Prosperity Index (Social Capital pillar), 2019. Available from: https://www.prosperity.com/about/resources
Tax compliance (index)	Sub-component within Fraser Institute Economic Freedom Index, measuring the cost of tax compliance. Measure: score out of 10.	Fraser Institute – Economic Freedom Index, 2019. Available from: https://www.fraserinstitute.org/economic-freedom/dataset?geozone=world&year=2017&page=dataset&min-year=2&max-year=0&filter=0
Acceptability of undeclared work (% total 'unacceptable')	<p>The acceptability of various behaviours across respondents (1 - 'absolutely unacceptable' and 10 – 'absolutely acceptable').</p> <p>Percent of total 'unacceptable' (1-4):</p> <ul style="list-style-type: none"> Firm hires worker on undeclared basis (A firm hires a private person and all or a part of the salary paid to him or her is not officially declared) Undeclared work by firm for firm (A firm is hired by another firm and it does not declare its activity to tax or social security authorities) Undeclared work by individual for private household (A private person is hired by a private household and he or she does not declare the payment received to tax or social security authorities although it should be reported) Undeclared work by firm for private household (A firm is hired by a private household for work and does not declare the payment received to tax or social security authorities) Someone partially or completely conceals their income (A private person or self-employed person evades taxes by not declaring all or part of their income) 	Special Eurobarometer surveys 498 - Undeclared Work in the European Union, 2019. Available from: https://ec.europa.eu/commfrontoffice/publicopinion/index.cfm/Survey/index?p=5&instruments=SPECIAL
Personally know people engaged in undeclared work (% 'yes')	Response to the survey question 'Do you personally know any people who work without declaring all or part of their income to tax or social security authorities?' (% total 'yes').	Special Eurobarometer surveys 498 - Undeclared Work in the European Union, 2019. Available from: https://ec.europa.eu/commfrontoffice/publicopinion/index.cfm/Survey/index?p=5&instruments=SPECIAL



Estimated share of undeclared work: $\leq 10\%$ Response to the survey question 'Approximately, what percentage of the population in (OUR COUNTRY) do you think work without declaring some or all of their income to tax or social security authorities?' ($\% \leq 10\%$).

Special Eurobarometer surveys 498 - Undeclared Work in the European Union, 2019. Available from: <https://ec.europa.eu/commfrontoffice/publicopinion/index.cfm/Survey/index#p=5&instruments=SPECIAL>

Source: updated from Williams C.C. and Horodnic I.A. (2020). Horizon scanning: early warning signals of future trends in undeclared work. European Platform tackling undeclared work.

Table A2. Bivariate correlation between extent of undeclared work and structural conditions in the European Union: Spearman's rank correlation coefficient

Macro Indicators	Undeclared work, % of labour input in the corporate sector	
	r_s	Sig.
A. FORMAL INSTITUTIONS		
I. FORMAL INSTITUTIONAL RESOURCE MISALLOCATIONS AND INEFFICIENCIES		
1. Level of modernisation of government		
Government effectiveness (-2.5 to 2.5 (strong performance))	-0.699	***
2. Formal institutions acting in a corrupt manner		
Corruption Perceptions Index (CPI) (0-100 (very clean))	-0.710	***
Control of corruption (-2.5 to 2.5 (strong performance))	-0.695	***
II. FORMAL INSTITUTIONAL VOIDS AND WEAKNESSES		
1. Modernisation Explanation - Level of 'development'		
GDP (current prices, euro per capita)	-0.725	***
Human Development Index (HDI) (0-1 (highest development))	-0.706	***
Social Progress Index (SPI) (0-100 (high))	-0.761	***
2. State intervention		
Burden of government regulation (1-7 (best))	-0.373	*
Workers' rights (0-100 (best))	-0.460	**
Business flexibility index (0-10 (high))	-0.178	
Expense of government (% of GDP)	0.094	
Research & Development expenditure (% of GDP)	-0.578	***
Tax revenue (% of GDP)	-0.105	
Social contributions (% of revenue)	-0.098	
Impact of social transfers on poverty reduction (%)	-0.446	**
Labour market policy (LMP) expenditure (% of GDP)	-0.515	***
People at risk of poverty/social exclusion (% total population)	0.516	***
Severe material deprivation rate (% of total population)	0.701	***
Inequality of income distribution (income quintile share ratio)	0.370	*
Gini coefficient (0-100 (perfect inequality))	0.364	*
Labour productivity (% change on previous period (Y-3))	0.550	***
III. FORMAL INSTITUTIONAL POWERLESSNESS		
Reliability of police services (1-7 (best))	-0.610	***
Judicial independence (1-7 (best))	-0.636	***
Rule of law (-2.5 to 2.5 (strong performance))	-0.704	***
Regulatory quality (-2.5 to 2.5 (strong performance))	-0.691	***
Voice and accountability (-2.5 to 2.5 (strong performance))	-0.690	***
Trust in Government (% tend to trust)	-0.420	**
Trust in Parliament (% tend to trust)	-0.502	***
Trust in Tax and Social Security authorities (% tend to trust)	-0.367	*
Trust in Labour inspectorate (% tend to trust)	-0.377	*
IV. FORMAL INSTITUTIONAL INSTABILITY AND UNCERTAINTY		
Democracy Index (0-10 (full democracy))	-0.751	***
Political stability (-2.5 to 2.5 (strong performance))	-0.392	**



Macro Indicators	Undeclared work, % of labour input in the corporate sector	
	<i>r_s</i>	Sig.
B. INFORMAL INSTITUTIONS		
Social capital (0-100 (high))	-0.638	***
Tax compliance (0-10 (high))	-0.326	*
Acceptability of undeclared work (% total 'unacceptable')		
Firm hires worker on undeclared basis	-0.267	
Undeclared work by firm for firm	-0.422	**
Undeclared work by individual for private household	-0.059	
Undeclared work by firm for private household	-0.396	**
Someone partially or completely conceals their income	-0.346	*
Personally know people engaged in undeclared work (% 'yes')	-0.096	
Estimated share of undeclared work: less than 10% (%)	-0.574	***

Note: Significant at: *** p<0.01, ** p<0.05, * p<0.1