Study on indirect measurement methods for undeclared work in the EU (VC/2008/0305)

European Commission, Directorate-General Employment, Social Affairs and Equal Opportunities

Unit EMPL/D1 – Employment Analysis

Final Report submitted by GHK and Fondazione G. Brodolini

Date: 17 December 2009

The information contained in this publication does not necessarily reflect the position or opinion of the European Commission.

Document Control

Document Title	Final Report
Job No.	J6164
Prepared by	Giuseppe Ciccarone, Enrico Marchetti, Inga Pavlovaite
Checked by	Roger Sumpton
Date	17/12/2009

CONTENTS

ACKNOWLEDGEMENTS

United Kingdom	Ken Walsh	Training and Employment Research Network

1 INTRODUCTION

This is the Final Report submitted in the framework of the study on indirect measurement methods for undeclared work (UDW) in the EU (and Croatia and Turkey) (VC/2008/0305) for DG Employment, Social Affairs and Equal Opportunities of the European Commission. The report is submitted by a consortium consisting of GHK Consulting Ltd and Fondazione G. Brodolini.

The objectives of the study were threefold:

1. To provide a systematic review of **indirect methods** to measure UDW and the resulting national figures for the EU Member States and Croatia and Turkey. This review encompasses a classification of methods by several criteria, including methodological and information requirements, type, scope, quality and reliability of data and the possibility of successfully implementing the methods across the Member States. In addition, data tables with available figures on the size of UDW are supplied for each method investigated. This allows the collection and presentation of up-to-date figures on UDW. The study also investigates whether and how existing figures on UDW are reflected in the national accounts figures and GDP calculations.

2. To carry out a similar review in relation to **administrative sources** of information existing in the Member States to measure UDW and produce a classification of such sources and assessment of their potential applicability across the 29 countries, and potential complementarity with the information stemming from the indirect methods.

3. Having analysed the information from the review of indirect methods and administrative sources, to propose **option(s) for a methodology** which could be systematically applied at the EU level to obtain comparable estimates of UDW in terms of its share of GDP and employment, by country and at the EU level.

In sum, the objective of the study was to review the current methodologies existing to measure UDW, collect available recent data on UDW and put forward proposals for EU-wide method(s) to measure UDW.

1.1 Report structure

The Final Report is structured as follows:

Section 2 – detailed outline of the methodological approach carried out in the study;

Section 3 – key findings from existing literature on measuring UDW;

Section 4 – review of indirect methods applied in the Member States;

Section 5 – review of data available in the Member States from indirect methods;

Section 6 – review of administrative sources for measuring UDW;

Section 7 – review of data available through administrative sources;

Section 8 – testing the most appropriate method at the EU level – labour input method;

Section 9 – testing the most appropriate method at the EU level – social security data;

Section 10 – conclusions and recommendations.

The report is accompanied by the following annexes:

Annex 1 – Key literature sources of individual measurement methods,

Annex 2 – Detailed description of labour input method application in Italy by ISTAT,

Annex 3 – Assessment of availability, accessibility and reliability of information for the labour input method

Annex 4 – Main points from the workshop on "Indirect measurement methods for undeclared work in the EU" held in Rome on 13 October 2009.

In addition, extensive electronic files containing the data on UDW collected during the study have been submitted to the European Commission for future reference.

2 METHODOLOGICAL APPROACH

This section presents a detailed outline of the methodological approach undertaken for the study.

The central element of the methodological approach was additional work undertaken in five core countries (Greece, Italy, Romania, Spain and Turkey). The core countries were chosen on the basis of having the highest prevalence of UDW. Country experts in these core countries undertook more in-depth research than the experts from the remaining 'non-core' countries.

2.1 Task 0 – Inception Phase

The Inception Phase consisted of the following activities:

- Inception meeting, held on 15 January 2009, to discuss the focus of the study and key requirements of the European Commission,

- Literature review, undertaken to review the key existing sources on measuring UDW and thus establish a knowledge base for the remainder of the study,

- Preparation of guidance materials and briefing of country experts to enable them to start primary data collection and research in the Member States,

- Inception Report, which detailed the results of the Inception Phase.

2.2 Task 1 – Review of indirect methods and resulting figures on the size of UDW

This task consisted of the following four activities.

2.2.1 Activity 1.1 – Review and classification of macro-economic methods for quantifying UDW

The purpose of this activity was, in all 29 countries covered by the study, to review, describe and classify the macro-economic methods used to quantify UDW. All of the macro-economic methods used in any given country were considered. In particular, attention was paid to the macro-economic methods used by the national statistical institutes as these were likely to provide more comprehensive and internationally validated estimates.

For each method used, the following information was collected by the country experts:

- Estimation approach used;

- Underlying data and information requirements;

- Type of data on UDW delivered;

- Breakdown available;

- Time period covered and frequency of data collection;

- Key strengths of the method;

- Key weaknesses of the method;

- Potential applicability across the Member States;

- Key existing UDW information sources in the country concerned.

2.2.2 Activity 1.2 – Provide and assess the up-to-date figures available through macro-economic methods on UDW

The purpose of this activity was to provide and assess available up-to-date figures obtained through each macro-economic method described under Activity 1.1 in the countries covered by the study. For each method, the data was provided overall and by specific sectors with widespread UDW (e.g. construction) and any other available breakdown. In each country, where available, time series was also provided (annual figures for the longest period available). In relation to each dataset relating to a particular method, country experts assessed the credibility, reliability and statistical representativeness of quantitative estimates and any bias underlying the different methods.

In relation to Activities 1.1 and 1.2, a more thorough analysis of existing macro-economic methods and accompanying data was undertaken in the core countries (Greece, Italy, Romania, Spain and Turkey). The analytical reports comprised an analysis of existing indirect methods in measuring UDW in core countries, including the experts' views on each of them, on the quality of the results they produced (reliability, clarity, potential exportability to other countries, etc.) and on the academic or public debates they stimulated; the same was done with the accompanying data on UDW.

2.2.3 Activity 1.3 – Assessing the results obtained

The national reports fed directly into the first interim report delivered to the European Commission by the central team in May 2009. The inputs provided by the country experts were brought together and analysed by the central team. The analysis concentrated on the following questions:

- The assessment of the applicability of individual macro-economic methods across the (clusters of) Member States and over time,

- Key advantages and disadvantages of individual methods emerging from the EU-wide review,

- Key assessments of credibility, reliability and statistical representativeness of quantitative estimates obtained through each macro-economic method.

2.2.4 Activity 1.4 – First Interim Report

The first interim report was delivered (in English) at the end of May 2009. The report contained the overall results of Task 1 and detailed results of activities 1.1-1.3 and provided a review and assessment of indirect methods for measuring UDW and the resulting data.

2.3 Task 2 – Review of the administrative sources to estimate UDW

The main purpose of this task was to review and map all available administrative sources in the countries covered by the study.

2.3.1 Activity 2.1 – Mapping of administrative sources

Administrative sources were considered here to represent data collected by the public authorities, such as inspections by taxation authorities or labour inspectorates.

A list of administrative sources for measuring UDW in each country included:

- Labour inspectorates,

- Tax and customs authorities,

- Ministry of Finance,

- Departments charged with administering social security,

- Migration authorities responsible for the regularisation of migrants,

- Other relevant authorities charged with addressing fiscal and social security fraud,

- Any other sources relevant in the country.

For each administrative source, the following information was collected by the country experts:

- Time period covered, frequency of data collection,

- Agency responsible and its contact details (including Website details),

- The nature of data on UDW delivered by the source and type of fraud or infringement captured (e.g. tax, social security contributions, labour regulations, health and safety norms),

- Any available breakdown of the UDW by socio-economic categories,

- Sectoral breakdown available,

- The expert's assessment of the quality of UDW data available through this source; quality and statistical representativeness (with respect to data from indirect methods) of UDW data available through this method,

- The expert's assessment of how complementary the administrative source is to the macro-economic models.

For each method, the country experts provided the following assessments:

- An evaluation of the range and type of data which can be drawn from such sources and their statistical representativeness,

- An assessment of the complementarity of the administrative sources with the macro-economic models analysed under Task 1 (e.g. whether inspection data on UDW are especially useful in the context of evaluating policies tackling UDW).

2.3.2   *Activity 2.2 – Assessing the results obtained*

A review of existing administrative methods and resulting data formed the second national reports for the study. They directly fed into the second interim report delivered to the European Commission by the central team at the end of July 2009.

The inputs provided by the country experts were brought together and analysed by the central team. The analysis concentrated on the following questions:

- The assessment of the applicability of administrative methods across the (clusters of) Member States and over time,

- Assessments of the range and type of data on UDW to be obtained through administrative sources,

- Key assessments of credibility, reliability and statistical representativeness of quantitative estimates obtained through administrative sources,

- Assessments of the complementarity of the administrative sources to the macro-economic methods.

The results of this activity provided direct inputs into the second interim report.

2.3.3   *Activity 2.3 – Second Interim Report*

The second interim report was delivered (in English) at the end of July 2009. The report presented the main results of Task 2 and detailed findings of activities 2.1-2.2.

2.4   Task 3 – Proposing methodologies applicable at the EU level

This task consisted of the following activities.

2.4.1   Activity 3.1 - Drawing together results of the study

Under this activity, the results of the literature review under Task 0 (and under Task 1 for the core countries) and the findings on macro-economic methods, administrative sources and resulting figures on the size of UDW from Tasks 1 and 2, were brought together to identify key findings in relation to the macro-economic and administrative methods used across the countries covered by the study. The main purpose of this activity was to rate individual methods and sources according to the following criteria:

- Comparability of methods across the EU-27 and Croatia and Turkey,

- Transferability of methods across the EU-27 and Croatia and Turkey,

- Credibility, reliability and statistical representativeness of methods across the EU-27 and Croatia and Turkey,

- Judgements on the feasibility of a method (or a combination of methods) to be applied at the EU level (e.g. in terms of information requirements).

This activity was undertaken by the central team, based on the country-level research undertaken by country experts and other analytical inputs.

2.4.2   Activity 3.2 – Proposing one or two options for an EU-wide applicable method

Based on the emerging results from Activity 3.1, the central team, with the technical support of the experts in the core countries, formulated options for an EU-wide applicable macro-economic method to measure UDW. The requirements for the ideal method were as follows:

- It should provide national figures for all Member States to allow systematic cross-country comparison, monitoring over time and evaluation of policies undertaken by the Member States to combat UDW,

- It should be reliable, statistically robust and representative, and produce good comparable estimates of UDW,

- It should provide a breakdown by socio-economic categories and the incidence of UDW in the sectors where UDW is widespread.

The criteria for deciding on the EU-wide measurement method included the feasibility of applying the method across the EU and the potential for integrating administrative data. The possibility of integrating the macro-economic and administrative approaches was considered in developing the options for an EU-wide applicable method.

2.4.3   Activity 3.3 – Testing the options

The proposed options were tested in the context of their applicability in the core countries. A workshop took place between the central team, the European Commission and the experts from these countries to discuss in detail the implications of the proposed method(s):

- To produce comparable results across the Member States,

- The potential implications for the proposed methods to provide estimates of UDW in terms of national accounts, GDP and employment shares,

- Feasibility, reliability and representativeness of the proposed options.

Each country expert was asked to rate, using the template provided by the central team, the proposed options in terms of the above criteria and to provide reasoned assessments of

their judgements. In each of the core countries, the proposed options were also tested and applied to identify the nature and characteristics of data on UDW the option(s) would produce. This allowed the identification of whether UDW data would be available by socio-economic characteristics and in sectors with a widespread prevalence of UDW (e.g. construction).

Core country experts have collaborated extensively with the central team in highlighting the implications and challenges of the proposed measurement method from an EU-wide perspective (including cross-country comparability). The experts for other countries considered its implications for their own country. The results of both approaches were integrated by the central team into the final report.

2.4.4 Activity 3.4 – Draft Final Report

This was submitted and discussed during the steering group meeting on 2 December 2009.

2.5 Task 4 – Finalising the study

The main purpose of this task was to finalise the study results and produce the Final Report of the study. The draft final report was amended based on the comments and feedback from the Steering Group.

3   KEY FINDINGS FROM EXISTING LITERATURE ON MEASURING UNDECLARED WORK

3.1   Introduction

During the study, a review of existing literature sources on measuring UDW was undertaken. The aim of this review was to inform and ground subsequent study research and provide an overview of current state-of-the-art research in this area.

The review of literature in the study consisted of three strands:

1.   A review of key studies of the main indirect methods of measuring UDW.

2.   Recent (since 2004) relevant studies and research.

3.   Reviews of the literature on the measurement of UDW in the core countries (Greece, Italy, Romania, Spain and Italy), including the experts' comments and opinions on the suitability of different methods. Such reviews were integrated into the analysis below.

This phase of the work allowed the team to identify indications on the potential applicability of the different methods across the Member States.

Based on the results of the literature review, it was confirmed that the key indirect methods to measure UDW are considered to be:

1.   Discrepancy methods,

2.   Labour Input methods,

3.   Degree of Participation method,

4.   Tanzi Method,

5.   Global Indicators Methods: Electricity Consumption,

6.   Latent Variable Methods.

Indirect or general methods rely on comparisons of macroeconomic aggregates (such as national accounts, electricity consumption, cash transactions) in order to estimate the extent of UDW and to interpret observable phenomena as signs of the invisible part of the economy. They refer to total production, including unrecorded production, or to a part of it. They comprise labour-force survey-based adjustments, supply-based adjustments, demand-based adjustments, income-based adjustments, and adjustments through a supply and use framework.

Econometric approaches are those methods that produce a total quantitative estimate of the non-observed economy by means of a model. The main types of econometric models are the following:

•   Monetary methods,

•   Global indicators methods,

•   Latent variable methods.

A general classification of the methods is provided in table 3.1 below.

Table 3.1 – Classification of methods of measuring undeclared work

Type of method	Sub-type of method	Individual methods
Indirect methods		1.Discrepancy method
	Labour market methods	2.Labour input
		3.Degree of participation
Econometric methods	Monetary methods	4.Tanzi method
	Global indicator methods	5.Electricity consumption
	Latent variable methods	6.MIMIC/DYMIMIC

In relation to each of the methods, the following dimensions are described, based on the results of the recent literature review. This is to facilitate the reading of material and allow the comparison of the different methods using the same analytical categories.

- Key assumptions,

- Estimation approach used,

- Underlying data and information requirements,

- Type of data on UDW delivered,

- Breakdown available,

- Key strengths of the method,

- Key weaknesses of the method,

- Potential applicability across the Member States.

The information resulting from the review of the literature in national languages (referred to henceforth as 'national literature') and the core country experts' opinions are identified by use of bullet points.

A list of key reference sources for each of the methods is provided in Annex 1 (this is submitted as a separate document).

3.2 Indirect Methods

3.2.1 *Method 1: Discrepancy method - comparing income and consumption*

Key assumptions

Income can be hidden more easily than consumption.

Estimation approach used

Declared income does not include income that has been concealed for tax reasons, whereas the estimate of consumption does. Accordingly, the difference between the two estimates can be attributable to tax evasion.

The review of the national literature on this approach provides the following information (in addition to points already known from previous publications):

- Spain. The method permits an estimation of the aggregate household consumption by province and income level, the average propensity to consume and per capita disposable income; to make comparisons between estimated income and revealed income; to obtain the difference between revealed and estimated income as a percentage of GDP.

- Greece. Consumption expenditure, as recorded in the National Accounts, underestimates the true volume of consumption expenditure, whereas equivalent data drawn from household surveys do not.

- Romania. A particular derivation of this method starts from the assumption that not all income is declared by households and that the lower the formal income, the higher the propensity to engage in informal activities (the concept of UDW is not actually used in Romania). Therefore, the difference between the so-called "desired income" and actual income is viewed as a measure of participation in informal activities and as a measure of the dimensions of the informal sector. Another derivation of the method creates a model of tax evasion in which some of the income is not declared from the outset but is later discovered (and therefore a penalty tax is applied). This raises the amount of income finally declared, although it is assumed that finally not everything is being identified and that therefore some income still remains hidden. GDP is hence divided into declared income, undeclared income discovered by the authorities and undeclared income that remains undiscovered by the authorities. The official GDP figure includes only the first two categories. The model argues that the probability of detection is endogenous and positively correlated with both the initial size of the hidden economy and the amount of taxes finally collected by the state, expressed as a share of GDP. Three estimators of the share of the "invisible" sector are being developed; these are the ratios of visible income/GDP to total income/GDP, total tax collected to total income/GDP and declared income to total income.

Underlying data and information requirements

- Spain. Data on consumption and revealed income are provided by the Survey on Household Budget 1990/91; data on GDP by the national accounts.

- Greece. Estimates of private consumption expenditure are taken both from the National Accounts and the Household Budget Surveys.

- Romania. Information is collected from the national accounts and the Integrated Household Survey as a well as from a micro-survey which included specific questions.

- Turkey. Data on declared income are from taxation authorities; data on consumption estimates are from the national accounts.

Type of data on UDW delivered

- Spain. Undeclared income as a percentage of GDP.

- Greece. Proportion of non-recorded GDP: 27% (1982), 37% (1988). UDW is taken to comprise the same figures in terms of labour input (e.g., total number of hours worked).

- Romania. Informal sector as a share of total GDP.

- Turkey. Proportion of UDW in GDP.

Breakdown available

- Spain. Data for Andalusia (by provinces) and the Autonomous Communities (17 regions) (1990).

- Greece. Breakdown by sector (e.g. construction, services, etc) and expenditure categories (e.g., education, entertainment, etc).

Key strengths of a method

- Greece. Good data availability; data are collected using the same method over a period of time.

- Romania. The methodology makes use of harmonised data.

- Turkey. Good data availability, also cross-nationally.

Key weaknesses of a method

Discrepancy methods are based on data comparisons between certain economic quantities. One of the common ways of using the discrepancy method involves the measurement of differences between national income on the basis of income from taxation and on the basis of calculations of the national accounts. Another popular application of discrepancy methods - recommended by Eurostat to ensure the exhaustiveness of national accounts - is to compare the findings of labour force surveys (LFS) with the recorded labour demand (e.g. based on company declarations to tax or social security authorities or national statistical offices). The main problem with both approaches stems from the use of different sources of information, which may apply different definitions, classifications, and different periods of measurement. As a result, the adjustment of figures drawn from different sources can lead to deviations from reality (statistical variance). Another shortcoming is that discrepancy methods exclude certain sectors (e.g. private households acting as employers or agriculture) which may be particularly relevant for UDW because there is little or no information available for the labour demand. Among the indirect methods, the national accounts method provides some insight into the structure of UDW and gave the best results as far as cross-national comparability is concerned.

- Spain. When comparing revealed and estimated income, this methodology takes only current income into account; hence, there might be some over-estimation of revealed income, as consumption usually takes into account expected income flows. It is also important to note the lack of representativeness of the survey on household budgets at the province level.

- Greece. Consumption expenditure in national accounts includes items not related to UDW (e.g., consumption expenditure by tourists); GDP figures might include income from illegal activities.

- Romania. The very concept of UDW is not employed; the confusion between "informal" and UDW is maintained and propagated.

- Turkey. The method uses different sources of information which may have different methodologies (this can lead to deviations from reality); it excludes certain sectors where UDW is prevalent due to lack of information on labour demand; results are volatile in Turkey, because of the huge discrepancy in GDP calculation methodologies (value added vs. factor income).

Potential applicability across the Member States

- Spain. As data on consumption expenditure and income have been widely homogenised, the potential applicability of this method is quite high.

- Greece. Very good due to harmonised national accounts.

- Romania. Good, due to the fact that it uses basically National Accounts information, with some refinements, especially with regard to the differentiation between informal and UDW

- Turkey. Good due to harmonised national accounts.

3.2.2 *Method 2: Labour Input*

Key assumptions

Information on the supply side of the labour market – for instance the Labour Force Survey (LFS) – can register a part of the undeclared work because individuals are less motivated than enterprises to conceal the nature of their work. In this method, the above information is

compared with information on the demand side – e.g. from enterprise surveys in order to indirectly identify a share of UDW.

A detailed description of the application of this method in Italy (by ISTAT) is provided in Annex 2 (which is submitted in a separate document).

Estimation approach used

- Italy. Undeclared employment is computed as the difference between the overall (i.e., recorded and unrecorded) number of workers identified by supply-side (household) surveys and the number of (recorded) workers emerging from demand-side (enterprises) surveys. It may make use of several statistical and administrative sources.

- Spain. Comparison of the number of employed workers according to the LFS and the number of affiliated workers to the social security in each branch of economic activity.

- Greece. Employees and employers often have motives to conceal employment in order to evade social security contributions.

- Romania. Develops the traditional approach by considering undeclared or actually "informal" employment as the difference between the overall number of workers identified by the LFS (RO-AMIGO) and the Enterprise Survey as well as administrative enterprise data.

Underlying data and information requirements

- Italy. Labor Force Survey, Household Survey, Administrative sources (e.g., Social Security System, VAT declarations from the Finance Ministry)

- Spain. Labour Force Survey by the National Institute of Statistics, number of affiliated workers to the Social Security System, by the former ministry of Labour and Social Issues.

- Greece. Data on registered employment from the social security funds. Data on total employment recorded by administrative checks by the social security funds.

- Romania. The Labour Force Survey, the Enterprise Survey as well as the exhaustive source constituted by the administrative-type enterprise labour force investigation (*Balanta Fortei de Munca*).

- Turkey. Labour force survey (Turkstat defines informal employment as 'not covered by social security').

Type of data on UDW delivered

- Italy. Number of workers, number of jobs, number of Full Time Equivalent units

- Spain. Undeclared employment as a share of overall employment.

- Greece. Unrecorded Social Security Contributions: EUR 4 billion annually (2003-2005). Uninsured employees: Over 1 million annually (1 030 000-1 180 000, during 2003-2005).

- Romania. Share and number of workers engaged in informal activities, by broad sector of activity as well as economic activity.

- Turkey. Proportion of GDP.

Breakdown available

- Italy. Sectoral breakdown (at the two-digit NACE level); employment status (self-employed and employees); sub-national breakdown (at the regional level)

- Spain. Data by gender, branch of economic activity (NACE at 2 digits), and nationality for 1998 and 2002.

- Greece. Breakdown according to the Social Security Fund. As there is a plethora of Funds in Greece and each roughly covers a specific socio-economic group, available breakdown corresponds to broad occupational categories.

- Romania. Breakdown on major sector of economic activity and on economic activity (branch).

Key strengths of a method

- Italy. Well-established method; recommended by the OECD; National Accounts consistent results; very refined breakdown available (the method is bottom-up so that in principle micro data are available).

- Spain. High degree of disaggregation by gender, economic activity, etc.

- Greece. If applied regularly, administrative checks can reveal whether UDW is on the increase, or declining.

- Romania. Harmonised data on the labour force both on the demand as well as on the supply side are used.

Key weaknesses of a method

- Italy. Not easy to implement. For instance, many sources need to be harmonised; it may prove hard to achieve the representativeness of the labor force survey.

- Spain. Problems to deal with and interpret negative differences between employed and affiliated; lack of willingness to respond honestly to the LFS concerning irregular situations; lack of representativeness of the LFS concerning sporadic situations in employment (usually irregular).

- Greece. Administrative checks may vary in quality and intensity from year to year.

- Romania. The concept of UDW is not actually used.

- Turkey. No time use survey data yet. Income variable inadequate. No historical data. Data availability only recently (wage data public since 2004).

Potential applicability across the Member States

- Italy. Potentially very good due to harmonised national accounts.

- Spain. The potential applicability of the method is quite high, but the degree of accuracy and disaggregation of data will depend on the methodological compatibility between LFS and data on affiliated workers.

- Greece. Potential applicability is hindered by the existence of a plethora of social security regimes in Europe.

- Romania. Good, as it uses harmonised data.

- Turkey. Possible problems in the Mediterranean and/or transition countries.

3.2.3   Method 3: Degree of participation method

Key assumptions

In situations where participation in formal work is limited, there will be a shift of labour from declared to undeclared work.

Estimation approach used

A well-established procedure does not exist. As a general framework, positive (negative) variations in labour force participation in the official economy are seen as negative (positive) variations in undeclared labour.

- Romania. The methodology starts from the assumption that a higher level of formal income per household implies a lower participation in informal activities, with the reverse being valid. Then it assumes that regions that display a higher formal income per household will have a lower involvement in informal activities and vice-versa. Although a mildly-sophisticated mathematical apparatus is used, the method reaches a rather common-sense conclusion which points out that the rich region of Bucharest would be the place with the lowest involvement of households in informal activities while the poor north-east of Romania will have the highest involvement.

  An alternative method starts from a different assumption – the wider the general economic opportunities, the wider the opportunities for informal activities and especially for UDW. The method argues that, contrary to the general assumption, more developed economies will generally offer more opportunities for the development and spread of UDW than less developed economies with the same degree of institutional development (i.e., less monetised), especially if they are in an early stage of their development or weak institutionally but sufficiently monetised. As a consequence, those regions of Romania that actually display a lower GDP per capita and a lower level of formal income per household are not necessarily hotbeds of UDW (here, the difference between UDW and informal employment in general is more than apparent). Those regions that display a higher GDP per capita and a higher level of formal income, while being less exposed to informality, might as well be hotbeds of UDW. This is confirmed by the fact that regions that are supposed, according to the first method, to have a higher level of informality display a higher rate of unemployment when measured with the national-level measurement but a far lower rate of unemployment when measured with the harmonised measurement. At the same time, regions like Bucharest, which, measured by the national-level measurement, display very low rates of unemployment, when measured with the harmonised measure, display values that are actually close to the national average or even sometimes above it. This might prove that those declaring themselves as unemployed in the household survey do not register with the PES as they do have access to informal (UDW-related) sources of income, in most cases monetary. On the other hand, in poorer regions, where opportunities for monetary income are scarcer, more individuals are registering with the PES as they have no other sources (including UDW) of monetary income. A quite different picture of UDW will therefore emerge, when compared to the first approach.

Underlying data and information requirements

- Romania. Integrated household survey and National Accounts data; LFS and PES data (therefore only partial harmonisation).

Type of data on UDW delivered

- Romania. Informal sector as a share of total GDP; Informal incomes as share of total incomes; Proportion of UDW and informal workers in total labour force

Breakdown available

- Romania. Regional breakdown.

Key strengths of a method

- Romania. Harmonised data are used to a certain extent.

Key weaknesses of a method

The degree of participation method is based on the assumption that in a situation where participation in formal work is limited (e.g. among males between 15 and 64 years of age), there will be a shift of labour into undeclared work. The main shortcoming of this approach is that people involved in UDW often have a legitimate job as well and earnings of the regular job itself can be partly undeclared. Also, part of the male population is not participating (e.g. early retired).

- Romania. Concept of UDW not used at all; a distinction is made between informality (a broader concept) and UDW.

Potential applicability across the Member States

- Romania. Possible, to a certain extent, as it makes use of harmonised data; the type of data it requires are to be found in all Member States.

3.3 Econometric Methods

3.3.1 *Method 4: Monetary Method - Tanzi Method*

Key assumptions

Underground transactions are conducted only on a cash basis.

Estimation approach used

- Italy. It requires an estimation of the quantity of money held for illicit (tax evasion) purposes by measuring the sensitivity of the demand for money to income taxes. Then, assuming a constant velocity of circulation, undeclared GDP is computed via the exchange equation.

- Spain. An econometric model that estimates the function of demand for money, including as explanatory variables the tax pressure, income level, prices and interest rates, regulatory hardening due to opaque assets. It may omit the assumption of constant velocity of circulation.

- Romania. Ratio of total demand for money and total deposits in the Romanian economy.

Underlying data and information requirements

- Italy. National Accounts data (e.g., per capita GDP as a proxy of the technology of payments); fiscal data (some measure of the income tax burden); financial data (some proxy of the opportunity cost of holding cash, e.g., the saving-deposit interest rate).

- Spain. GDP from national and regional accounts, consumption price Index, interest rates series, a synthetic indicator for private banks data, tax pressure: (different indicators on indirect and direct taxes over GDP), GVA from national accounts, M2.

- Romania. National Accounts data.

- Turkey. Time-series consumption, GDP and monetary variables (and sub-items) from the Central Bank (CB), State Planning Organisation (SPO), and Turkstat readily available (but starts in 1968 as a consistent series).

Type of data on UDW delivered

- Italy. No direct measure of UDW, only a measure of tax evasion.

- Spain. Underground economy as a share of GDP; underground economy as a share of Gross Added Value (GVA), and rate of growth.

- Romania. UDW as share of total GDP.

- Turkey. Level (TL), proportion of GDP.

Breakdown available

- Spain. Data for Spain (1964-2003), Andalusia (1980-2000) and Murcia (1980-2003), data by provinces 1980-2000.

Key strengths of a method

- Italy. Easy to implement.

- Romania. Harmonised data.

- Turkey. Good national and cross-country data availability.

Key weaknesses of a method

The Tanzi method produces overall estimates of all the non-observed economy, which is not the focus of the current study.

The assumption made by proponents of monetary methods that the extent of undeclared work is influenced only by the level of taxation is highly questionable. In monetary methods, the development of the ratio between cash and demand deposits is taken as an indicator for the existence and development of UDW. One of the problems with this approach is the assumption that transactions in the informal economy are made in cash. Next, the changes in the currency-demand deposit ratio are more due to a slowdown in demand deposits than to an increase in currency caused by informal activities. Also, the assumption that the extent of undeclared work is influenced only by the level of taxation remains disputable. Finally, the monetary model calculations have been criticised for measuring unrealistically high rates of UDW.

- Italy. Only aggregate measure of tax evasion; difficulty of estimating the "true" cash-to-M2 ratio.

- Spain. Most authors agree that this approach takes into account only one of the several explanatory causes of the underground economy, which is tax evasion. Hence they acknowledge important limitations of the approach

- Turkey. Highly volatile estimates within sample; single equation short time-series data estimation sensitive to formulation; estimates not precise. Estimation 'remedies' lead to too conservative estimates.

Potential applicability across the Member States

- Italy. Good, conditional on the availability of data on cash.

- Spain. As long as a commonly agreed estimation equation is used, the potential applicability is high; however, there might be significant difficulties in the common measures of tax burden.

- Romania. Good, as it makes use of a rather commonly used methodology.

- Turkey. Very good due to harmonised national account systems.

3.3.2   *Method 5: Global Indicators Method - Electricity Consumption*

Key assumptions

The consumption of electricity is the single best indicator of total economic activity. The elasticity of this consumption with respect to GDP is equal to one.

Estimation approach used

The difference between the growth rate of electricity consumption (a proxy for the growth rate of total economic activity) and the growth rate of measured GDP yields an approximation of the growth rate of unrecorded income.

- Romania. Electricity consumption.
- Turkey. Electricity consumption.

Underlying data and information requirements

- Romania. Use of harmonised data.
- Turkey. Data available (as in monetary). Electricity consumption and production data, by province and industry-residential breakdown.

Type of data on UDW delivered

- Romania. UDW as share of total GDP
- Turkey. Level, then proportion of GDP.

Breakdown available

- Romania. Non-available.
- Turkey. Non-available.

Key strengths of a method

- Romania. Harmonised data.
- Turkey. National and cross-country data availability. Reliable method for trends.

Key weaknesses of a method

The method requires a problematic estimate of the initial share of unrecorded income in total economic activity.

- Turkey. In the only study for Turkey, it provided conservative estimates (perhaps because Istanbul is a big city in terms of electricity consumption, industrial production and population). Further breakdown is needed. Also, much residential electricity is stolen, especially in the southeast (20% of Turkish consumption is unaccounted, much higher than accepted practice).

Potential applicability across the Member States

- Romania. Good, as it makes use of a rather commonly used methodology.
- Turkey. Good.

3.3.3 *Method 6: Latent Variable Methods - MIMIC (multiple indicators and multiple causes) or DYMIMIC (dynamic multiple indicators and multiple causes)*

Key assumptions

Undeclared work is an unobserved (or latent) variable that influences observed indicators and is determined by observed variables.

Estimation approach used

First, search for determinants (e.g., real and perceived tax burden, the burden of regulation, tax immorality, etc.) and indicators (male participation rate, hours worked and growth of real

GNP). Then, calculate undeclared work with the aid of econometric tools such as MIMIC or DYMIMIC.

- Italy. The method is based on the statistical theory of unobserved variables, which considers multiple causes and multiple indicators of the phenomenon to be measured. For the estimation, a factor-analytic approach is used to measure the hidden economy as an unobserved variable over time. The unknown coefficients are estimated in a set of structural equations within which the "unobserved" variable cannot be measured directly.

- Spain. Determinant variables: GDP growth, income level, disposable income, average real pension, tax pressure, public consumption, direct and indirect tax over GDP, indirect tax over GDP, social security contributions over GDP, unit labour costs, rate of public employment, unemployment rate and rate of self-employment, waged employment rate, temporality rate in employment, price index. Observed indicators: GDP, nominal and real GDP per capita, participation ratio of labour force, employment rate, currency ratio, activity rate, liquid assets held by the public, cash in circulation, energy consumption, male labour participation.

- Romania. The method supposes that the "hidden economy" (which is for all purposes in this method equivalent to UDW) leaves "traces" which are to be found (as they are latent) in two aggregates: the share of wages in total household disposable income and the covered wage bill (here used as a proxy for wages paid formally and for which social contributions are paid, therefore incomes collected by the state). Therefore, the difference between the total household disposable income and wages, which are here considered as a proxy for formal incomes, as well as the difference between the total wage bill and the covered wage bill, are attributable, at least in theory, to the hidden economy. It is assumed that determinants for those two variables, which are in turn taken as both endogenous and exogenous, are GDP growth expressed as an average for the interval up to the moment of the calculation, employment in agriculture as a share of total employment and, up to 2004, the so-called "Liberalization Index" which served as a proxy for the progress in the Plan to Market Transition; calculated values of the two variables (as opposed to statistically available values) are then used in order to calculate the dimensions of the UDW (hidden economy) expressed conventionally as share of the GDP. A second method supposes that undeclared activities (i.e.: UDW), are strongly connected with practices such as bribe, corruption, graft, tax evasion, etc; Therefore, the higher the prevalence of such practices in a certain sector or within a certain economic activity, the higher the prevalence of the UDW.

Underlying data and information requirements

- Italy. National Accounts data, administrative data; very many variables may act as indicators or causes.

- Spain. Objective tax pressure: weight of taxes on GDP; subjective tax pressure: rate of growth of that weight; temporality rate: weight of fixed term contracts over the total; disposable income per capita from national accounts; GDP growth from national accounts; GDP per capita from national and regional accounts; activity and employment rates from LFS.

- Romania. National Accounts data and some administrative data usually available in all Member States; the method makes use of a dedicated survey of enterprises.

- Turkey. CB, Ministry of Finance, SPO, Turkstat macro data readily available.

Type of data on UDW delivered

- Italy. No direct measure of UDW, only a measure of tax evasion and/or underground activity.

- Spain. Underground economy as a share of GDP.

- Romania. UDW as a share of total GDP; share of workers engaged in UDW by broad economic sector and by economic activity.

- Turkey. Level in currency (TL or USD), proportion of GDP.

Breakdown available

- Spain. Aggregated data for Spain (1976-2002); data for Murcia (2002) and for 46 provinces out of 50 (1996 and1998).

- Romania. Breakdown by activity.

Key strengths of a method

- Italy. Relatively easy to implement

- Spain. MIMIC more accurate than the monetary method and better reflects the multidimensional nature of the phenomenon.

- Romania. Use of harmonised data and highly adapted to situation in the New Member States; makes thorough use of the concept of UDW and thus distinguishes from the broader context of "informality"; covered wage bill as an indicator of "regulatory compliance" highly suitable for this purpose; can provide a quite detailed picture with regard to the actual share of the workforce involved in UDW.

- Turkey. Good national and cross-country data availability; reasonable and satisfactory results (DYMIMIC).

Key weaknesses of a method

MIMIC method produces overall estimates of all non-observed economy, which is not the focus of the current study.

Latent variable methods in general require a problematic estimate of the initial share of unrecorded income in total economic activity.

- Italy. Only aggregate measure of tax evasion. It provides only trend data; hence the absolute size of the shadow economy must be estimated by taking advantage of an "external" benchmark. There is no definition of the "underground sector" - it is just an unobserved variable.

- Spain. The most important weakness of the method is the strong dependence of the outcomes on the (exogenous) choice of the scale coefficient. This approach only allows for an ordinal analysis of the underground economy, hence it is necessary obtaining an exogenous estimation for a specific year before estimating the whole time series.

- Romania. Severe limitations due to its dedicated survey-based character.

- Turkey. Conservative proportions obtained in MIMIC; it systematically overestimates crisis years from trend.

Potential applicability across the Member States

- Italy. Good, but determinant variables and observed indicators may differ significantly across Member States.

- Spain. The selection of relevant determinants may significantly vary across countries, which may make the generalised application of this method quite difficult. Furthermore, as in the case of *MIMIC* method, there might be some difficulties to obtain certain homogeneous indicators, such as the tax pressure.

- Turkey. No guarantee of standardised data or estimation variables across countries.

3.4 Other approaches

3.4.1 Informal sector and income inequality

Source: Chong, A. and M. Gradstein (2007): "Inequality and Informality", Journal of Public Economics, 91, pp. 159-179.

This article presents theory and evidence on the relationship between inequality and informality. It first builds a theoretical model in which the size of the informal sector is negatively related to wealth and institutional quality (which should explain why more developed economies have smaller informal sectors), and is positively related to income inequality. Basically, an increase in income inequality lowers the relative benefits of becoming formal for the poor and produces a bigger informal sector, the more so the weaker the institutions. The model is then empirically tested using different proxies for the size of the informal sector, income inequality and institutional quality, and employing different econometric techniques in a cross-country sample and a panel analysis. The main result is that income inequality, particularly in conjunction with institutional quality, is a statistically significant determinant of the relative size of the informal sector. This result is shown to be robust with respect to a variety of econometric specifications. By including some of the government policy variables traditionally conceived of as important determinants of the informal sector, the article shows that in the presence of institutional and inequality variables, some of the commonly believed determinants of informality are not robust in all specifications; more specifically, the proxies for the tax burden and for labour rigidity are significant in some specifications but not in others.

3.4.2 Estimations based on different approaches

Source: Fethi M. D., Fethi S. and S. T. Katircioglu (2006): "Estimating the size of the Cypriot underground economy: A comparison with European experience", International Journal of Manpower, 27, 6, pp. 515-534.

The paper aims at measuring the size of the underground economy and the amount of tax evasion in Cyprus over the period 1960-2003 by employing recent data and several different approaches (both monetary and non-monetary): employment discrepancy; simple currency ratio; transaction and currency demand. It also compares these figures with some European estimates. The paper stresses that each approach has strengths and weaknesses, that they yield different results and that the theory is far from selecting the best method. They hence calculate average values and find that, in Cyprus the average ratio of the underground economy to GDP is 9.41 percent and tax evasion is 0.31 percent.

Source:

Kazemier, B. (2005) "The Underground Economy: A Survey of Methods and Estimates", Discussion Paper, Statistics Netherlands, Voorburg, Netherlands.

This paper is not available online. It is published as Chapter 2 of the Jahrbuch Schattenwirtschaft 2006/2007 edited by Enste, D.H. and Schneider, F.

It summarises, in Chapter 2.3, the main available methods to estimate the size of the underground economy (no attention is paid to the methods measuring the informal and the illegal economy). No particularly innovative description is discussed. The main claim is that these methods do not provide the necessary detail to be of help for the national accounts

and that surveys are the best instruments available to estimate the size of the underground labour market.

3.5 **Conclusions**

The recent international literature reviewed in this study has mainly focused on applications of the existing methods and on technical/econometric developments, aimed at tackling some of their main shortcomings, paying particular attention to those of the MIMIC models. Some attention has also been paid to institutional and socio-economic factors.

Several papers devote space to reviewing the existing definitions of the unobserved / underground / shadow economy and the different methods employed in the literature. Repetitions and references to well-known literature are common.

Hence, overall the literature review does not provide new specific suggestions on the method(s) to be preferred at the European level, even though some remarks are certainly useful.

Much of the above applies also to the review of the national literature sources. The core country experts highlighted advantages and disadvantages which tend to confirm existing findings.

This survey hence confirms that indirect methods differ with respect to:

- data requirements;

- the possibility of breaking down aggregate national data by employment status of individuals, occupation, sex, etc.; and

- the potential for the method to provide data on undeclared work across sectors and/or countries and over time.

It also confirms that indirect methods may lack information on structural aspects of UDW and they underestimate different socio-cultural profiles. Some are too simple to reflect reality and some include too many variables and sources of information which undermine the certainty and reliability of the results.

Indirect methods may also expose difficulties with the harmonisation and adjustment of figures drawn from different sources and offer limited cross-national comparability of the results.

The assumption that undeclared work may be quantified by matching actual data with some "all inclusive" indicator is a key, but not always sufficiently explored, issue.

All approaches, with the notable exemption of the labour input approach, yield no refined picture of undeclared work, and generally use a definition of the underground economy (including both legal and illegal activities) that is too broad. This is why they are likely to produce upper biased estimates of UDW.

Econometric models are unable to provide reliable and exhaustive estimations of GDP, or of underground production. Their validity, however, often depends on the extent to which the chosen causes and indicators reflect what they are assumed to reflect. In addition, it is not clear which kind of activities are measured by the models (for example, non-observed or non-measured production; informal and illegal activities in addition to underground activities); the assumptions made tend to be too simplistic; the results obtained by use of a given model are not robust to changes in the underlying assumptions; different models produce different results; and econometric models provide only global estimates for the whole economy.

The table below further summarises in brief the observations from the literature review in relation to key dimensions to be used in the process of determining the most suitable EU-wide applicable method to measure UDW.

Table 3.2 – A summary overview of the key methods for measuring UDW

Method	Data on UDW delivered	Breakdown available	Main strengths	Main weaknesses	Cross-country applicability
1. –Discrepancy	% of GDP	Regional (ES) Sector (EL)	-Good data availability -Harmonised data used	-Different sources used together, hence, the estimates problematic -Certain important sectors excluded	Good
2. – Labour input	% of total employment and No of workers	Sector (IT, ES, RO) Region (IT) Occupational categories (EL)	-Well established -Refined breakdown available -Harmonised data used	-Reliance on LFS results questionable (lack of representativeness in LFS; dishonest responses to LFS)[1] -Some countries lack data -Could be difficult to implement	Very good
3. – Degree of participation	% of GDP % and no of workers % of income	Regional (RO)	Harmonised data used	-Example found only in RO -Assumptions questionable	Possible to an extent
4. – Tanzi method	Underground economy as % of GDP, GVA, rate of growth	Regional (ES)	-Easy to implement -Harmonised data used -Good data availability	-Focus on all non-observed economy (of which UDW is only one part) -Assumptions questionable	Good
5. – Global indicator – electricity consumption	% of GDP	Not available	-Harmonised data used -Good data availability	-Requires a problematic initial estimate -No breakdown is available -Assumptions questionable	Good
6. – Latent variable MYMIC/DYMIMIC	% of GDP % of workers	Regional (ES) Activity (RO)	-Easy to implement -Harmonised data used -Good data availability	-Focus on all non-observed economy (of which UDW is only one part) -Requires a problematic initial estimate	Limited

Based on this overview, the following observations can be made:

- Method 4 (Tanzi) and method 6 (latent variable MYMIC/DYMIMIC) cannot be considered as suitable candidates for an EU-wide method as they focus on measuring all of the non-observed economy, of which undeclared work constitutes only a part.

---

[1] However, tests have proved that at the level of NUTS 1-3 and for broad (one-digit) occupational categories or branches of activity, LFS results are statistically reliable. The lack of adequate data on the self-employed might be more problematic in relation to measuring UDW. In addition, there is the issue of multiple job holders, who usually have a job in the formal (recorded) economy and side jobs in the informal economy.

- Method 3 (degree of participation) could be excluded from further considerations as a suitable option for an EU-wide method, given its very limited potential applicability across the Member States.

- In relation to method 5 (global indicator electricity consumption), its disadvantages appear to outweigh greatly the advantages. So this method could also be excluded from further considerations as a suitable option for an EU-wide method.

- If such observations are accepted, the remaining options for consideration as an EU-wide applicable method are method 1 (discrepancy) and method 2 (labour input).

A useful outcome of the literature review has also been the preliminary assessment of the potential applicability of the different indirect methods across the Member States which can be drawn from the first inputs provided by the core country experts. This important outcome can be summarised here as follows.

- *Method 1: Discrepancy method.*

  The potential applicability of the method seems to be good, due to the existence of harmonised national accounts.

- *Method 2: Labour Input method.*

  Applicability is assessed as potentially very good by the experts from Italy, Spain and Romania, as it employs largely harmonised national accounts. The Greek expert pointed out that applicability is hindered by the existence of a plethora of social security regimes in Europe; the Turkish expert points to possible problems in the Mediterranean and/or transition Countries

- *Method 3: Degree of participation method*

  This is applicable, to some extent, as pointed out by the Romanian expert, as the method makes use of harmonised data available in all Member States.

- *Method 4: Monetary Method - Tanzi Method*

  The experts suggest that the potential applicability of this method is good, as it makes use of a rather commonly used methodology and harmonised systems of national account. This judgment is however conditional on the availability of data on cash and on the use of a commonly agreed estimation equation. For Spain, there may be difficulties with common measures of the tax burden.

- *Method 5: Global Indicators Method - Electricity Consumption*

  Applicability of the method is assessed as good by experts from Romania and Turkey, given that it is based on a commonly used methodology.

- *Method 6: Latent Variable Methods – MIMIC/ DYMIMIC*

  The potential applicability of this method is good, but determinant variables and observed indicators may differ significantly across Member States. Moreover, there could be some difficulties in obtaining standardised data (e.g., tax pressure) or estimation variables across countries.

4 REVIEW OF INDIRECT UDW METHODS APPLIED IN THE MEMBER STATES

This section presents, in brief, the reviews of the indirect methods to measure undeclared work (UDW), undertaken by national experts of 27 EU Member States, as well as Croatia and Turkey. This is a summary of the research undertaken by the national experts to provide a **systematic review of indirect methods** of UDW and the resulting national figures for the 29 countries.

In this section, we provide a summary description of the main findings of the national experts on UDW in the 29 countries. A brief account and evaluation of each of the six methods is given on the basis of the information collected by the national experts.

4.1 Discrepancy methods - comparing income and consumption

This is one of the most employed indirect methods in the study of UDW, as well as in the estimation of the underground/shadow economy in general.

The majority of the countries covered by the study (**17 out of 29**) report at least one source adopting this method, and in six countries – France, Greece, Hungary, the Netherlands, Spain and Sweden – there is more than one source (in Greece and Sweden four different source are available).

The **estimation approach** is generally the standard of the discrepancy method, but for some countries specific variants have been employed. For instance, in Belgium the estimation has been conducted on adjusted value added on a per-sector basis; in Romania a specific model of tax evasion has been developed and implemented; Slovakia and Estonia used differences between theoretical and actual VAT. Austria relies upon a combined estimation of shadow activities (focusing on specific sectors), VAT evasion, non recorded bounties and illegal activities. Finally, Ireland adopts a specific approach based on the estimation of a relationship between household food consumption and reported disposable income.

As for the **underlying data**, the most used ones are official data from National Accounts (10 Countries) together with fiscal data (five Countries) such as personal income taxation or VAT data. Different data are also present, e.g., data from surveys on household consumption, social insurance, wage earnings and activity levels of various specific sectors, households' food consumption. Among the core countries, estimation approach and underlying data are mainly from national accounts and fiscal sources for Turkey and Spain, while Greece presents studies using also data from social security institutions.

Type of data on UDW: given the nature of the method, most of the data on UDW come in the form of percentage of the shadow economy (or tax evasion, or undeclared income) on GDP. In one of the four studies for Greece, a ratio between actual and imputed social contributions is also provided. For Ireland, intervals for the ratio of actual to disposable income of households are also delivered. The level of detail of the data shows a degree of variability between the countries; **breakdowns** for sectors of economic activity are available only for five countries, while a regional breakdown is present only for Slovenia and Spain. Other types of breakdown (e.g. gender, age, employment status, etc.) are available for three countries and the studies in Slovenia and Greece appear to be the most detailed in this respect.

Time period and frequency of data collection are also variable: yearly data for sufficiently long time intervals (more than two years) are available only for seven countries, while quarterly data appear not to be available.

The **key strengths** usually identified for this type of measurement are mainly related to the ease of applicability (simple data collection; easily retrievable data) and to the possibility of meaningful international comparisons.

This is also the main reason behind the common observation on the **high potential applicability** of this methodology across the Member States.

The main **key weakness** of the method is the potential imprecision in providing an accurate measure of UDW. It relies upon strong assumptions and a simple methodology, and the main data source employed (national accounts) has not been developed in the light of the estimation of the shadow economy. In particular, the relationship between the real-output measure of the shadow economy and UDW is not directly captured by this method. A possible exception to this general weakness is the study for Greece (Tsatos et al. 2001) in which data from social security contributions are employed.

4.2 Labour input method

Similarly to the discrepancy method, the techniques based on labour input detection are also widely employed. Actually, **this is one of the most common and well-established (indirect) methods** for dealing empirically with issues related to the underground-shadow economy.

17 Countries report at least one source adopting this method, and eight countries – Croatia, Czech Republic, Estonia, Hungary, the Netherlands, Portugal, Slovakia, Slovenia – report more than one source. In Hungary four different sources can be traced. The application of this method appears to be particularly developed (official source and estimations given on a regular basis) in Italy, Netherlands and Slovakia. It should be noted that for the Czech Republic this method has been applied only to the construction sector, but this is the core sector for UDW.

For Austria, the method is applied in a very limited way – there is a paucity of data (only one year) and limited applicability (only UDW of migrants is estimated).

The **estimation approach** generally follows the standard procedure prescribed for this method – comparing the data from LFS (supply side) with those from the firms demand side. The differences are related to the depth of the analysis and its integration with different data sets. In some cases (e.g. Italy, Czech Republic, Slovakia), a relatively more complete and refined analysis is pursued. For instance, data from different sources can be harmonised and integrated in independent ways, information on non-directly observed phenomena (such as undeclared foreign workers or, for Ireland, data on part-time, seasonal and casual workers) can also be used and integrated. Data on the number of job-holders can be converted into full-time equivalent units.

Some countries (Croatia, Portugal, Slovenia) integrate this method with information on productivity, to achieve estimations of the value added by the informal sector. In the case of Hungary, information on tax records and pension funds is also used for estimating the share of UDW in total employment. In Spain, the number of employed workers according to the LFS is compared to the number of workers affiliated to social security.

Given the nature of the method, country studies generally share one common source of **underlying data**, i.e. employment figures from the official Labour Force Survey (LFS) or from census surveys. The situation relative to the other data sources – figures for firm demand for labour – is clearly less uniform.

The most common data set for labour demand – coherently with the standard method's procedure – comes from business and firms surveys, but there are also variants and integrations. Some of the studies make use of administrative data from different sources,

such as social security institutions (Italy, Spain), tax and fiscal authorities (Estonia, Portugal, Slovakia), and national accounts data (Slovenia).

In the study for the Czech Republic, firm surveys are integrated with data from labour inspectorates and other institutions, and with information coming from consultations with trade unions, entrepreneurs' confederations and local experts. The study also takes into account the estimations of expelled foreign illegal workers and data from the Eurostat's Project on Exhaustiveness. The four studies for Hungary use only data from tax records and pension funds.

As for the **type of data on UDW delivered**, the method generally allows for a straightforward calculation of the number of UDW or of UDW as a share of total employment (full-time equivalents for Italy). Some of the studies provide also estimations (via productivity) of the size of the informal sector on GDP (Croatia, Estonia and Slovenia). Portugal shows data on UDW only as shares of value added of the GDP.

Breakdowns for different dimensions are available for an ample number of countries (10) and the most frequent breakdown is for sectors of economic activity. Only Croatia (national vs. foreign) and the Netherlands (gender; number of working hours) provide breakdowns not encompassing the sectoral dimension.

The remaining countries also provide, in some cases, breakdowns along additional dimensions (e.g. geographical area, gender). Italy provides a sectoral breakdown at both regional and national level, together with a breakdown for size class of firms.

Time period and Frequency of data collection is mostly yearly, but many countries present data for a very limited time span (one or two years). Latvia and Turkey provide data with quarterly frequency, while Slovakia presents both quarterly and yearly data. Italy has a rather long time series (yearly, with differentiated breakdowns) ranging from 1980 to 2005.

This method is widespread and well-known. It basically relies upon official data (LFS surveys) that are usually easy to access and systematically updated. These are not however its unique **key strengths**, as this methodology allows for simple and straightforward calculations and in many cases also for interesting and refined breakdowns.

On the other hand, the **key weakness** of the method is the strong dependence of the resulting estimates on the quality of the data. Information from LFS and firms surveys may be affected by biases and inconsistencies (e.g., lack of willingness to respond honestly).

A widely held opinion is that the method is simple and useful, but somewhat crude.

These limits notwithstanding, the **potential applicability** of the method is generally recognised as high and advisable.

4.3 Degree of participation method

Contrary to the two previous methodologies, the degree of participation method is represented only in **five countries**: Czech Republic, Finland, the Netherlands, Romania and Slovenia. Furthermore, only Finland records three different sources adopting this methodology, although two of these procedures are evaluated as not detailed enough.

The **estimation approach** allows for a more differentiated range of techniques. For instance, while the study for the Netherlands adopts the "standard" procedure of Contini (1981), the study for the Czech Republic focuses on UDW among unemployed workers, and compares the reported number of unemployed workers from the LFS and the registered number of unemployed workers at the Employment Offices. The Slovenian study also adopts a peculiar methodology, based on the discrepancy on hours worked: the difference between registered and actual (real) employment is measured by means of information on hours worked.

The Romanian study uses a more articulated approach with two methodologies. In the first one, a (mildly-sophisticated) mathematical apparatus is used, together with the assumption that a higher level of formal income per household implies a lower participation in informal activities, to derive the result that the regions that display a higher formal income per household will have a lower involvement in informal activities. The second procedure starts from the assumption that the economics of informality is one of opportunities: the wider the general economic opportunities the wider the opportunities for informal and especially for UDW. The method then argues that regions displaying a lower GDP per capita are not necessarily hotbeds of UDW, while regions with a higher GDP per capita might as well be hotbeds of UDW.

One of the Finnish studies compares the LFS recorded hours worked with other registries (distribution of income, received salaries and benefits).

Underlying data differ: LFS surveys are commonly used (Czech Republic, Finland, Romania, Slovenia), but also national accounts data (Romania), households surveys (Romania), and general data on permanent employment (the Netherlands) are employed. One of the Finnish studies uses income distribution statistics.

The *type of data on UDW delivered* were mostly in terms of UDW volume or percentage of employment (unemployment for the Czech Republic), but also percentage of informal sector (computed *via* productivity) were delivered in some cases (Finland, Romania, Slovenia).

Breakdowns are in general available in the sectoral dimension (Romania, Slovenia and Finland for some sectors) and in other dimensions, such as regional level (Czech Republic, Romania) or gender, education, age (Czech Republic, the Netherlands).

As for the *time period covered and the frequency of data collection,* these are quarterly for Czech Republic, yearly for Slovenia (for the time period 1993 to 2004) as well as for Romania and the Netherlands (but for very few years). Finland presents yearly data from 1994 to 2001.

Due to the scarcity of pre-existing implementations, this method does not present itself as a candidate for a widespread adoption, and its *potential applicability* can be considered low.

The main *key strengths* and *key weaknesses* are basically those previously discussed with respect to LFS data (when used).

4.4 Monetary Methods: Tanzi Method

The methods based on the Tanzi monetary approach are *the most frequently used* among the 29 **countries: 20** of them report at least one source using this methodology and 12 countries show more than one source – Spain reports six different sources for these methods.

The Tanzi method is one of the most developed techniques for estimating the non observed economy: its usage is established and widespread and relevant favourable features act in its favour – specifically, the ease of implementation, together with the accessibility of the required data.

The *estimation approach* is standardised: it is based on econometric estimates of the sensitivity of currency demand to the tax burden, which can be used to derive a measure of the currency held for illicit purposes; subsequently, and by assuming that the velocity of circulation in the underground economy is the same as that in the "legal" sector, the exchange equation is employed for estimating the size of the underground economy.

Most of the studies (in 14 Countries) directly apply this methodology, with some minor variants. For instance, as illicit transactions are generally made in cash and avoid the banking system in order not to leave traces, relevant increases of the demand for cash which cannot be explained by standard factors can be imputed to the growth of the non observed economy; a long series of monetary data may thus be used to recover the size and the development of the underground economy in nominal terms (Bulgaria, for instance, provides two studies applying different versions of this variant).

Three countries present studies which depart from the standard procedure in a slightly more pronounced way. In Denmark, a comparison between the growth of private consumption and the growth of large banknotes in circulation is performed. In Austria and Germany, two studies combine the standard monetary method with the MIMIC (Austria) and DYMIMIC (Germany) approaches. In the Austrian case, the MIMIC part is built up by taking the UDW as an unobserved variable and by considering multiple causes/indicators; a factor-analytic approach is then used for the estimation.

The *underlying data* required by this methodology are in general common macroeconomic time series. They include the main monetary aggregates and ratios – e.g. M1, M2, M3, currency/deposit, etc. – together with appropriate measures of the velocity of circulation; time series for real GDP, real private income per capita, inflation and interest rates, share of taxes on GDP (or other measures of tax burden) are generally also required.

Studies employing the variant of the method that contrasts banking monetary instruments against cash generally require long time series for deposit money and cash payments (Croatia). The two studies for Bulgaria also make use of (seasonally adjusted) time series for household expenditure. For Denmark and Germany, the data were index for private consumption and information on large banknote circulation (Denmark), working hours, material consumption, VAT drop-out and cash flows (Germany).

Type of data on UDW delivered: the method produces, as a result, a measure of the underground economy (and tax evasion) as a share of total GDP or of total Gross Value Added (as is the cases of Slovenia and Spain). Sometimes, however, a direct monetary measure of the amplitude of the underground sector is provided (e.g., Austria, Czech Republic, France, Germany, the Netherlands).

The method is macroeconomic in its nature, so *breakdowns* for different sectoral, territorial and socio-economic dimensions are usually not available. There are however some exceptions; for Poland the method reflects well changes in sectors such as tutoring, housekeeping, taxi services; for the two countries adopting a mixed methodology – Austria and Germany – breakdowns are available for broad economic sectors (Austria, Germany), and also for Federal States (Austria).

Time period and Frequency are mostly yearly – the only exceptions are the two studies for Bulgaria, providing quarterly data for the period 1997-2002, a source in Poland that uses quarterly data, and the quarterly data provided by Romania for the period 1998-2008.

In general, the outputs of these studies are rather long (around ten years or more) time series estimates of the shadow economy (SE), calculated as a ratio of GDP (SE/GDP). Some countries provide significantly long time series: Germany from 1975 to 2009, Turkey from 1970 to 2000 and Spain from 1980 to 2001 (from different sources). There are also cases in which only few figures are provided: Greece presents only estimates of average figures for the periods 1950-1988 and 1960-1997. Cyprus provides only average values for two periods: 1960-2003 and 1960-1990; Portugal and France have results only for three years and Slovenia for one year only.

The *key strengths* of the method are its international recognition and the fact that it uses an underlying assumption that is generally accepted. Also, the fact that it uses National

Accounts data is obviously a major strength in terms of comparability and applicability across the countries.

The method is characterised by ease of implementation, clarity and formal presentation. Furthermore, it requires data that are easily accessible and generally delivered by many national and international institutions.

These features lead to a consensus on the generally positive evaluation of the method's *potential applicability*.

Nonetheless, some *key weaknesses* of the method are also highlighted by many studies and researchers. The analysis' results strongly depend upon two main assumptions: underground transactions are exclusively conducted on a cash basis (and this may lead to an underestimation of the shadow economy); the velocity of circulation is the same for both parts – regular and underground – of the economy. While the first assumption may be easier to defend, there exists more limited consensus on the second one, as it lacks strong empirical evidence.

Furthermore, many authors agree that the method takes into account only one of the several possible explanatory causes of the shadow economy – i.e. tax evasion – and this may result in a severe limitation.

Finally, *it should be noted that this approach does not usually make it possible to distinguish UDW from criminal and other non observable activities, and that its macroeconomic nature does not allow data breakdown. In particular, estimates of UDW can only be obtained via supplementary hypotheses (on productivity).*

4.5 Global Indicators Methods: Electricity Consumption

The methods based on global indicators (mainly electricity consumption) are somewhat at a middle position in the six-method scale: studies adopting this methodology are sufficiently spread across the 29 Countries but they are not as common as those adopting methods 1, 2 or 4.

12 Countries report the presence of at least one source making use of the global indicators method, and for half of the cases there is only one source per country. A notable exception is Poland, for which five different sources for this method have been identified. There are also two different sources for Belgium, Hungary and Slovenia, and three for Croatia.

As in the case of the Tanzi monetary methods, the *estimation approach* for the global indicators methods is a rather standardised one. Most of the studies apply the general procedure of comparing the registered growth of real GDP with the implied growth of activity measured by the growth of electricity consumption.

Four countries have some studies that make use of a slightly modified approach. For instance, in Belgium and Croatia, two studies adopt the MTE (modified total electricity consumption) method, in which the estimated relationship between changes in electricity consumption and in overall economic activity takes into account additional variables that could explain variation in electricity usage. For Portugal, a study develops a similar methodology by separating the households electricity consumption into two parts: one related to the hidden economy and one independent from it; thus, by estimating two equations (one explaining electricity consumption via several factors and the other one explaining why households try to hide their economic activity) a measure of the hidden sector is obtained. Finally, Hungary presents a study in which electricity consumption and the Tanzi monetary procedure are integrated in a DYMIMIC econometric model.

In line with the standardised procedure of the method, the *underlying data* required are, in general, time series for GDP growth and for electricity consumption (the latter may be obtained by various sources, such as supply to households, general energy supplies, data

from different power plants). When modified methods are employed, the information requirements may be more demanding. In the case of MTE methods, for instance, time series on prices and changes in industry shares are required (Belgium), or even more structured data, such as personal incomes, corporate profits, taxes on goods and services, public social welfare expenditures, employment data may be employed (Portugal). In the case of one of the studies for Poland also average atmospheric temperatures are used.

Type of data on UDW delivered: the method produces a measure of the size of the underground economy in absolute terms, or as a share of total GDP; when in the form of time series, the data usually include rates of growth of the shadow economy, expressed as the SE/GDP ratio. One of the studies reported by the Hungarian expert does not single out the SE/GDP ratio for Hungary but only the value of the same ratio for all the post-soviet economies.

Breakdowns for different sectoral, territorial and socio-economic dimensions are usually not available for these studies. Exceptions are Bulgaria (possible breakdown for main sectors of activity), France (possible breakdown by sectors) and Slovenia (regional breakdown).

Time period and Frequency are mostly yearly – the only exception is a source in Poland that uses quarterly data. For this methodology, the time series produced are – on average – extensive enough, covering some years. The study for Portugal presents only an estimate for 1990. Slovenia shows only the average value for 1990-2001.

The ***key strengths*** of the method rest on the two facts that are at its basis (consumption of electricity is the single best indicator of total economic activity; the elasticity of this consumption with respect to GDP is equal to one); furthermore, the methodology is clear and easy to implement, and the required data are usually easily accessible and reliable.

These features are the main reasons behind the popularity of the method and the generally favourable evaluation it obtains relative to its ***potential applicability*** across Member States.

In relation to the ***key weaknesses***, a distinction must be made between methods controlling for various determinants of electricity consumption and simpler implementations. First there is a critique addressed to both variants: these methods are usually unable to capture the whole spectrum of relevant hidden activities, because electricity consumption is tightly related only to energy-intensive (usually manufacturing) activities. In particular, underground services and "immaterial" productions, such as housekeeping, personal domestic services, taxi services, private lessons, etc., are susceptible to go largely undetected by these methods.

Second, there is a problem for the studies that do not control for other factors capable of influencing the demand for electricity. Variations in electricity consumption may come from sources other than hidden activities (e.g., changes in efficiency); but there is some debate on the factors to be included as adequate controls.

For this reason, the method is deemed by some researchers to be ***particularly inappropriate for transitional economies***, but also in this case there are doubts related to the instability of electricity demand in some transitional economies. There is also a specific concern in the case of Turkey, related to the paramount level of electricity consumption in Istanbul in comparison with the rest of the country.

4.6 Latent Variable Methods

Studies applying the latent variable methodology are present in some of the 29 countries but only **10 countries** report sources using the MIMIC-DYMIMIC approaches. These have been extensively adopted in the analysis of UDW in Spain (five studies); Slovenia and

Turkey report two different sources each. The cases of Austria and Germany have already been discussed in the section on monetary methods, so they will not be detailed here.

The latent variable approach consists of an estimation process in which a set of variables are taken either as consequences of the presence of shadow economy (*indicators*) or as its causes (*determinants*), provided that the shadow economy is assumed to be an unobservable phenomenon. Hence, when put into practice, the **estimation approach** based on this methodology provides a wide variety obtained by combining different models. For instance, the specific econometric techniques applied to obtain the corresponding coefficients may differ among studies, depending on the assumptions made over the degree of multivariate normality of the variables. Generally, the estimation method relies upon maximum likelihood techniques.

Besides the statistical hypotheses, another source of differentiation among the implementations of this methodology is clearly the choice of indicator and determinant variables. Even though all the studies considered in the present analysis basically share a common framework, a somewhat different case is the source for Romania. In this case the latent variable approach has been "customised" to fit the country context. It is assumed that the shadow economy leaves "traces" which are to be found (they are latent) in basically two aggregates: the share of wages in total household disposable income and in the covered wage bill.

As noted before, the **underlying data** required may vary between the different studies. The most common variables used are National Accounts data, administrative data, LFS data, fiscal and tax records. For instance, in the studies for Spain the *determinant variables* are: direct and indirect tax over GDP, social security contributions over GDP, rate of public employment, unemployment rate and rate of self-employment, unit labour costs, employment rate of waged workers, unemployment rate, disposable income and public consumption, rate of temporality in employment and GDP growth. The *indicator variables* are: real GDP (absolute and per capita), labour force participation ratio, activity and employment rates, currency ratio, liquid assets held by the public and energy consumption. The specificity of the Romanian source is reflected also in the choice of data: GDP on one side, and various wage statistics plus collected social security contributions on the other side. Finland makes use of data from European values surveys.

Type of data on UDW delivered: the studies usually deliver estimates of the ratio SE/GDP, but some of them propose also different measures: Romania and Slovenia present estimates of the total number of UDW workers (Romania) and of the share of workers engaged in SE.

Breakdowns for sectors of economic activity are available for Croatia and Slovenia. Two of the studies for Spain present territorial breakdowns (one only for Murcia and a second one for 46 provinces out of 50).

Time period and Frequency are yearly; medium-length time series are generally provided, the only exception being France (only one figure). Two of the studies for Spain present data for a limited number of years (respectively, 1996-1998 and 2002).

Among the most frequently mentioned **key strengths** of this methodology is the fact that it is "eclectic" in a certain fashion, i.e., it allows for the identification of different causes of SE and conceptually relates them to the indicator variables in a (macro) economic and econometric framework. In particular, the method allows the identification of a connection between the relevant variables. Furthermore, it takes explicitly into account the multidimensional nature of the phenomenon (SE) and generally offers accurate estimates.

The **key weaknesses** of this methodology are related to its technical and econometric features: the maximum likelihood techniques tend to produce estimated coefficients which

are unstable with respect to sample size and alternative specifications. In particular, the choice of the determinant variables is crucial, so that the results strongly depend on selection criteria for which a widespread consensus is lacking. Another, related, problem is the general lack of homogeneity in the measurement of some determinant variables across countries (this problem is particularly relevant for Romania, given the choice of variables specifically tailored for the national context).

These harmonisation problems are viewed as a limitation for the *potential applicability* of this method.

4.7   Other methods and issues

Some (seven) of the 29 Countries considered in the present analysis report the presence of a number of *studies adopting indirect methodologies which do not immediately fit into the six methods* described above. These Countries are: Denmark (1 source), Estonia (3), Lithuania (1), the Netherlands (1), Portugal (1), Slovakia (1), and Croatia (1).

However, most of these studies (five sources in as many countries) focus on a specific dimension of SE rather than UDW - the problem of tax evasion. Actually, the type of estimated data which is delivered usually refers to the amounts of tax audit/inspections procedures reporting fraud/evasion or amounts of evaded tax base (or payments). Clearly, this information, although relevant *per se*, is only indirectly related to the problem of UDW, so these studies will not be evaluated here in detail.

The same holds for the study for Lithuania, as it focuses on the percentage of non-observed wage relative to overall wage indicators.

Pertinent information on UDW obtained via other methods is reported only in one study for Portugal, which relies upon interviews with experts. After having found statistical discrepancies in overall employment, informed observers are interviewed in order to establish a benchmark of undeclared work in small, medium and large size firms; this allows for an assessment of the percentage of UDW work in various sectors. Although the method is relevant for UDW estimations, its intrinsic characteristics hinder its potential applicability.

Three countries – the United Kingdom, Malta and Luxembourg – *reported the absence of any relevant or pertinent study* on UDW for their economies that can be included in the methods here itemised. As highlighted by the respective national experts, this does not amount to say that the phenomenon is completely absent in these countries. Rather, it is a signal of the lack of any systematic – or sufficiently accurate – statistical information on the subject.

For the **United Kingdom**, the expert points out that, according to the Autumn 2004 European Employment Observatory Report[2], there is no consensus on the size and economic value of undeclared work in the UK, due to the lack of robust data on the scale of UDW. This situation has remained basically unchanged up to now.

As for **Malta**, there is no relevant study applying one of the six indirect methodologies, but the expert reports some data obtained from the local public employment service: basically, it is the number of reported infringements (people working without having notified the PES of their engagement, thus breaking the law).

Also **Luxembourg** lacks reliable statistics on UDW. Nevertheless, the expert mentions an estimation proposal made by a research institute using the European average rate of UDW

---

[2] European Employment Observatory Review, Autumn 2004, United Kingdom. Available at: http://www.eu-employment-observatory.net/resources/reviews/eeo_review_autumn2004_en.pdf

as a benchmark. The figures thus obtained do not however constitute a proper estimation of illegal work in Luxembourg.

4.8   Summary overview of the different methods in the study countries

Table 4.1 provides a summary overview of the availability of different indirect methods in the 29 European countries reviewed during the study. The table is based on a calculation of sources using different methods available in each country. Based on this information, several observations can be made:

- The Monetary (Tanzi) method is most frequently used in the countries (39 sources across 29 countries), followed by the discrepancy (28 sources) and labour input (27 sources) methods.

- The least used method is the degree of participation, with only eight sources available in 29 countries.

- The number of sources available in each country for the main six indirect UDW measurement methods varies significantly between the countries. The highest number of sources is reported in Spain (14), followed by Slovenia (10), Hungary and Croatia (9 each), and Netherlands, Poland and Turkey (8 sources in each country).

- In contrast, none of the six main measurement methods is used in Malta, Luxembourg and the UK.

Table 4.1 Summary of UDW indirect measurement methods reported, by country

Country	Method						Total number of sources per country
	Discrepancy	Labour input	Degree of Participation	Monetary (Tanzi)	Global Indicators	Latent Variable	
Austria	(1)	(1)	-	(1)	-	(1)	4
Belgium	(1)	-	-	(2)	(2)	(1)	6
Bulgaria	(1)	(1)	-	(2)	(2)	-	6
Croatia	(1)	(2)	-	(2)	(3)	(1)	9
Cyprus	-	-	-	(3)	-	-	3
Czech Republic	-	(2)	(1)	(1)	(1)	-	5
Denmark	(1)	-	-	(1)	-	-	2
Estonia	-	(2)	-	(1)	-	-	3
Finland	-	-	(3)	-	-	(1)	4
France	(2)	-	-	(1)	(1)	(1)	5
Germany	-	-	-	(1)	-	-	1
Greece	(4)	-	-	(3)	-	-	7
Hungary	(3)	(4)	-	-	(2)	-	9
Ireland	(1)	(1)	-	(1)	-	-	3
Italy	-	(1)	-	-	-	-	1
Latvia	-	(1)	-	-	-	-	1
Lithuania	-	(1)	-	-	-	-	1
Luxembourg	-	-	-	-	-	-	0
Malta	-	-	-	-	-	-	0
Netherlands	(2)	(2)	(2)	(1)	(1)	-	8
Poland	(1)	-	-	(2)	(5)	-	8
Portugal	-	(2)	-	(3)	(1)	-	6
Romania	(1)	(1)	(1)	(2)	(1)	(1)	7
Slovakia	(1)	(2)	-	-	-		3
Slovenia	(1)	(2)	(1)	(2)	(2)	(2)	10
Spain	(2)	(1)	-	(6)	-	(5)	14
Sweden	(4)	-	-	(1)	-	-	5
Turkey	(1)	(1)	-	(3)	(1)	(2)	8
United Kingdom	-	-	-	-	-	-	0
TOTAL	**(28)**	**(27)**	**(8)**	**(39)**	**(22)**	**(15)**	**139**

Legend: the number in parenthesis indicates the existing sources available for the method in the country.

Table 4.2 shows the classification of sources available for each of the six methods by the nature of such sources. The sources have been classified into the following categories: Academic, Official (i.e. written by ministries of labour, finance, tax authorities, central banks etc), NSIs (National Statistical Institutes) and Other (chiefly social partners).

The analysis of the nature of the sources permits the following observations:

- A clear majority of sources (61%, or 86 out of 139 overall) are of academic nature,

- The number of official sources and NSI sources is equal (26 out of 139 overall, constituting 19% each, or 39% together).

- Looking at individual methods, academic sources dominate in the application of monetary (Tanzi) method; official sources in the discrepancy method; and NSI sources in the application of labour input method.

Table 4.2. Summary of UDW indirect measurement methods reported, by country and nature of source (official/academic/NSI)							
Country	Discrepancy	Labour input	Degree of Participation	Monetary (Tanzi)	Global Indicators	Latent Variable	Total number of sources
Austria	NSI	Academic	-	Academic	-	Academic	4
Belgium	(1) - Official (Institute of National Accounts)	-	-	(2) - both academic	(2) - both academic	(1) Academic	6
Bulgaria	(1) - Academic	(1) - Academic	-	(2) - Academic - Official source (National Bank)	(2) - both academic	-	6
Croatia	(1) -official	(2) -Academic	-	(2) -Academic	(3) -Academic	(1) -Academic	9
Cyprus	-	-	-	(3) -all academic	-	-	3
Czech Republic	-	(2) - both academic	(1) -academic	(1) -Academic	(1) -Academic	-	5
Denmark	(1) -Official	-	-	(1) - Employer representative body	-	-	2
Estonia	-	(2) - both NSI	-	(1) -academic	-	-	3
Finland	-	-	(3) - 1 NSI - 2 academic	-	-	(1) Academic	4
France	(2) -Official	-	-	(1) -Official	(1) -Official	(1) -Official	5
Germany	-	-	-	(1) -Academic	-	-	1
Greece	(4) - All academic	-	-	(3) - All academic	-	-	7
Hungary	(3) -All official	(4) -All NSI	-	-	(2) -all academic	-	9
Ireland	(1) Academic	(1) NSI	-	(1) Academic	-	-	3
Italy	-	(1) NSI	-	-	-	-	1
Latvia	-	(1) NSI	-	-	-	-	1
Lithuania	-	(1)	-	-	-	-	1

		-NSI					
Netherlands	(2) -Academic -Official	(2) - Both NSI	(2) - Both NSI	(1) Official source (National Bank)	(1) - NSI	-	8
Poland	(1) - Official	-	-	(2) - All official sources	(5) -All academic	-	8
Portugal	-	(2) - National Statistics - Academic	-	(3) - All academic	(1) -Academic	-	6
Romania	(1) -Academic	(1) -Academic	(1) -Academic	(2) -Both academic	(1) -Academic	(1) -Academic	7
Slovakia	(1) -Official	(2) - Both NSI	-	-	-		3
Slovenia	(1) - NSI	(2) - Both academic	(1) - Academic	(2) - Official source (Tax authority) -Academic	(2) -Both academic	(2) -Both academic	10
Spain	(2) - Official source (Regional Authority) - Academic	(1) - Academic	-	(7) - 2 official - 5 academic	-	(5) -All academic	14
Sweden	(4) -All NSI	-	-	(1) -Official	-	-	5
Turkey	(1) - Official	(1) - NSI	-	(3) - Official source (Central Bank) - 2 academic	(1) -Official	(2) -Both academic	8
Total academic sources	**9**	**11**	**5**	**28**	**19**	**14**	**86**
Total official sources	**13**	**0**	**0**	**10**	**2**	**1**	**26**
Total NSI sources	**6**	**16**	**3**	**0**	**1**	**0**	**26**
Total other sources				**1**			**1**
TOTAL	**(28)**	**(27)**	**(8)**	**(39)**	**(22)**	**(15)**	**139**

Legend: the number in parenthesis indicates the existing sources available for the method in the country.

Table 4.3 ranks each of the six main indirect UDW measurement methods according to their applicability across the Member States. The information is based on the assessment of such applicability as provided by the national experts in the reviews of existing methods in their country. The methods are subsequently ranked as of high/medium/low applicability, depending on their potential to provide useful and robust cross-country comparisons.

The following main observations can be made.

- Discrepancy, labour input and monetary (Tanzi) methods score highest in terms of their applicability across the different countries, based on their use of harmonised data, international recognition of the methodological approach and ease of access to the underlying data.

- In contrast, degree of participation and latent variable methods are assessed as having low applicability across the countries, primarily based on several key methodological considerations.

Table 4.3 – Method ranking, based on the level of potential applicability across countries

Method	Potential applicability across countries	Ranking (high, medium, low applicability)
Discrepancy	Ease of applicability (simple data collection; easily retrievable data) and possibility of meaningful international comparisons	High
Labour input	Widespread and well-known method, which relies upon official data (LFS surveys) that are usually easy to access and systematically updated	High
Degree of participation	Scarcity of pre-existing implementation. This method does not present itself as a candidate for widespread adoption	Low
Monetary (Tanzi)	Internationally recognised, uses an underlying assumption that is generally accepted; uses National Accounts data which is a major strength for comparability and for applicability across countries	High
Global indicators	Methodology is clear and easy to implement, and required data are usually easily accessible and reliable	Medium
Latent variable	There is a general lack of homogeneity in the measurement of some determinant variables across countries	Low

Table 4.4 describes, for each country covered in the study, the 'most frequently used' method, i.e. the method which has the highest number of sources applying the method in a particular country, alongside a summary of the experts' assessments of its key strengths and potential applicability across the Member States.

In this way, a detailed picture of the situation in each Member State in relation to the use of indirect UDW methods emerges.

Several general observations can be drawn:

- Labour input and monetary methods are widely applied across the countries. Labour input method was the most frequently used in CZ, EE, HU, IE, IT, LV, LT, NL, SLK and SLV. Monetary Tanzi method was the most frequently used method in BE, BG, CY, DK, DE, IE, PT, RO, SLV, ES and TR.

- The discrepancy method was the most frequently used method in eight countries; global indicators method in four countries. The least popular

method is the degree of participation method, which was the most popular method only in two countries (FI, NL).

Key strengths associated with the labour input method used in the countries included:

- Assures a detailed amount of information on undeclared work that can be used for estimating the corresponding hidden production and value added;

- Standard method based on well established national surveys, especially those referring to the supply of labour, even though those on the demand side are not presently collected in some countries and may require some lengthy effort to construct the necessary data bases;

- Conceptually straightforward and transparent estimation procedure, even though requiring a well established statistical implementation;

- Provides scope for disaggregation and can use time series;

- Harmonisation of data to the ESA95 concept.

Key strengths associated with the monetary (Tanzi) method used in the countries included:

- Well known method, relatively easy to apply, requiring a limited amount of statistical data;

- Provides comparisons over long time periods;

- Provides behavioural explanation of UDW activities, related to government regulation and tax burdens;

- Good national and cross-country data availability.

Both methods are assessed as being highly applicable across the countries.

Table 4.4 – Most frequently used method per country, its key strengths and potential applicability

Country	Most frequently used method	Key strengths	Potential applicability across MS	Most frequently used method 2	Key strengths	Potential applicability across MS
Austria	Discrepancy (1 source)	Estimations for UDW based on results of empirical studies and administrative data	As the calculations are based on the EC decision (24 July 1998), all EU member states should be able to apply these methods. But the data situation differs widely between the member states	Monetary (1 source)	Method tries to consider the multidimensional nature of UDW	Determinant variables and indicators may differ across Member States
Belgium	Monetary (2 sources)	Makes no a priori assumption of no shadow economy in a base year; it takes into account the phenomenon of money hoarding	Good if the same common methodology is used	n/a		
Bulgaria	Monetary (2 sources)	Well known method	Can be easily applied across the MS	Global indicators (2 sources)	Considers structural changes and corresponding activity shifts	More useful at the national level and long-term time series
Croatia	Global indicators (3 sources)	Provides a possibility to compare the results of various methods for the same country and a possibility to gain insight into dynamics of the undeclared work	Very applicable	n/a		
Cyprus	Monetary (3 sources)	This is a relatively simple method, requiring a limited amount of statistical data	This method can be applied in order to estimate the 'hidden' part of the GDP across the EU, but not in order to estimate the size and structure of UDW	n/a		
Czech Republic	Labour input (2 sources)	Provides UDW data in the core sector with most of undeclared work	Good	n/a		
Denmark	Discrepancy (1 source)	Provides an exact estimate of UDW. Based on statistics already available	Should be applicable, since all Member States make their national accounts along the same lines and also should have data on total taxable income	Monetary (1 source)	Simple data collection. Data are easily available and accessible	Easily applicable, since data will be available in all Member States
Estonia	Labour input (2 sources)	Straightforward estimation procedure, scope for disaggregation	Good potential due to the availability of similar data	n/a		
Finland	Degree of participation (3 sources)	In Finland, this method is applied in a more qualitative way, as expert evaluations of the extent of UDW		n/a		
France	Discrepancy	One part of the indicator (the use of	Not assessed	n/a		

Country	Most frequently used method	Key strengths	Potential applicability across MS	Most frequently used method 2	Key strengths	Potential applicability across MS
	(2 sources)	GDP of the National Accounts system) is robust in most European countries				
Germany	Monetary (1 source)	A broad definition of UDW, including illegal work and criminal action; Macro-estimates for all parts of Germany; Comparisons over long time periods; Behavioural explanation of UDW activities, related to government regulation and tax burdens	Good; the approach is applied for international comparisons	n/a		
Greece	Discrepancy (4 sources)	Attempts to provide an 'exhaustive' GDP This is a relatively simple method, requiring a limited amount of statistical data	Limited	n/a		
Hungary	Labour input (4 sources)	Data relatively easy to access	High	n/a		
Ireland	Discrepancy (1 source)	Availability of consistent and regularly collected data	Good given general availability of national household survey data	Labour input (1 source)	Simplicity of method; all data required collated by Central Statistics Office	Good assuming that similar data is collected in other EU countries
Ireland[3]				Monetary (1 source)	Trends in the estimate which by definition mirror changes in the average tax rate should a priori provide a useful guide to trends in the black economy	Good given standard equation for estimation and general availability of generic data
Italy	Labour input (1 source)	Assures a detailed amount of information on undeclared work that can be used for estimating the corresponding hidden production and value added	Highly applicable where the Labour force survey is conducted yearly	n/a		
Latvia	Labour input (1 source)	Standard method based on well established national surveys	Applicable as surveys can be based on the same methodology	n/a		

---

[3] In Ireland, three methods used are based on one source of research each; hence, all three method applications are reviewed.

Country	Most frequently used method	Key strengths	Potential applicability across MS	Most frequently used method 2	Key strengths	Potential applicability across MS
			and it is not difficult to carry them out			
Lithuania	Labour input (1 source)	Simplicity and transparency	Could be easily applied due to the existence of same information	n/a		
Luxembourg	No methods are used					
Malta	No methods are used					
Netherlands[4]	Discrepancy (2 sources)	Not described	Good	Labour input (2 sources)	Not described	Not assessed
Netherlands				Degree of participation (2)	Factors which determine the possibility of success in the formal labour market, also determine the opportunities in the hidden labour market	Not assessed
Poland	Global indicators (5 sources)	One of the most credible methods. Clarity and formal presentation. Possibility of consideration for many various factors influencing undeclared economy	The method can be used in EU countries. It gives the possibility of international comparisons	n/a		
Portugal	Monetary (3 sources)	This method is easy to apply	High	n/a		
Romania	Monetary (2 sources)	Its international recognition and the fact that it uses an underlying assumption that is generally accepted	The fact that it uses National Accounts data is obviously a major strength for comparability and for applicability across M.S	n/a		
Slovakia	Labour input (2 sources)	Wide range of data (sources) on supply and demand sides, harmonisation of data to ESA95 concept, time series available	Very good. Method is recommended by Eurostat as a global method to ensure the exhaustiveness of national accounts	n/a		
Slovenia[5]	Labour input (2 sources)	Simple calculation/estimation of the SE extent in the economy; simple to	More suitable for transition countries in the past; Possible if	Monetary (2 sources)	Easy to implement if good data availability	Potentially good, but depends on the availability of data on cash

[4] In the Netherlands, three methods used are based on two sources of research each; hence, all three method applications are reviewed.

Country	Most frequently used method	Key strengths	Potential applicability across MS	Most frequently used method 2	Key strengths	Potential applicability across MS
		implement	harmonised data are available in all Member States			and on their harmonization
Slovenia				Global indicators (2 sources)	Simple; easy to implement.	Data on electricity consumption are available in every country – potentially good comparativeness of the method
Spain	Monetary (6 sources)	None identified, weaknesses outweigh the benefits	As long as a commonly agreed estimation equation is used, the potential applicability is high. However, there might be strong difficulties in the common measures of tax burden	n/a		
Sweden	Discrepancy (4 sources)	Comparable data for long periods of time	High	n/a		
Turkey	Monetary (3 sources)	Good national and cross-country data availability.	Very good due to harmonised national account systems.	n/a		
United Kingdom	No methods are used					

---

[5] In Slovenia, three most popular methods used are based on two sources of research each; hence, all three method applications are reviewed.

5 REVIEW OF DATA AVAILABLE IN THE MEMBER STATES THROUGH THE MAIN MEASUREMENT METHODS

In this section, a synthesis of data collected through the national review process by national experts is provided. Key data categories are presented, but not all the information and statistics collected by the national experts are included in this section. Additional material was submitted to the European Commission as separate electronic documents.

5.1 Data review in all the countries covered by the study

Tables 5.1 – 5.6 present, for each of the six methods, data on UDW available in each country. As seen from these tables, information is not homogeneous, in terms of years and of estimated variables. This further confirms the relevance of a European-wide attempt to estimate UDW using the same methodological approach.

Table 5.1 – Discrepancy method: data available in the countries reviewed, % of UDW in GDP (unless otherwise indicated)

Member State	Most recent years available		
Austria	1995: 3.73%	2001: 3.65%	2004: 3.8%
Belgium	1997: 3 to 4%	2002: 3.6%	
Bulgaria	2001: Undeclared household income as share of GDP- 34%		
Croatia	1998: 8.9%	1999: 8.1%	
Denmark	Not publicly available		
France	1985: 4.3%		
Greece	Share of underground economy: 28.6% (1984)	Proportion of non-recorded GDP: 34.6% (1988)	Proportion of households participating in informal activities: 42.3% (1993-94) Evaded social security contributions as a share of social security receipts: 29% (1997)
Hungary	1997: 15.4%	1997: 30%	2001: 21%
Ireland	1994: 5%		
Netherlands	2005: 16.41%	2006: 20.37%	2007: 19.68%
Poland	Difference between registered unemployment and LFS unemployment for 2000 - 2007 (in %) 2004: 0.73%	2005: 0.41%	2006: 2.36%
Romania	2003: Lower limit: 22.7% Upper limit: 27.5%	2004 Lower limit: 22.5% Upper limit: 27.3%	2005 Lower limit: 22.5% Upper limit: 27.8%
Slovakia	2000: Estimated volume of the non-registered VA in total as percentage of GDP: 12.2%		
Slovenia	National accounts	Households expenses approach:	Expert evaluation 1 :

	approach: 2000: 6.4% 2001:6.7% 2002:7.5%	2003: 2,7 - 1,4% 2004: 3,1 - 1,6% 2005: 5,4 - 4,8%	2002: 25% Expert evaluation 2: 2003: 17%
Spain	1990:19.21%	1995: 14.1%	
Sweden	1998: 5.0%	1999: 5.0%	2000: 4.9%
Turkey	1997: -0.4%	1998: 2.49%	1999: 7.53%

Table 5.2 – Labour input method: data available in the countries reviewed

Member State	Data available		
Austria	1995 (one-off exercise) Underground economy as a share of GDP: 8.7% Estimated total work volume of the shadow economy as a share of overall economy: 10% Estimated maximum number of migrants doing undeclared work: 47 000 – 70 000 persons (share between ca. 10% - 14% of total number of third-country persons aged 15 -64 years)		
Bulgaria	Number of unreported employees in the private sector: 2005: 193 800	2006: 242 000	2007: 312 900
Croatia	Share of persons employed in shadow economy: 25.79% (1997)	Difference in number of employed between HLS and registered Employment: 114 143 (2002)	
Czech Republic	Number and share of undeclared employment in the construction industry 1998: total economy: Number of illegally working persons: 250 000 - 350 000 Their share of labour force: 5-7% Proportion of construction industry on total number of illegally working persons - approx 50%		
Estonia	Value added in SE as % of total (at current prices) by economic activity 2004: 5.7%	2005: 5.4%	2006: 5.2%
	Employment in shadow economy: 1999: 39 900 persons	2000: 37 000	2001: 35 000
Hungary	Share of undeclared employment as percentage of total in Hungary *Estimate 1*: 2002: 23%	*Estimate 2*: 2001: 18%	*Estimate 3*: 2003 17.1% 2004 16.3% 2005 16.9%
Ireland	1996: % of sample studied who were on Live Register but not classified as unemployed in the LFS: 44% (50% according to ILO classification)		
Italy	Undeclared full-time equivalent unit – total economy (thousands) 2003: 2 811.7	2004: 2 863.0	2005: 2 951.3
Latvia	% of GDP: 2005: 11.7%	2006: 11.0%	2007: 8.7%
Lithuania	Share (%) of undeclared employees in the economic activity 2002: 10%		
Netherlands	Undeclared employees number of persons corrected for vacancies (thousands) 2005: 67.8	2006: 304.9	2007: 514.4
Portugal	% of value added: 1996: 5%	% of salaried workers: 2001: 25.7%	
Romania	UDW total in number of workers, million: 2002: 2.27	2005: 2.08	2006: 2.08
Slovakia	Share of unregistered work in employment: 2006: 8.2%	2007: 7.7%	2008: 7.3%
Slovenia	1993: SE in % overall LF: 26 SE in % fully-employed: 9	% of shadow economy in GDP: 2001: 6.2% 2002: 6.2%	% of shadow economy: 2001: 21.1%

	SE in % GDP: 10 Total (sum of activities) SE in % GDP: 16.8 – 21.3	2003: 4.9%	2004: 17.7%
Spain	Sectoral gender breakdown only is available		
Turkey	Number of unregistered workers: Data not reliable		

Table 5.3 – Degree of participation: data available in the countries reviewed

Member State	Data available				
Czech Republic	Gap between unemployed persons who are formally registered at employment offices and those who declared themselves unemployed for LFS 2002: 38%				
Finland	% of construction sector: 1998: 9%-16% 2005: 11%	Construction 1992 16.2% % of sector	Motorcycle repair 1992 5-15%	Hotels and restaurants 1992 9.6%	Transportation 1992 5.5%
Netherlands	1983: Total hidden income (million guilders) 3 000				
Romania	Sectoral and regional breakdown, data quality in question				
Slovenia	% of SE in GDP:	2002: 4.1%	2003: 7.6%	2004: 2.1%	

Note: Finland row also contains a "Childcare 1993 5-10%" column.

Table 5.4 – Monetary methods: data available in the countries reviewed

Country	Data available			
Austria	Informal sector as a share of official GDP	2007 9.06%	2008* 8.07%	2009* 8.47%
	Informal sector current revenue (billion EURO)	20.8	19.92	20.5
Belgium	% of GDP - estimate 1	1978 15.4	1979 15.5	1980 15.2
	% of GDP - estimate 2	1980 17 to 33	1987/1988 12 to 32	1991 12.7
Bulgaria	1. Relative share of the hidden economy (%) of GDP, average per year	1997 15.2	1998 35.3	1999 24.1
	2. Relative share of the hidden economy (%) of GDP, average per year	2000 10.4	2001 8.56	2002 7.985
Croatia	% of GDP	1998 25.5	1999 24.9	2000 25.8
Cyprus	All activities (average share of underground economy): estimates from three different sources	1960-1990 8.8%	1960-2003 9.41%	2007 10.70%
Czech Republic	Extent of unregistered shadow economy % of GDP	1997 7.2 - 10.3	1998 11.1 - 14.7	2000 14.6 - 19.0
Estonia	In % of official GDP	1999/00 38.4	2001/02 39.2	2002-03 40.1
France	Demand for money	2002: 15.0	2003: 14.5	
Germany		2007	2008	2009
	in billion euro	349.0	346.8	351.8

	in % of GDP	14.74	14.22	14.57
Greece	All activities (average share of underground economy); estimates from 3 sources	1958-1988	2001	1960-2000
		24.64%	30.10%	25.01%
Ireland	% of GDP	1990	1991	1992
		7.9	8.2	8.0
Poland	% of GDP	2004: 25.7	2005: 20.5	2006: 37.9
Portugal	% of GDP	1990-1993	1997-1998	1999-2000
		15.6%	23.1%	22.7%
Romania	% of GDP	2006: 26.90%	2007: 26.60%	2008: 26.60%
Slovenia	% of GDP	1996: 22%		
Spain	Underground economy as a % of GDP. *Estimate* 1	1998: 18.01	1999: 17.25	2000: 16.35
	Underground economy as a % of GDP. *Estimate* 2	1996: 16.4	2000: 14.4	2003: 10.5
Sweden	Shadow economy as a share of GDP, percentage	2002	2003	2004
		6.7%	6.7%	6.5%
Turkey	% of GDP	1998: 30%	1999: 27%	2000: 25%

Table 5.5 – Global indicators methods: data available in the countries reviewed

Country	Data available			
Belgium	% of GDP - estimate 1	1990		
		19.8		
	% of GDP - estimate 2	2003	2004	2005
		18.1	17.7	17
Bulgaria	Shadow Economy/ GDP (%)	1996	1997	1998
	Standard	13	6.7	-0.3
	Sector	34.4	28.2	21.9
Croatia	% of total economic activity	1999	2000	2001
		22%	21%	18%
Czech Republic		1999	2000	2001
	unregistered real product of shadow economy as % of GDP	2.7	2.6	2.6
	+ subsistence economy	3.5	3.5	3.5
Hungary	share of unofficial economy in GDP for post soviet economies including Hungary	1992	1993	1994
		30.6	28.5	27.7
Netherlands	Difference in growth rate	2005	2006	2007
		3.27%	4.09%	3.17%
Poland	Estimation of unofficial economy based on delivery of low voltage electricity to consumers	2004	2005	2006
		18.4	16.5	14.2
Portugal	Underground economy (% of the GDP)	1990		
		16.8%		
Romania	% of GDP	1994	1995	1996

		27.1	35.8	37.8
Slovenia	% of GDP	average 1990-2001		
		20.4		
Turkey	% of GDP	1998	1999	2000
		19	20	16

Table 5.6 – Latent variable methods: data available in the countries reviewed

Country	Data available			
Austria	described under monetary method			
Belgium	% GDP	2005	2006	2007
		20.1	19.2	18.3
Croatia	The share of grey economy (undeclared work) in total GAV of particular sectors	2000	2001	2002
		10.7	10.3	10.2
Finland	% GDP	1999/2000	2001/2002	2002/2003
		18.1	18.0	17.6
France	MIMIC (1978)	8.7		
Romania	% in GDP, using the share of wages in total disposable income	2004	2005	2006
		18.55	21.07	21.63
	UDW total in million workers	1.7	1.93	1.96
	Latent variable method using the covered wage bill	2004	2005	2006
	% in GDP	24.15	25.4	28.54
	UDW total in million workers	0.51	0.39	0.68
Slovenia	% in GDP	2004	2005	2006
		29	28.6	27.2
Turkey	UDW to GDP ratio	2003	2004	2005
		35	35	35

Table 5.7 presents, in brief, an overview of UDW estimation (as a proportion of GDP) available from the six main measurement methods (which are also indicated in the table accordingly) in 24 countries (out of 29) reviewed for this study.

Table 5.7 – Undeclared work as a proportion of GDP, data available in 24 European countries

Legend: Methods of measurement are abbreviated as follows: discrepancy (DI), global indicators (GI), degree of participation (DP), labour input (LI), latent variable (LV), monetary (M), and combined methods (C).

Note: this is a very wide multi-country data table. Country columns are sub-divided by measurement method (LI, C, M, GI, DI, LV, etc.). Blank cells indicate no data.

year	AT LI	AT C	AT M	BE GI	BE C	BE M	BG GI	BG DI	BG DI	CR DI	CR M	CY M	CZ M	EE M	EE LV	FI M	FI LV	FR DI	FR M	FR C	DE C	DE LI	DE DI	EL LI	HU LI	HU GI	IE M	LV LI	NL GI	NL DI	NL M	PL M	PT M	PT C	RO LV-1	RO M	RO LV-2	RO LI	RO GI	SLK	SLV LI	SLV GI	SLV DI	SLV DP	ES M	ES LV-1	ES LV-2	ES DI	SE M	SE GI	TR M	TR LV	TR GI	year
1963																					0.0																																	1963
1964																					0.4																																	1964
1965																					0.7																																	1965
1966			11.1																		1.4																																	1966
1967			11.2																		1.7																																	1967
1968			11.3																		1.7																																	1968
1969			11.5																		2.0																																	1969
1970			11.5																		2.6																																	1970
1971			11.9																		2.8																															19		1971
1972			12																		2.4																															19		1972
1973			12.3																		2.5																															19		1973
1974			12.3																		4.7																															20		1974
1975			13.2																	5.75	2.8																															18		1975
1976			13.8																		4.4																												8.8		18		1976
1977			14.9																		3.8																												10.3		18		1977
1978			15.4																		3.8																												11.7		20		1978
1979			15.5													8.7		6.3/6.7			3.8																												13		21		12	1979
1980			15.2																	10.8	5.3																								11.27	11.38	14				21		13	1980
1981						26.5															6.2																								11.59	12.55	15.4				21		14	1981
1982						25.1															7.3																								11.64	12.59	15.2				22		20	1982
1983						26															8.1																								12.62	14.33	16.1				17		6	1983
1984						26															9.1			28.60																					13.02	14.44	15.3				23		26	1984
1985						26									4.3					11.2	8.5																								13.55	16.49	14.9				21		27	1985
1986						25.7															8.8																								13.89	18.4	15.4				20		33	1986
1987						24.9															8.5																								16.19	20.61	15.9				17		23	1987
1988		12 to 32				24															8.4																								17.38	18.88	15.7				23		22	1988
1989						22.5															8.1				27	37																			18.51	20.29	16.5				22		22	1989
1990		5.47			22	19.3										8.8		13.4	10.4	12.2					28	43	7.9	15.60	15.90	9.47	12	16.23	32.6	21.3								20.4			19.74	19.16	17.2	19.21	3.80		21		21	1990
1991				12.7		22.3													10.4	13.8					32.9	36	8.2	15.60							29.14	15	22.78	38.4	31			20.4			19.73	19.61	18		3.40		24		15	1991
1992						22.4								4					10.4	13.8					30.6	38	8.0	15.60	17.20						32.87	16	36.52	39.2	30.8			20.4			19.43	20.38	19		4.50		23		26	1992
1993						23.2													10.4						28.5	34		15.60							23.82	33	29.28	38.4	28.5		6	20.4		16.1	19.72	21.54	18.9		5.30	5.2	24		20	1993
1994						22.5																			27.7	38									23.54		32.36		27.1		6.2	20.4		4.8	19.03	21.04	17.8		5.70	5.3	29		23	1994
1995	8.70	7.32		21.5		22.3										18.2			13.9	14.5						41	5.00	15.00			55.5			22.10	20.32	30.65	16.6	35.8			6.8	20.4	6.8	3.1	18.37	21.62	16.8		5.20	5.3	31		21	1995
1996		8.32				22.2	39.13													14.5						37		16.50	4.83		49			22.00	20.45	32.64	18.4	37.8			7	20.4	6.8	4.9	18.19	22.97	16.1		5.20	5.1	23		22	1996
1997		8.93		15.2		21.5							7.2 - 10.3							14.8	15							16.50	7.46		51.4			22.80	16.01	27.26	19.9				8.1	20.4	7	2.6	18.48	21.76	15.9		5.80	5.1	26		19	1997
1998		9.09		22.5		21.3	15.22			8.9	25.5		11.1 - 14.7				18.9		14.9	14.8								16.50	5.86		64			23.10	14.17	33.75	18.07	20.8			7.6	20.4	6.5	0.6	18.01	19.54	15.3		7.10	5	30		19	1998
1999		9.36		12.41		19				8.1	24.9			38.4						15.51								16.50	6.38	33.2	24.5				12.33	35.18	24.38				6.7	20.4	6.2	3.8	17.25	18.56	15.5		6.40	5	27	32	20	1999
2000		10.07		18.7	22	10.40					25.8		14.6 - 19.0	39.2	18.1					15.2	16.03			25.1				18.00	8.12		24.5			22.70	12.92	33.17	22.83			12.2	5.4	20.4	6.4		16.35	17.64	15.9		6.80	4.9	25	33	16	2000
2001		10.52		18.5	22	8.56		17	44					40.1							16.02		1.35					18.00	7.07	28.6	24.5			22.70	15.19	31.21	24.87				6.2	20.4	6.7	4.5	17.44		16.4		6.60			33		2001
2002		10.69				18.3											18.0			15	16.59							16.00	3.65	28.9	25.8			22.50	19.04	30.09	26.62				6.2		7.5	4.1			18.2		6.70		34			2002
2003		10.86		18.1		21.4						9.41					17.6			14.5	17.1							13.00	2.45	32.1	25.8				18.7	29.06	25.26				4.9			7.6	10.5				6.70		35			2003
2004		11.00		17.7		20.7															16.12		1.01					11.50	3.01	25.7	22.2				18.55	28.1	24.15							2.1					6.50		35			2004
2005		11.27		17		20.1															15.41							11.70	4.79	16.41	20.5	22.3			21.07	27.1															35			2005
2006		9.51				19.2															15							11.00	5.41	20.37	37.9	22.1			21.63	26.91																		2006
2007		9.06				18.3							10.7								14.74							8.70	5.23	19.68						26.69																		2007
2008		8.07																			14.22															26.66																		2008
2009		8.47																			14.57																																	2009
Country average (multiple methods)		9.22				19.0	20.2				18.64	9.637	10.93	39.23		15.46			12.2		12.9					33.6	4.8	14.53	8.05			31.4	18.97			25.2				17.10		10.1			16.6				5.5		22.7			Country average (multiple methods)
Country median (multiple methods)		9.09				19.3	15.21				24.9	9.41	10.83	39.2		18			13.8		14.74					34.0	4.4	16.00	5.86			25.8	17.20			25.9				17.10		6.8			16.65				5.3		22.0			Country median (multiple methods)

5.2 Core countries – summary statistics

Table 5.8 and Figures 5.1 – 5.2 summarise the available information on UDW, for each of the six methods, in the core countries.

In order to provide a prompt understanding of the orders of magnitude of the estimated variables, averages have been calculated. These must however be taken only as first order approximations, as the richness of the statistical information gathered in the study cannot in any way be condensed.

It should be noted that the labour input method suggests the presence of millions of undeclared workers in four of the five core countries.

More precisely, according to these estimations, in Italy, Spain, Romania and Turkey there could be more than 8.5 million undeclared workers.[6] This would constitute a significant proportion of the labour force in these countries.

Table 5.8 – Estimates of UDW (or SE) by method (selected years/time intervals)

Country	Methods					
	Discrepancy (ratio SE/GDP)	Labour input (X 1000 units)	Degree of Participation	Monetary (Tanzi) (ratio: SE/GDP)	Global Indicators (ratio: SE/GDP)	Latent Variable (ratio: SE/GDP)
Greece	29 % (1997)	-	-	25.1 % (average 1960-2000)	-	-
Italy	-	3064.6 (average 2000-2003)	-		-	-
Spain	14.1% (1995)	1338.3 (2002)	-	18 % (average 1990-2001)	-	17.8 % (average 1996-2002)
Romania	30.27 % (average 1990-2005)	2080 (average 2005-2006)	24,5 % (2004) **	29.81% (average 1998-2008)	30.32 % (average 1990-1996)	20.48 % (average 1996-2002)
Turkey	7.53 % (1999)*	2059.6 (average 2000-2003)	-	23.2 % (average 1990-2000)	20 % (average 1979-2000)	33.8 % (average 1999-2005)

Notes: * For Turkey, the figure should not be considered as a result coming from a proper application of the technique, but as an exercise by the author of the national report. **for Romania, the figure is the percentage of UDW on total employment (average by sectors, unweighted).

---

[6] For Italy, the figure obtained using the Labour input method refers to full-time equivalent workers; for Romania, Spain and Turkey, the figures refer to the gross number of unregistered workers.

$\left| G \right| H \left| K \right|$

Figure 5.1, 5.2 - Time series for Labour input and Monetary method

Labour input method

Monetary method
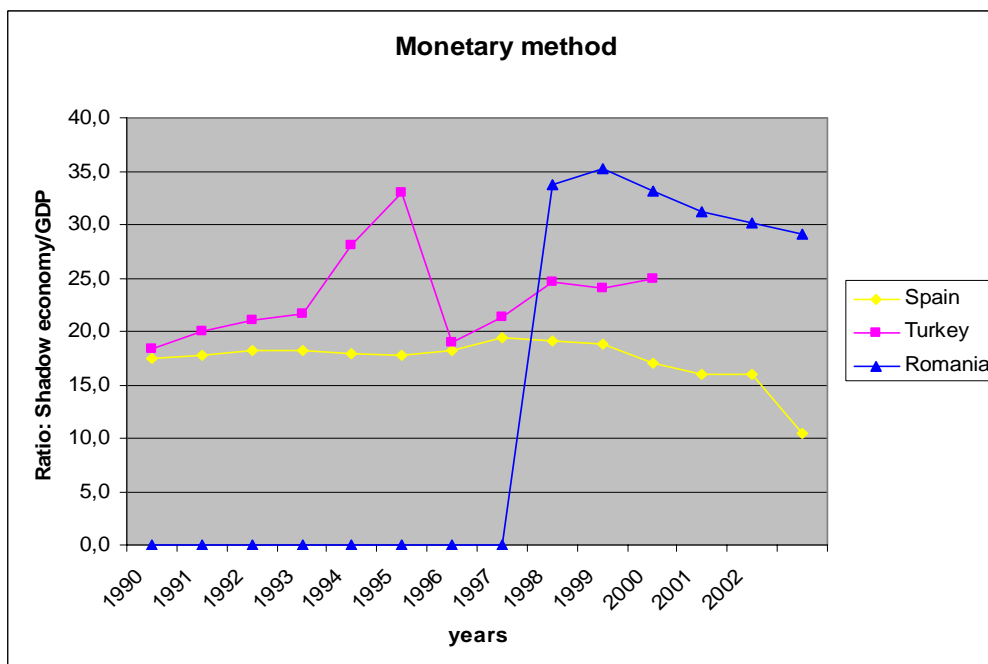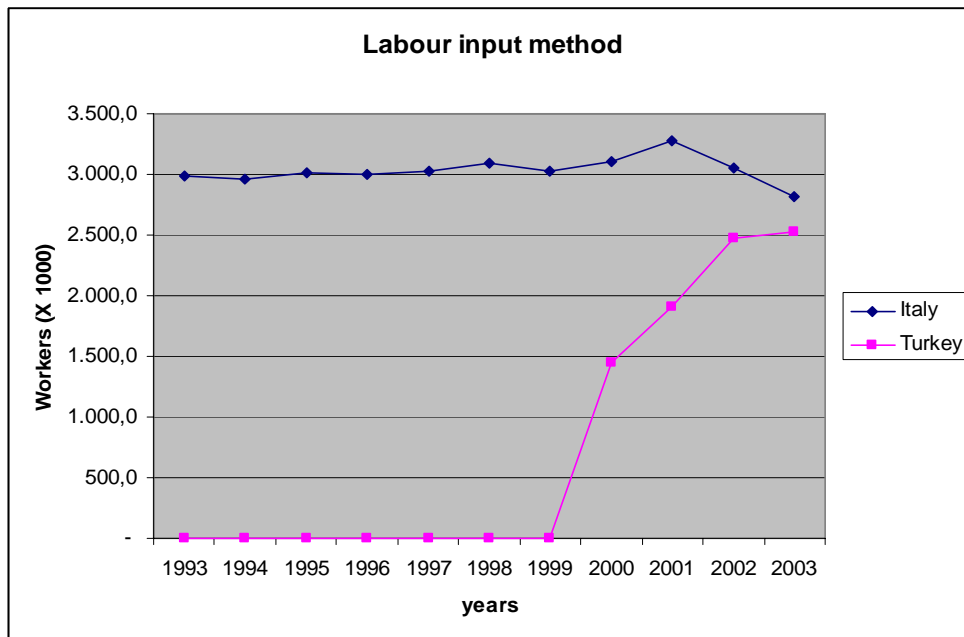
Legend: in the two graphs only the available time series for two of three main methods are plotted (comparable time series for Discrepancy data are lacking for four of the five core countries).

5.3   Conclusions

The existing data on UDW in the 29 countries considered in the study are both rich and heterogeneous.

The main reasons underlying this conclusion, which are of course partly intertwined, are the following:

$\left| G \left| H \right| K \right|$

- The degree of research attention paid to the UDW phenomenon is different across countries;

- The degree of awareness of the limitations of each method in the provision of meaningful estimates of the UDW phenomenon is consequently different;

- No indirect method exists which has universally emerged as the most promising one;

- The different methods require different sets of data, and some of them are not readily available in some countries.

When judged from the perspective of potential applicability across the countries, the most promising methodologies are the Labour input, the Discrepancy and the Monetary (Tanzi) methods.

The Discrepancy and the Monetary (Tanzi) methods have, however, a significant shortcoming: they only give figures for the ratio of SE/GDP (and UDW forms only a part of the shadow economy), so that an estimate of the amount of UDW can be obtained only via supplementary hypotheses (specifically, on productivity).

On the contrary, the Labour input method allows for a straightforward estimate of UDW – both in absolute terms and as percentages of total employment. It also allows for informative and relevant breakdown in relation to several socio-economic and geographical dimensions.

These key strengths constitute important elements of the comparative superiority of the Labour input method with respect to the other two methods.

Focusing on the Labour input method, a specific issue may be highlighted. Among the five core countries, Italy presents a somewhat specific economic and historic feature: it is the nation with the longest and more consolidated development trajectory. This may raise a question on the nature and the causes of the amplitude of UDW in this Country. A partial explanation of this phenomenon may be the role played in Italy by regional imbalances, as it is widely recognised that the Southern regions lag behind in the development process and that this is a major cause of the level of UDW in the Country.

This further emphasizes the usefulness of the Labour input method, as its high potential for relevant data breakdowns may be of great help in an attempt to provide a more detailed picture of the UDW phenomenon, not only at the national, but also at the regional (and sectoral) level.

|G|H|K|

6   REVIEW OF ADMINISTRATIVE SOURCES FOR MEASURING UDW IN THE MEMBER STATES

This section presents, in brief, the reviews of the **administrative sources** to measure UDW undertaken by national experts of 27 EU Member States, as well as Croatia and Turkey. The main aim of the section is to present a summary of the research undertaken by the national experts so as to provide a *systematic review of administrative sources* of UDW and the resulting national figures for the 29 countries.

The full information for these countries as provided by the national experts was submitted to the European Commission as a separate electronic document.

In order to provide a brief account and evaluation of the information provided by the national experts, the various sources/methods for measuring UDW will be grouped according to the **type of fraud or infringement detected**. Four different and broad typologies of fraud/infringement/irregularities constitute the following categories:

1. **Evasion of taxes** and other (relevant) infringements of fiscal regulations;

2. **Evasion of** (mandatory) **social security contributions**;

3. **Infringements of labour norms and regulations** (e.g. failing to declare a labour contract to deputed institutions/administrations, including hiring of irregular migrant workers and infringements of health and safety norms).

4. **Other forms of irregularities providing UDW-relevant data.**

For each of the four categories, the evaluation criteria are those included in the template that the national experts were requested to complete. It should be noted that the examined administrative sources frequently include in their records and inspections' results several of the abovementioned frauds/infringements types. Two or more of the first three categories may overlap, in the sense that a single administrative source undertakes inspections or data collection on different types of frauds/infringements at the same time. In the following brief description of the administrative sources (as summarised in Table 6.1 below), these overlaps are disentangled, i.e., when an administrative source collects aggregate data including different types of frauds/infringements, these are reported more than once.

6.1   Tax evasion

Data collection on tax evasion exists in **13 of the 29 countries reviewed,** which report at least one administrative source providing data on tax evasion, most of the time based on sample inspections/surveys. The limited availability of such data is a rather unexpected finding, given the importance of the data. In eight countries (Bulgaria, France, Hungary, Ireland, Italy, Slovakia, Slovenia and Sweden) there is more than one source/study (in Italy, there are four different sources available, while one of the French sources – INSEE – collects information which is only relevant in the context of the discrepancy method reviewed in section four).

Most of the **Responsible Agencies** are National Fiscal Administrations (frequently task forces or ad-hoc offices are involved) and National Statistical Institutes.

Time period and Frequency of data collection are heterogeneous: yearly data for a sufficiently long time interval (more than two years) are available for half of the countries. Latvia and Lithuania provided quarterly data for the 2001–2009 period. Italy makes available a long time series of estimated VAT evasion, with yearly data covering the 1982–2001 period. Romania provides quarterly data on the estimated percentage of SE (shadow economy) on GDP for 1998-2008.

G|H|K

Breakdown by socio-economic categories are available only for five countries (France, Hungary, Italy, Slovenia and Sweden), mainly focusing on age, gender and residence; the Slovakian Police Forces provide data on foreign employees. Slovenia reports the availability of breakdown by subject status (but data from the Ministry of the Finance cover only 2007).

Six countries provide a ***sectoral breakdown*** for this type of method.

In terms of ***the quality of UDW data and statistical representativeness***, six countries (Bulgaria, France, Hungary, Romania, Slovakia and Slovenia) report at least one source providing data which can be considered as good and representative according to the experts' evaluations. Denmark, Latvia, Sweden and the UK present data with a somewhat lower degree of reliability/representativeness, mainly due to their focusing on individual cases of tax evasion and/or to possible underestimation biases. The data provided by many Italian sources may lack in representativeness. Data provided in the Czech Republic are at a high enough level of quality/representativeness, but some limitations in the information provided makes it difficult to use them as reliable estimates of UDW. According to the national expert, the data for Lithuania are difficult to evaluate.

In relation to ***complementarity with the macro-economic models***, most of the administrative sources in Bulgaria, Italy, Hungary, Romania and Slovenia provide data which are substantially complementary with the main indirect methods; data from different sources could be useful with at least one of such methods (for Romania, the judgement is conditional on the publication of the data). For Slovakia, the usefulness of the administrative data mainly rests on the supplementary nature of information provided by the source. One of the sources in Slovenia (Ministry of Labour – Government Commission for the discovery and prevention of UDW) provides strongly complementary data: these are collected through a coordinated action of units and Ministries, although the data on UDW should be further elaborated in order to provide a reliable projection of the UDW level and dynamics. For the Czech Republic, France and Sweden, the complementarity appears to be somewhat more limited, and this is basically due to the imprecision in the UDW estimates based on the reported administrative methods (and to the weak representativeness of the data for the Czech Republic). For Sweden, the information provided may be useful mainly for selected issues on tax evasion and for the possibility of breakdown. The UK and Latvia sources present a scarce degree of complementarity, related to the limited representativeness of their samples. According to the national experts, the complementarity of data for Denmark and Lithuania is difficult to evaluate.

In conclusion, it could have been expected that tax evasion data would be present in more countries. Where the data does exist, the availability of socio-economic and sectoral breakdown is limited, and its representativeness varies across countries.

6.2   Evasion of social security contributions

Administrative sources involved in detection or estimation of fraud/infringements related to social contributions are roughly as numerous as those involved in the detection of general tax evasion. **15 Countries** present studies or data collection activities in this field. Seven countries report more than one source in this specific method; in particular, Belgium and Italy provided four different sources. Data from the Austrian KIAB are not published, and also data from one of the Polish sources (Social Insurance Institution) are not easily accessible. As noted before, many of the sources involved with social contribution evasion pool these data with information relative to general tax evasion. For instance, in Italy two administrations (Labour Inspectorate and *Guardia di Finanza*) collect national data on inspection aimed at capturing *both* tax evasion *and* social contributions evasion: thus, both administrative sources present figures of the *overall* reported level of evasion (or infringements).

G|H|K

Responsible Agencies are mainly National Social Security Institutes, National Fiscal Authorities and Directorates (or units) of the Ministry of Labour.

Time period and Frequency. Data series of considerable length are publicly available in only eight of the fifteen countries adopting this administrative method. Figures on frauds/infringements for more than two years are reported by Belgium, Hungary (monthly and annual), Italy, Latvia (quarterly data), Lithuania (yearly, monthly and quarterly), Portugal, Romania and Spain.

Breakdown by socio-economic categories are available only for a limited set of countries, including: Hungary (region, age gender, occupation), Italy (regions), Spain (regions and provinces) and Greece (native and foreign labour).

A greater number of countries provide **sectoral breakdowns**: Belgium (only for 2005), Cyprus (available upon request), Czech Republic (only for 2007), Greece (only for 2008), Hungary, Italy (for one of the four reported sources), Lithuania, Poland, Sweden. Data from labour and social security inspections in Spain are organised according to administrative features (actions taken, type of infraction, etc.).

Quality of UDW data and statistical representativeness. Only four countries (Hungary, Poland, Romania and Spain) report the presence of at least one source providing data that are considered both of high quality and significantly representative by the country expert. This may be due to the nature of the method itself: in some cases, inspections and controls tend to be concentrated in those sectors and areas of economic activities which are thought to be more prone to contributions (and tax) evasion. Actually, some of the experts of the remaining countries report a tendency of administrative data to be upward biased for some sources, as the inspections are usually focused on detection (those focusing on specific sectors), whereas other experts suggest that there may be downward biases for some other sources, with inspections or controls spanning wider economic areas, but limited in number. In many of these countries the aim of inspections is mainly to monitor and prevent UDW rather than to provide a statistically unbiased estimate of the phenomenon; clearly, when the UDW figures are thought to be "underestimated" they can nonetheless serve as a lower bound value for the overall share of SE/UDW in the country. As for Italy, which offers a relatively large number of different sources for this method, most of the sources present good quality data, which are not however statistically representative.

Complementarity with the macro-economic models. Only six countries report at least a high/good level of complementarity of these data with the macro-estimates. In Belgium, the National Statistics Institute already uses this type of administrative data for corrections in its GDP estimates, but the expert highlights some caveats about data quality (duplicates in the statistics, some figures may be distorted, interpretation problems); the strength (and complementarity) of administrative data rests mainly in the high level of detail and breakdown. Hungary and Poland reports good complementarity of their sources (specifically with the labour input method for Hungary), but, as already noted, the Polish source does not make its data easily accessible. Three of the Italian sources, although their data describe only a part of the UDW phenomenon, are substantially complementary with the macroeconomic approaches. The administrative source of Romania shows high complementarity with the latent variable method discussed in section 4. The degree of complementarity of the remaining Countries' sources appears to be substantially lower: Portugal and Sweden report only a limited complementarity, while for other countries complementarity is generally scarce. A frequently mentioned reason behind this evaluation is the narrow focus of administrative sources on specific areas of activity or typologies of infringements. On the contrary, some experts (e.g., the Czech Republic) highlight that the broad definition and interests of the inspections may hinder the usage of these data in the indirect macro-methods context (a possible exception is the Labour Input method, which may usefully employ these general data).

G|H|K

In conclusion, it can be noted that the data on Social Security contributions are widespread and of good quality, with significant time series available. They can also allow for relevant breakdowns by socio-economic category and sector. These data can hence be considered as an important unifying source of information on UDW.

6.3   Infringements of labour norms and regulations

Administrative data on violations of labour norms and regulations are collected by more than two thirds of the countries (22 out of 29) considered in this study: this is the most frequently mentioned typology of administrative data on UDW. This should not be surprising: actually, this is the broadest typology of fraud/infringements among those covered in this study. It includes any irregularity related to labour norms which is not directly or uniquely related to tax/contributions evasion; a wide range of phenomena are thus covered: irregularities in labour contract registrations (when required), violations of the laws on health and safety in the workplace, irregular foreign workers, fraud (or errors) in benefit systems, forms of exploitation of particularly weak categories of workers, etc. The number of countries presenting more than one source is relatively limited (nine), but three countries present several sources; in particular, Lithuania presents seven data collections, but five of these data sets are actually collected by the same institution (the State Labour Inspectorate). Slovenia presents four different sources, but three of them are involved in a coordinated action against UDW and undeclared employment.

Given the comprehensive category of fraud/infringements, the *Responsible Agencies* which are active in data collection are of a more heterogeneous nature than those discussed above. Besides National Social Security Institutes, Fiscal Authorities, Statistics Institutes and various Inspectorates of the Ministry of Labour (and/or of social policies), in some cases (Austria, Italy, Poland, Slovakia and UK) also Police Departments or Border Guards are involved in this activity.

Time period and Frequency. The majority of the countries (17) present (yearly) data series for more than two years, but in many cases the time length is short (three or four years). Italy presents a six-year time series from one of its sources, while the remaining three sources have only data for one year. Latvia and Lithuania report the availability of monthly (and also quarterly for Lithuania) data for their sources, while Slovakia data are available in yearly and half-year format.

Breakdown by socio-economic categories: eleven countries report the availability of socio-economic breakdown for some of their sources. Breakdown by regional/territorial dimensions are provided for Bulgaria, Italy and Lithuania and Spain, while Hungary reports breakdown by region, age, gender, occupation status, and nationality. Three of the four Dutch sources present breakdowns by country of origin, as for irregular immigrant workers. One of the sources for the Czech Republic (focusing on immigrant workers) make available breakdown by country of origin, size and legal form of the company. Socio-economic breakdown should be available upon request for Cyprus. The source for Poland makes breakdown available along a wide range of socio-economic dimensions. Two of the Slovenian sources display the possibility of breakdown by employment status, region and nationality.

Sectoral breakdown is present in the sources of 15 Countries. For Cyprus, the observations made in the previous section are also applicable (availability upon request). In Croatia, a number of inspections took place in 2008 in some specific sectors (catering, tourism, trade/retail and bakery). The Romanian experts highlights that although a sectoral breakdown is available, its reliability may be questioned. For the Slovenian sources, a partial breakdown is possible.

Quality of UDW data and statistical representativeness. Also for these types of sources, only a small number of countries (Belgium – with the same caveat mentioned in the previous section – Poland, Spain and Slovakia) report the presence of at least one source

providing data that are considered both of high quality and significantly representative. Most of the general observations made in the previous section can be directly replicated here: inspections and controls aimed at this type of infringements tend to be affected by upward or downward biases (when related to the estimation of UDW extent) due to nature of the administrative objectives pursued by the involved sources. If anything, these problems may be exacerbated here due to the broad nature of the frauds/infringements falling into this category. One of the sources from the Netherlands (providing an estimate of the illegal persons in the country) shows, according to the national expert, a good level of accuracy and quality, but it offers an estimate for 2005 only. The assessment of representativeness for the Romanian source is medium (its main strength is the direct relationship with UDW).

Complementarity with the macro-economic models. Nine of the 20 Countries report at least a medium-to-good level of complementarity of these data with the macro-estimates. This is highlighted in particular for Belgium, Bulgaria, Hungary, Italy, Lithuania, the Netherlands, Portugal, Slovakia and UK. Three Dutch sources are complementary with some of the macro-methods, but they need additional statistical information to be fruitfully employed. Two of the Slovenian sources are potentially complementary with the macro-approaches, while one of the sources (presenting data from a coordinated action of different administrations) is highly complementary, but its data need more statistical elaboration. Similarly to the other data typologies, the strength (and complementarity) of these administrative data mainly rests on the high level of detail and breakdown. For instance, the main advantage offered by these data in Lithuania is their capability to identify the regions or sectors in which UDW is concentrated. As for Italy, data focus on (some specific parts of the) UDW, thus they are generally considered complementary to the figures extracted from macroeconomic models. Good levels of complementarity are mentioned for Portugal and Slovakia. Some data for the Czech Republic, although not immediately comparable with macro-estimates, may offer an overall picture of employment law compliance.

In conclusion, this data category offers very different information categories of relevance to the measurement of UDW. It is widespread across the countries, but is difficult to summarise and too heterogeneous to be of immediate and concrete use for producing estimations of UDW. Moreover, only four country experts have considered the data to be of good quality.

6.4   Other forms of irregularities and data

Data on other forms of irregularities are reported for 11 countries. This category includes all the methodologies which are not directly referable to those previously examined. There are two broad typologies of data/methods in this set:

1. The first type includes sources collecting data that are only loosely or indirectly related to the UDW phenomenon but that may be used (at least in part) as complementary information;

2. The second type includes data that are tightly related to indirect methods and that are collected by administrative sources (these data have generally been used by some of the sources mentioned in section 4).

In the first group only Bulgaria, Ireland and Poland are present, while in the second group Croatia, the Czech Republic, France, Hungary, Italy, Poland and Spain are represented. The cases of Germany and Luxemburg are somewhat peculiar and will be discussed in the subsequent section. The countries presenting these typologies of data typically display only a limited number of sources, with the two significant exceptions of Croatia, (6), France (10) and Spain (6). In France, most of these sources (8) are part of the same institution (the National Institute of Statistics, INSEE) and in Spain four of them are attributable to the Ministry of Labour and Immigration. The Italian source (National Institute of Statistics, ISTAT) provides the data used in the application of the Labour Input method.

|G|H|K|

Also in this case, there are different types of **Responsible Agencies** involved in the activity; the most common institutions are the National Institute of Statistics (Croatia, the Czech Republic, France, Hungary, Italy and Spain), the Ministry of Labour (the Czech Republic, Spain) and the National Central Banks (Croatia and France). In Bulgaria, the Netherlands and Poland also Judicial Offices and Police Departments are involved in this activity and in Spain some data are collected by the Electric Power Company. In Ireland, the Department of Social and Family Affairs operates a control strategy to minimise risks of fraud and eliminate incorrect payments on welfare schemes, and provides data on the amounts saved due to inspections results. For Croatia, also data from two private/non-administrative sources (an on-line job-placement firm and the federation of Croatian trade unions) are mentioned.

Time period and Frequency. Seven countries (the Czech Republic, France, Hungary, Ireland, Italy, Poland and Spain) present (yearly) data series for more than two years, with data collected on a regular basis. In Croatia, one source presents yearly (National Accounts) data from 1995 to 2005, while the second source makes use of yearly and selected quarterly data (the third quarter, period 1999-2007) from the balance of payments (provided by the Central Bank). The Bulgarian source regularly collects data (also on a monthly and a quarterly basis) but, as noted before, these are only indirectly related to UDW. Hungary and France also report the presence of quarterly data. Four sources in Spain (those attributable to the Ministry of Labour) have collected monthly data since 1985, in addition to the annual data. Italy presents the longest time series for estimated UDW (in ULA units), going from 1980 to 2005.

Breakdown by socio-economic categories: data from the Czech Republic, France, Hungary, Poland and Spain present breakdowns along main socio-economic categories – mainly: age, residence, nationality (for immigrants). Hungary also has a breakdown by education level. Ireland has a breakdown for the welfare payment scheme.

Sectoral breakdown is mentioned for six countries: the Czech Republic, France (three sources), Hungary, Italy, Poland and Spain (four sources).

Quality of UDW data (statistical representativeness) For Bulgaria, the expert evaluation of quality/representativeness of the data is generally not favourable, but this is due to the indirect nature of the data. The Bulgarian sources report the number of crimes against employment rights, economy, finance, tax and insurance system. As for Croatia, the data from official sources (Bureau of Statistics and Central Bank) can be considered reliable and pertinent, although not directly displaying UDW measures. Also the remaining Countries generally give a good evaluation relative to the data quality/representativeness: some of these data sets – in particular those provided by Ministries of Labour and LFS – are particularly well-suited for usage in UDW estimates.

Complementarity with the macro-economic models. Apart from the Bulgarian source, the complementarity of this type of data is generally considered of a good overall level for many sources. This is particularly true for the data coming from the Ministries of Labour and National Institutes of Statistics (in the Czech Republic, France, Hungary, Italy, Poland and Spain), such as firms surveys and LFS. Actually, these data are those used in the Labour Input method discussed in the first interim report. Many of the data from France's INSEE (especially those related to national accounts, financial indicators and electricity consumption) can also be used as a basis for estimations with some of the indirect methods. Their high complementarity notwithstanding, the Spanish expert reports some possible interpretation problems for data coming from LFS and Social Security affiliations; negative differences between the number of employed persons and those affiliated to Social Security may be due to the fact that the second figures refer to affiliation situations, so that one person may be counted more than once in the Social Security registry. Given the availability of breakdown for economic activity for Spain, these issues could be addressed by confronting the Social Security data with the LFS data on a sectoral basis (so

|G|H|K|

as to focus on the sectors in which the discrepancy is stronger). Finally, Croatia reports directly the estimates of the shadow economy made by the Bureau of Statistics for the years 1995-2005, by employing national accounts data in the context of the discrepancy method.

Therefore, it can be concluded that this data category is only very loosely related to the measurement of UDW and is thus of limited immediate use to the measurement of UDW.

6.5   Other issues

A number of countries – Estonia, Finland, Germany, Luxembourg, Malta and Turkey – *reported the substantial absence of (sufficiently) systematic and informative data on UDW on the part of administrative institutions/sources*. As highlighted by the respective national experts, this does not amount to say that the phenomenon is completely absent in these countries; nor is it a signal of a total lack of interest (or effort) on the part of national institutions in the evaluation of the UDW phenomenon. Rather, in these countries, there are specific features and issues related to the UDW justifying the particular stance taken by national institutions.

Estonia does not have an identifiable dataset collected by the public authorities on UDW. The national expert reports that the Estonian Institute of Economic Research provides a yearly survey (made on behalf of the Ministry of Economic Affairs) on ”envelope“ wages (earnings received without the employer paying any taxes) received by a random sample of workers. There are also regular tax audits carried out by the tax authority, but the sampling is non-random. Thus no reliable generalisations on the overall extent of UDW, which are based on these limited data sets, are possible.

In **Finland**, the expert points out that the quantitative analyses of UDW have been mainly undertaken by individual researchers, rather than by institutions (in a systematic fashion). As a result, the public authorities have based their judgements of the problem of UDW on experts' estimations of its size, rather than on systematic data collection. However, signs of growing interest for the UDW in the public debate have been recently recorded – the main reasons are: (i) the increased mobility of people and firms, which creates potential room for SE–UDW; (ii) the potential extension of money laundering and speculative economy, hidden in political structures and practises; (iii) the increase in the extension of the exploitation (in terms of irregular labour practices) inside households and among migrant workers.

As for **Germany,** the issue of UDW seems to have only marginal relevance in the eyes of the public authorities. For instance, the expert reports the explicit refusal of the Federal Labour Agency to collect data on UDW, as it would be somewhat contradictory to collect *official* data about *illegal* activities. Nonetheless, there are two administrative sources of data on UDW: inspections of workplaces and employers (EUR 488 996 in 2008) made by the Customs Authority (which is part of the Ministry of Finance) and detections of persons running a business without being registered in the register of craftsmen (detection made by municipal authorities); the first source is more systematic and has a nationwide coverage. The more systematic source (custom authority) only delivers information on captured infringements (relative to a series or irregularities), and the data provided cannot be interpreted as a reliable (administrative) estimate of the size of UDW in Germany.

Luxembourg lacks reliable statistics on UDW, but the expert mentions an estimation proposal made by a research institute using the European average rate of UDW as a benchmark. The figures obtained in this way do not however constitute a proper estimation of illegal work in Luxembourg**.**

As for **Malta**, the expert reports some data obtained from the local public employment service. It is the number of reported infringements (people working without having notified the PES of their engagement, thus breaking the law).

|G|H|K|

Turkey reports the presence of three different administrative sources that are in some way involved in UDW issues, but the expert highlights the substantial absence of reliable and/or publicly accessible data on UDW provided by these sources. The Labour Inspectorate provides only occasional and non-systematic reports, useful only for certain qualitative assessment. The Tax Authority has provided data on occasional tax audit, by they are not statistically representative. The Social Security Institution has collected data that could be usefully matched with information from Turkstat (on labour statistics) for evaluating the size of UDW, but these data are difficult to obtain.

6.6   Summary overview of the different methods reviewed in the study countries

Table 6.1 provides a summary overview of the availability of administrative sources in the 29 European countries reviewed in the study. The table is based on a calculation of sources using different types of data (on frauds or infringements) available in each country. The overall number of sources available is 139. This information seem to highlight, at a glance, that the number of available administrative sources greatly varies across countries, with Italy scoring the highest number (14) and Malta the lowest (1), excluding of course the countries with no sources. It must however be recalled that some national sources may present data fitting in more than one of the four typologies itemised in the table columns. Thus, the number of institutions providing administrative data is less than 139, as some institutions collect more than one category of administrative data.

Table 6.1 Summary of administrative sources reported according to the nature of fraud of infringements detected, by country

Country	Type of fraud or infringement				Total number of sources per country
	Tax evasion	Evasion of social security contributions	Infringements of labour norms and regulations	Other irregularities and data	
Austria	(0)	(1)	(1)	(0)	**2**
Belgium	(0)	(4)	(4)	(0)	**8**
Bulgaria	(4)	(1)	(1)	(1)	**7**
Croatia	(0)	(0)	(1)	(6)	**7**
Cyprus	(0)	(1)	(1)	(0)	**2**
Czech Republic	(1)	(1)	(3)	(1)	**6**
Denmark	(1)	(0)	(1)	(0)	**2**
Estonia	(0)	(0)	(0)	(0)	**0**
Finland	(0)	(0)	(0)	(0)	**0**
France	(2)	(0)	(1)	(10)	**13**
Germany	(0)	(0)	(0)	(2)	**2**
Greece	(0)	(2)	(0)	(0)	**2**
Hungary	(4)	(3)	(4)	(1)	**12**
Ireland	(2)	(0)	(1)	(1)	**4**
Italy	(4)	(5)	(4)	(1)	**14**
Latvia	(1)	(1)	(1)	(0)	**3**
Lithuania	(0)	(1)	(7)	(0)	**8**
Luxembourg	(0)	(0)	(0)	(2)	**2**
Malta	(0)	(0)	(1)	(0)	**1**
Netherlands	(0)	(0)	(4)	(0)	**4**
Poland	(0)	(1)	(1)	(3)	**5**
Portugal	(0)	(1)	(1)	(0)	**2**
Romania	(1)	(1)	(1)	(0)	**3**

$|G|H|K|$

Slovakia	(2)	(0)	(4)	(0)	**6**
Slovenia	(2)	(0)	(4)	(0)	**6**
Spain	(0)	(1)	(1)	(6)	**8**
Sweden	(3)	(3)	(0)	(0)	**6**
Turkey	(0)	(0)	(0)	(0)	**0**
United Kingdom	(1)	(0)	(3)	(0)	**4**
TOTAL	**28**	**27**	**50**	**34**	**139**

Legend: The number in parenthesis indicates the existing sources available for the type of fraud/infringement in the country.

Table 6.2 describes, for each country covered in the study, the 'best available' source/method, i.e. the source/method which obtains the highest evaluation by the national experts relative to the quality of the data and the complementarity with macro-economic models.

Several observations can be drawn from this exercise:

- In 16 countries, national experts identified a number of problems with existing administrative sources, and hence could not single out one source which would be the 'best available' in terms of data quality and complementarity with the macro-economic methods. Data available from inspections of various authorities is particularly questioned, due to the issues of quality, representativeness and other concerns. An exception to this is Cyprus, where the inspection data is considered to be the key source, due to a number of factors specific to the country's situation (e.g. small numbers of people, all workers belonging to one social security scheme, long established tradition of inspections). Also in Portugal and Slovakia, the inspection data is considered reliable enough to be used for UDW estimations.

- Where a 'best available' method is identified, the following data appear to be the most relevant ones:

  o Social security related data (Bulgaria, Spain), pension contribution data (Hungary)

  o Macro-economic estimates and calculations (Croatia),

  o Merger of administrative and census data (Italy),

  o Data provided from the LFS (Poland).

- In countries where the 'best available' method is identified, it is noted that the data is already largely used to produce the estimations of UDW, including their use by the National Statistical Institutes (e.g. Bulgaria). As for Spain, the method is not explicitly used by the National Statistical Institute in order to provide an official estimation of the UDW, as a more thorough statistical analysis should be carried out to this aim (the UDW estimation is a preliminary estimation provided by the national expert commissioned for this study).

Table 6.2 – Best available source/methods per country, its key strengths and complementarity with macro-economic models

Country	Best available method	Key strengths	Complementarity with macro-economic methods
Austria	Both sources available are based on random checks/filed charges, so their reliability is questionable.		Low complementarity

GHK

Country	Best available method	Key strengths	Complementarity with macro-economic methods
Belgium	Administrative data available is based on data from inspections. Data quality problems exist, e.g. inspections are focussed on fraud-sensitive sectors which results in high % irregularities		The statisticians of the national accounts already use some of the administrative data to estimate the corrections for fraud (on a sectoral basis) that they apply to the national accounts data in order to calculate the GDP in an exhaustive manner. So most complementary is found between administrative data and estimating UDW in the national accounts
Bulgaria	Social security and tax related data from the National Revenue Agency ; LFS (Labour Force Survey), representative survey Data is available upon request only.	Good quality and well-guaranteed representativeness	That and additional data could be used for the Labour Input Method, or as complementary to its results.
Croatia	Adjustment of GDP for non-observed economy by Bureau of Statistics; Annual balance of payments data analysis by the Central Bank	High quality and statistical representativeness	Fully complementary
Cyprus	Inspections by the Department of Social Insurance Services of the Ministry of Labour and Social Insurance	Reliable and likely to become even more reliable in the near future because of only one social insurance scheme covering all persons, small numbers of people involved, and efficiency of public administration, including a long tradition of inspection	Cannot be meaningfully related to estimates of UDW delivered by other indirect methods
Czech Republic	No single 'best available' method is identified. Data from inspections is questionable because of the issues with its representativeness; data on UDW of foreign workers or all unemployed workers capture a segment of UDW		
Denmark	The administrative data do not provide any overall information on UDW, but are used solely to target individual cases of fraud.		
Estonia	No sources are available		
Finland	No sources are available		
France	No single 'best available' method is singled out. ACOSS-URSSAF data on amounts of repayment of back taxes resulting from illegal work and labour inspection data are considered reliable as an administrative source, but not as a direct estimate of UDW. Existing macroeconomic data can be used for macroeconomic models.		
Germany	The inspection data of the customs authority only give information about infringements captured. While the number of inspections does not distinguish between inspections without suspicion or inspections due to a tip-off, it does not deliver a representative figure of the whole extent of UDW in Germany		
Greece	No single best available method is available. Estimates of UDW based on SEPE inspections clearly underestimate the true volume of UDW as they focus on the application of labour laws (such as working conditions, pay), rather than UDW. Estimates of UDW based on IKA inspections overestimate the true volume of UDW. This is because these inspections are targeted to the sectors most 'prone' to UDW.		
Hungary	Pension insurance data	Representative, better quality data than other administrative data (e.g. than health insurance)	Important for labour input estimates
Ireland	No single best available method is identified.		

$G|H|K$

Country	Best available method	Key strengths	Complementarity with macro-economic methods
Italy	ISTAT estimates	Integration of administrative data with survey and census data, good representativeness of population. Some administrative data feed the Italian methodology to estimate undeclared work by use of the labour input method, as more extensively described in Annex 2.	Compatible and allow for comparisons across regions and sectors
Latvia	No single best available method is available. The figures are of interest but are hard to interpret and do not provide a solid indicator of the true scale of undeclared work		
Lithuania	No single best available source is available. Existing data is not statistically representative – usually economic entities with higher probability of risk are inspected. Data also might reflect the efficiency of labour inspectorate.		
Luxembourg	No single best available method is identified. Figures depend on the intensity of control policy.		
Malta	No single best available source is identified.		
Netherlands	No single best available source is identified.		
Poland	Modular LFS (Labour Force Survey), representative survey	The surveys are representative, conducted on a large sample, and provide wide and reliable information on employment in the shadow economy.	Full complementarity with discrepancy method – difference between official and real labour force, where the data from LFS are being used directly to assess the scale of UDW
Portugal	Data available from the Authority for Working Conditions	Allows an assessment of the size of UDW in Portugal through the number of UDW cases detected and thus compare it with the outputs of macro-economic models	
Romania	Data provided by the Labour Inspections	The data specifically refers to the UDW phenomenon, and as such they are the only source in Romania that directly address the issue	
Slovakia	National Labour Inspectorate inspection data	Data on UDW are of good quality. Efficiency of inspections and thus also data improved over the past years along with refined legislation	Good complementarity to macroeconomic methods (in package with other administrative sources)
Slovenia	No single best available source is identified.		
Spain	Social security data	Good quality of data for registered workers. The representativeness of the source to estimate UDW will depend on the representativeness of Labour Force Survey	Highly complementary with the labour input method
Sweden	No single best available source is identified.		
Turkey	No sources are available		
United Kingdom	No single best available source is identified. Representativeness is questionable; some data is out of date		

G H K

7   REVIEW OF DATA AVAILABLE THROUGH THE MAIN ADMINISTRATIVE SOURCES

In this section, a synthesis of data collected through the national review process by national experts is provided. Key data categories are presented, but not all the information and statistics collected by the national experts is included in this section. This additional material was provided to the European Commission as a separate reference document.

7.1   Data review in all the countries covered by the study

Table 7.1 summarises the administrative data available through the main types of administrative sources existing in the countries reviewed. Given the richness of the information available, only the main indicators and data categories are captured for ease of reference (the full data sets were provided in a separate document). In addition, only the most recent data is reported.

Table 7.1 shows administrative data on the phenomenon of **tax evasion**, which was reported from 13 countries (out of 29 covered in the study).

The main observations from the existing data on tax evasions are the following:

- The key data categories available through this type of data are:
  - Number of inspections conducted by administrative authorities;
  - Number of enterprises/economic entities controlled;
  - Number of tax regulation violations;
  - The amounts of fines issued and collected;
  - Estimations of revenues lost through tax regulation violations.

- In countries where such data is available, it is recent and up-to-date and thus can provide a good overview of the current situation.

- Data on tax evasion covers violations of all types of tax regulations. In some countries, further disaggregation by type of tax offence is available.

- However, data on tax evasion appears to be of limited direct use to estimate the UDW within a country. Very few countries conduct such estimations (e.g. Sweden, but also only the extent of UDW as a proportion of income).

- In addition, tax evasion data is difficult to use in a comparative way to assess and contrast the extent of tax evasion (and indirectly UDW) between different countries. The extent of tax evasion uncovered does depend on a number of factors independent of the actual extent of tax evasion – such as administrative capacity, resources provided to financial authorities, political priorities.

Table 7.1 – Administrative data available on tax evasion

G|H|K

	Main indicator	Source	Data	
Bulgaria	Additional sums that the companies and persons have to pay as taxes and social contributions according to the inspections	National Revenue Agency	2008:Total additional sums companies and persons had to pay as taxes and social contributions according to the inspections (in billion BGN).	1438.2
			of which:	
			VAT	68.95
			Corporate Tax on Annual Profits	18.51
Czech Republic	Number of tax inspections and check-ups; amount of additional taxes raised	Czech Tax Administration	2007: Number of investigations	114,490
			2007: Amount recoved in CZK	1,632,520,061
Denmark	Number of cases and the amount collected in repayments or as the results of quarantines	National Directorate of Labour	2008: number of new cases	347
			2008: number of finished cases	341
			2008: Repayments and quarantines, in DKK	20,674,385
France	Number of enterprises controlled; amount of repayment of back taxes resulting from illegal work	ACOSS-URSSAF	2007: Number of enterprises controlled	44 100
			2007: Amount recovered, in EUR	118 million
Hungary	Detected fraud	Tax authority	Data not reported as it is not representative and depends heavily on risk assessment quality	
Italy	Number of inspections; irregular and black workers uncovered; total tax evaders, subjects reported for tax crimes, violations ascertained	Financial Guard, Ministry of Economy and Finance	2008: Total tax evaders	6414
			Violations ascertained	7649
Ireland	Extent of tax and social security evasion	Office of the Revenue Commissioner	2008: Cases	53,050
			Value, in EUR million	1 044
			Yield, in EUR million	351.5
Latvia	Number and percentage of inspected enterprises that did not pay the proper amount of taxes (i.e. "envelope" wages)	State Revenue Service	2008: Number of cases where infringements were found of taxes are not correctly calculated on wages	1227
			2008: Taxes are not correctly calculated on wages: % of inspections where infringements were found	13.20%
Romania	data on potential revenues from shadow economy; shadow economy as % share of the GDP	Ministry of Finance	2008: Potential revenues (non-registered/non-obs.ec.) (%ofGDP)	11.30%
Slovakia	Data on UDW provided are a supplementary product of tax audits	Tax Administration	2008: Number of inspections of UDW	665
			2008: Number of illicitly employed persons	5
Slovenia	Number of inspections; number of penalties	Ministry of Labour, Family and social affairs, Government Commission of RS for detecting and prevention of UDW and UDE	2007: number of inspections	1334
Sweden	Number of tax and social security revisions;	Swedish Tax Agency	2003: Income from UDW as percentage of reported income, total private sector	11%
United Kingdom	Tax evasion such as VAT non registration, ghost workers and moonlighting	National Audit Office, a one-off study	In 2003, between 125,000 and 180,000 businesses that should have been VAT registered were not (with a combined tax loss of around £400-500m)	

Table 7.2 shows administrative data on the phenomenon of **evasion of social security contributions**, which was reported from 15 countries (out of 29 covered in the study).

The main observations from the existing data on evasions of social security contributions are the following:

G|H|K

- The key data categories available through this type of data are:
    - Number of inspections/controls conducted by administrative authorities;
    - Number of enterprises/economic entities controlled;
    - Number of violations detected;
    - The amounts of fines issued and collected;
    - Estimations of revenues lost through evasions of social security contributions.
- In countries where such data is available, it is recent and up-to-date and thus can provide a good overview of the current situation.
- However, data on the evasion of social security contributions appears to be of limited direct use to estimate the UDW within a country. Very few countries conduct such estimations.
- In addition, data on the evasion of social security contributions is difficult to use in a comparative way to assess and contrast the extent of social security evasion (and indirectly UDW) between different countries. The extent of such evasion uncovered does depend on a number of factors independent of the actual extent of the evasion – such as administrative capacity, resources provided to financial authorities, political priorities etc.

Table 7.2 - Administrative data available on evasions of social security regulations

	Main indicators	Source	Data	
Austria	Recorded cases; recorded suspects	Federal Ministry of the Interior - Federal Criminal Police Office	2007: Recorded cases	314
Belgium	Number of investigations; number of charges; number of irregularities; number of warnings; also as a % of inspected employers and employees; evaded contributions as % of overall contributions	National Employment Office; Federal Public Office Social Security; Federal Public Service Employment; Inspection of the National Social Security Office	2005: Number of reports/charges as % of inspected employers	14%
			2005: Number of reports/charges as % of inspected employees	5.50%
Bulgaria	Total additional sums incorrect companies and persons had to pay as social contributions according to the inspections (in billion BGN).	National Revenue Agency	2008: Social Security Contributions for the State Social Security, billion BGN	6.25
Cyprus	Data on unrecorded enterprises and data on uninsured workers (employees and self-employed)	Department of Social Insurance Services of the Ministry of Labour and Social Insurance	2008: Share of unrecorded employers	5.60%
			2008: Share of unrecorded employees	21%
			2008: Share of unrecorded self-employed	20%
Czech Republic	Number of inspections with infringements	Labour offices	2006: total number of inspections	11,495

GHK

	Main indicators	Source	Data	
	found, types of infringements by the size of the company		2006: inspections which found infringements	4,377
Greece	Data on unrecorded enterprises and data on uninsured workers (natives and foreigners); Number of inspections, number of uninsured employees	Institute for Social Insurance (IKA-ETAM); Labour Inspectorate (SEPE)	2008: number of enterprises inspected	21,496
			Number of unrecorded enterprises	2,137
			% of uninsured foreign and native workers as of all foreign and native workers	27%
Hungary	Detected fraud	Social Security Authority	Data not reported as it is not representative and depends heavily on risk assessment quality	
Italy	Number of firms inspected and firms with irregularities of paying social security contributions	National Institute of Social Security (INPS)	2008: Inspected firms	96414
			2008: Irregular firms	79276
Latvia	Number and percentage of inspected enterprises that did not pay the proper amount of taxes (i.e. "envelope" wages)	State Revenue Service	2008: Taxes are not correctly calculated on wages: % of inspections where infringements were found	13.20%
Lithuania	Number of inspections with respect to, inter alia, social security regulations compliance	State Labour Inspectorate	2007: Number of inspected economic entities	1717
Poland	Social Insurance Institution controls	Social Insurance Institution	Data is not in the public domain	
Portugal	The amount of undeclared contributions to social security	Since 2007, the authority responsible is the Authority for Working Conditions	2007: The amount of undeclared contributions to social security	2,920,658
Romania	Data on potential revenues from shadow economy	Ministry of Finance	2008: Potential revenues (non-registered/non-obs.ec.) (% of GDP)	11.30%
Spain	Registrations to the Social Security due to Labour Inspection activity; registration of foreigners without work permits due to the labour inspection activity; registration of workers receiving benefits wrongly; % of UDW transformed to regular employment due to the affiliation to social security	Labour and Social Security Inspection of Spain	Registrations in Social Security due to Labour Inspection activity	34,784
			Registration of foreigners without work permits due to Labour Inspection activity	11,637
			Registration of workers receiving benefits wrongly, due to Labour Inspection activity	5,046
			% of UDW transformed in regular over total affiliates Social	0.27%

|G|H|K|

	Main indicators	Source	Data	
			Security	
Sweden	Number of tax and social security revisions; estimated income from UDW	Swedish Tax Agency	2003: Income from UDW as percentage of reported income, total private sector	11%

Table 7.3 shows administrative data on the phenomenon of infringements of **labour law norms and regulations**, which was reported from 22 countries (out of 29 covered in the study).

The main observations from the existing data on infringements are the following:

- The key data categories available through this type of data are:
  - o Number of inspections/controls conducted by administrative authorities,
  - o Number of enterprises/economic entities controlled,
  - o Number of violations detected,
  - o Number of illicit workers detected,
  - o Proportion and number of controls where UDW was found,
  - o The amounts of fines and penalties issued and collected.

- In countries where such data is available, it is recent and up-to-date and thus can provide a good overview of the current situation.

- Data on violations of labour law regulations could provide a direct indicator on the extent of UDW uncovered in countries, since the presence of UDW is one of the infringements of labour laws. But, in none of countries reviewed did the authorities use the labour inspection data to provide more global estimates of UDW.

- Furthermore, not all countries provide a detailed breakdown of labour law violations uncovered, which would make it difficult to use such an indicator to estimate only the extent of UDW (rather than a whole spectrum of labour law violations, such as infringement of contractual provisions, health and safety, overtime, youth employment etc regulations).

- In addition, data on violations of labour law regulations is difficult to use in a comparative way to assess and contrast the extent of labour law violation (and thus UDW) between different countries.

Table 7.3 – Data available on the violations of labour law regulations

	Main indicators	Source	Data	
Austria	Number of controlled enterprises, persons, illicit workers; % of illicit workers in controlled workers	KIAB (Law Enforcement Unit to Combat Illicit Work)	2008: Number of controlled enterprises	26 697
			Number of controlled persons	70 760
			Number of illicit worker	15 431
			% of illicit workers in controlled workers	21.81

|G|H|K|

	Main indicators	Source	Data	
Belgium	Regularised wages as % of total wages all employees; number of irregularities detected; number of reports and warnings; number of controls where UDW was detected	National Employment Office; Federal Public Office Social Security; Federal Public Service Employment; Inspection of the National Social Security Office	2008: % of controls in which undeclared work was found	29.10%
Bulgaria	Number of employees working without labour contract; Compensation of employees without labour contract (thous. BGN); Number of cases of labour law violations	National Statistical Institute; General Inspectorate Executive Agency at the Ministry of Labour and Social Policy	Statements of breaching labour legislation	3 658
			Relative share in %	39.3
			Registered cases of illegal work of people under 18 years old	287
			Relative share in %	3.1
Croatia	Partial data, mainly reporting on violations of overtime and youth employment regulations	The Yearly Report by State inspection	Partial and incomplete data	
Cyprus	Data on unrecorded enterprises and data on uninsured workers (employees and self-employed)	Department of Social Insurance Services of the Ministry of Labour and Social Insurance	2008: Share of unrecorded employers	5.60%
Czech Republic	Number of inspections (total), number of controlled subject, number of deficiencies found	Labour Inspection Office; Czech Customs Office	2007: Number of inspections (total)	2 842
			Number of inspected subjects	2 644
			Number of deficiencies found	2 276
Denmark	Information on the number of employers and employees undertaking UDW	Ministry of Taxation	2008: firms inspected	320
France	Number of attested labour law violations	Ministry of Labour	2006: % of employers inspected with labour law violations	10.40%
Germany	Number of inspections, infringements captured and administrative fines	Customs Authority at the Ministry of Finance	2008: inspections of employers	46 058
			Amount of penalties, EUR million	56.7
Hungary	Detected fraud	Social Security Authority	Data not reported as it is not representative and depends heavily on risk assessment quality	
Ireland	Inspections and Breaches in Employment Rights Legislation	National Employments Rights Authority (NERA)	Number of inspections, breaches detected, arrears recovered	
Italy	Firms inspected, irregular firms, irregular workers, black market workers	Labour Inspectorate	2008: Firms inspected	197 181
			Irregular firms	93 554
			Irregular workers	168 553
			Black workers	48 362
Latvia	Violations of labour regulations, in particular it identifies the presence in a company of people without a work agreement	State Labour Inspectorate	2008: Number workers without work contract	1 623
			Number of inspections	4 554

G H K

	Main indicators	Source	Data	
Lithuania	Number of illegal work identification cases; number of illegally working persons; number of administrative law infringement protocols written for employers; number of cases of infringement of UDW regulations brought to court	State Labour Inspectorate	2008: Illegal work identification cases (during inspections of economic entities by SLI)	370
Luxembourg	Number of inspections	Labour Inspectorate	Data started in 2007 and is not available	
Malta	Number of infringements	PES (Employment and Training Corporation)	2007-2008	2 175
Netherlands	Recorded benefit fraud; number of illegal workers found through inspections	Labour Inspection Office; Czech Customs Office;	2008: number of illegal workers found through inspections	1 905
Poland	Number of persons performing undeclared work; number of cases of undeclared work; number of motions issued by National Labour Inspectorate for breach of employment relations legislation	National Labour Inspectorate (PIP)	2006: number of motions (in thousands)	308.6
Portugal	Monitored firms; fixed-term illegal and temporary workers; dissimulated contracts; undeclared workers	Since 2007, the authority responsible is the Authority for Working Conditions	2007: Monitored firms	16 110
			Fixed-term illegal workers	2 854
			Temporary illegal workers	576
			Dissimulated contracts	187
			Undeclared workers	398
Romania	Administrative data on controls and inspections performed in relation to UDW or to other cases of non-compliance in relation to the labour law (apart from health and safety issues which are dealt with in a distinct way) as well as on sanctions and penalties applied	Ministry of Labour Inspection	2008: No. of establishments subjected to controls and inspections	99 698
			No. of establishments where cases of UDW have been uncovered	7 963
			No. of individuals found as engaging in UDW	16 162
			Total value of sanctions and penalties applied in relation to UDW (RON)	22 763 300
Slovakia	Number of inspections of UDW; number of inspected persons and illicitly employed persons	National Labour Inspectorate	2008: Number of illicitly employed persons	1 105
Slovenia	Number of inspections; number of violations on UDW	Ministry of Labour, Family and social affairs, Government Commission for detecting and prevention of UDW	2008: number of inspections	1 334
Spain	Undeclared Work discovered by Labour Inspectorates	Labour and Social Security Inspection of Spain	2008: Registrations in Social Security due to Labour Inspection activity	43 351
United Kingdom	Fraud and Error in the Benefit System	DWP	2008: Fraud in Income Support and Jobseeker's Allowance (as % of total payments)	2.5

|G|H|K|

	Main indicators	Source	Data	
			Fraud in Income Support and Jobseeker's Allowance (£m)	280

Table 7.4 shows other administrative data available, which was reported from 11 countries (out of 29 covered in the study).

The main observations from other administrative data available are the following:

- The key data categories available through this type of data are:

  o Estimations of non-observed economy or evasion of official economy conducted through macro-economic methods by very reputable administrative authorities (e.g. in Croatia, Spain),

  o Data on employment of illegal migrants (which is often partial and not available in the public domain),

  o Ad-hoc surveys of employers and employees (e.g. Poland).

- In countries where such data is available, it is recent and up-to-date and thus can provide a good overview of the current situation.

- Due to the varied nature of this data, its usefulness in providing direct estimates of UDW is also varied. Global macro-economic estimates are considered to be very reliable and indeed can be considered as practical applications of the main theoretical UDW indirect measurement methods. Data on employment of illegal migrants is not public and considered to be partial, as it deals with only one segment of UDW. Ad-hoc surveys are considered to provide very interesting snapshots, but do not provide a solid systematic basis for any calculations of UDW.

Table 7.4 – Other administrative data available in countries reviewed

	Main indicators	Source	Data	
Bulgaria	Number of crimes, number of cases, court verdicts, damages awarded according to certain provisions of the Penal Code - crimes against employment rights, economy, tax, finance and insurance systems	National Supreme Prosecutor's Office of Cessation at the National Supreme Prosecutor's Office	2008: Newly opened proceedings before legal procedure (NOP) in relation to offences against tax, insurance and finance systems	355
Croatia	Gross Domestic Product, Major Statistical Revision including Non-observed economy, current prices, 1995 – 2005; Annual balance of payments data	Bureau of Statistics; National Bank	2005: Non-observed economy, HRK million	19 385
			2007: Net errors and omissions in the annual balance of payments data, EUR million	-889.8
	General statements on UDW in National Action Plan of Employment and Operational Programme for Human Resources Development	Ministry of Employment, PES	No data available	

|G|H|K|

	Main indicators	Source	Data	
	Surveys (over internet and interviews) on the extent of UDW	Web portal; The Union of Autonomous Trade Unions of Croatia	Very partial data	
Czech Republic	Thematic digest of data collected by Labour offices, Customs office and Trade Licensing Offices, from inspections focused on aliens -illegal employment of immigrants -illegal entrepreneurship of aliens -illegal migration of aliens	Ministry of Interior, Ministry of Foreign Affairs, Ministry of Labour and Social Affairs, Ministry of Industry and Trade, Ministry of Justice	2006: Number of inspections of employers employing aliens	1,474
			Number of inspected aliens	12,094
			Number of illegally employed aliens	3,788
France	GDP, expenditure, income, population census, employment, industry, financial indicators, energy consumption and production, household consumption	INSEE, Central Bank, Ministry of Industry	Global macro-economic and employment data	
Germany	Fines imposed on the lack of registration in the register of craftsmen	Municipalities	Data not collected centrally	
Hungary	Data on illegal immigrants	Customs authority, police, National Employment Office, migration authorities	Data not representative	
Ireland	Savings/Reviews by Welfare Scheme	Central Control Division, Department of Social and Family Affairs	Number of reviews, amounts recovered	
Italy	Estimates of evasion obtained from the difference between overall value added and declared IRAP taxable base	Revenue Agency	2002: Extent of evasion, EUR million	202 484
Luxembourg	Estimation of illegal number of workers	Project "2Plus" conducted by Centre de Formation Sociale Jean-Baptiste ROCK and Syndicat des Indépendants et des Classes moyennes du Luxembourg	No time series, and estimations are very imprecise	
Poland	Controls of legality of residence and legality of employment of foreigners; control of legality of stay of foreigners and number of foreigners expelled	Customs Authority, Border Guards	Data not in the public domain	
	Opinions on the phenomenon of undeclared work (hired work without formal employment contract and self-employment without deducting social contributions)	Modular LFS (Labour Force Survey), representative survey	Data is checked with the expert	
Spain	Approximation of growth rate of unrecorded income	Bank of Spain	2008: Growth rate of unrecorded income	0.12%

7.2 Core countries – summary statistics

Table 7.5 and Figure 7.1 summarise the available information on UDW from administrative sources in the five core countries. In order to provide a direct comparison with the figures presented in Section 5 for the same countries, only the data which are more directly related

|G|H|K|

with the UDW phenomenon are presented. Thus only one source for each Core Country has been selected.

It should be noted that administrative data from Greece and Turkey do not allow for such representation, and are thus omitted.

Table 7.5 – Administrative data for UDW (or SE), the description includes figures for selected years/time intervals and typology of data/method.
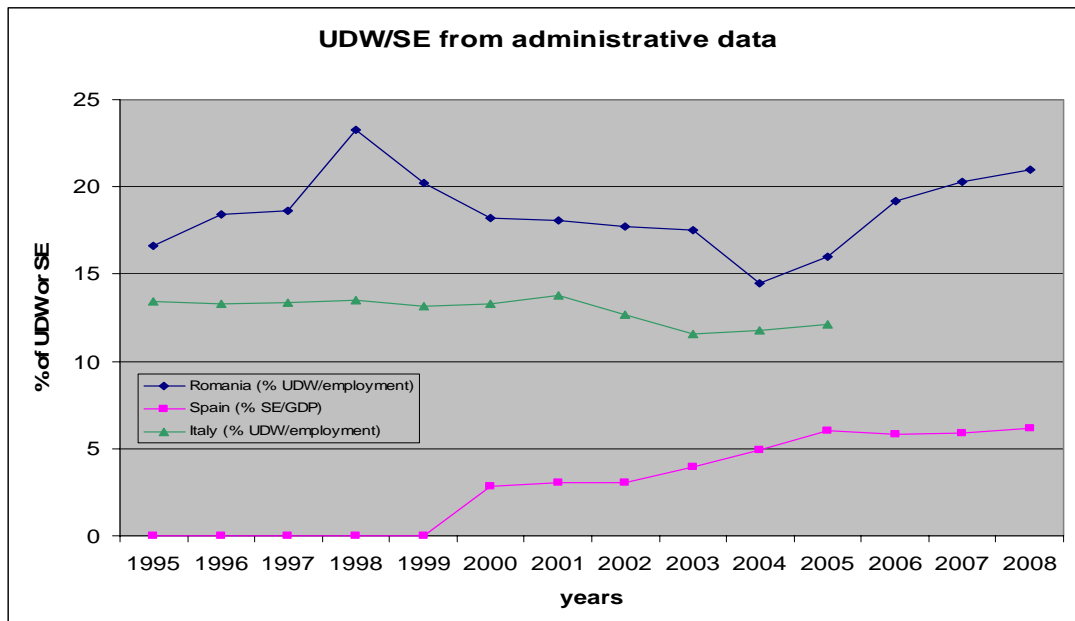
	COUNTRY		
	ITALY	**SPAIN**	**ROMANIA**
Method/type of data	LSF data coupled with firms surveys – *Demographic employment approach* (used with the labour input method)	LSF coupled with Social Security data	Data on tax evasion from the Ministry of Finance
Figures	**12.5%** (UDW as % of total employment – average 2000-2005)	**4.4%** (UDW as % of total employment – average 2000-2005)	**17%** (Shadow economy as % of GDP, average 2000-2005)

Some preliminary observations on the difference between macro-methods and administrative estimates of UDW can be put forward by contrasting the data from table 7.5 with those from table 5.8 in section 5.

The comparison for Italy is straightforward, as the indirect method and the administrative sources mentioned in the two tables do coincide. For Romania, the two sources can also be directly confronted, as the data on UDW provided are of the same typology (ratio of SE on GDP). The indirect methods offer a range of values for this ratio in the range of 20.5 – 30.2% for the 1996-2002 period, but the administrative source (based on tax evasion data) offers the substantially lower figure of 17% (for roughly the same period). As for Spain, the ratio of UDW over total employment obtained using the Labour Input method (for 2002) can be calculated by dividing the number of irregular workers by the number of employed workers from the LFS (1 338 300 ÷ 16 630 000 = 8.08 %), as compared to the 3.0 % reported by the Spanish administrative source for the year 2002. These comparisons may suggest the possibility of underestimation of the UDW amount estimated via administrative data for some of the five core countries.

In Figure 7.1 three time series for the UDW scale relative to the economy are plotted for a comparable time span, even though Italy offers a longer time series going from 1980 to 2005. According to these data, the UDW phenomenon seems to be almost steadily increasing in Spain, fairly stable between 1995 and 2001 and then U shaped in Italy, and rather cyclical in Romania.

Figure 7.1 Time series for Core Countries

|G|H|K|

UDW/SE from administrative data

Chart showing % of UDW or SE (y-axis, 0 to 25) versus years (x-axis, 1995 to 2008) for Romania (% UDW/employment), Spain (% SE/GDP), and Italy (% UDW/employment).

7.3 Conclusions

The analysis of the existing administrative data suggests that in most of the countries considered in the study there exist administrative data that might be usefully employed in the estimation of UDW.

Administrative data is very rich and detailed. It provides, in many countries, breakdown by sector/economic activity, region, size of company, type of ownership, type of employment, nationality; breakdown by type of infringement, which is very informative, compared to other more crude macro-economic estimates.

The main categories of administrative data available are as follows:

1. Number of inspections conducted by administrative authorities;

2. Number of enterprises/economic entities controlled;

3. Number of violations of tax/social security/labour law/other regulations;

4. Number of illicit workers detected;

5. Proportion and number of controls where UDW was found;

6. The amounts of fines issued and collected;

7. Estimations of revenues lost through violations;

8. Estimations of non-observed economy through macro-economic estimates.

It is noteworthy that only data category five (number and proportion of UDW found in inspections) provides a directly relevant estimation of UDW available through administrative sources. Category eight (macro-economic estimates) could in a way be considered closer to the theoretical macro-economic methods reviewed in Section 4.

The administrative data available provides a recent and up-to-date picture of the situation in the countries. In many countries, data is available from very recent years, and some data is available in the public domain up to the second half of 2009 (when the reports from national experts were submitted). Administrative data is usually available at least on an annual basis; some is published on a quarterly (or even daily!) basis.

|G|H|K|

General observations in relation to the data on UDW available through existing administrative sources include:

- The administrative data which are available in the different countries display a high degree of heterogeneity. For example, some sources provide direct estimations of UDW as a percentage of GDP, while others supply very indirect information, like the number of recorded infringements of different laws and regulations.

- For some countries administrative data are mentioned in the reports but are not provided – as the data sets are not always easily accessible and/or are not published for public access.

- Some countries have no administrative sources providing data that can be used to measure UDW. In some countries, specific issues are raised, mainly related to the relevance and importance assigned by administrative and institutional sources to the UDW phenomenon in their economies. This at least partially explains the paucity of administrative data in these countries.

The administrative data available is very heterogeneous and this may represent a difficulty for the availability of the information required to apply some common indirect measurement of UDW in these countries. In seven Member States, there are no relevant administrative sources to be used in the measurement of UDW, so here such process of measuring UDW would have to be introduced from scratch.

A further important caveat to the widespread use of administrative data is the quality of data from administrative sources. This is for a number of reasons:

- Representativeness of data is questionable, especially in respect to inspection data where the number of inspections is based on the regulatory framework (e.g. inspections are undertaken only after a formal complaint, or only employers suspected of violating the law are targeted) and resources allocated. These results in a pre-selection of employers and sectors inspected, and thus could over-estimate the extent of UDW.

- Focus of inspections in many countries is not on uncovering UDW, but other violations of labour law (e.g. health and safety, working conditions, pay, employment of minors), tax and social security regulations. This means that UDW issues are of secondary importance in the agendas of administrative authorities (e.g. in the UK the focus is on uncovering benefit fraud).

- Changes in regulations result in breaks in time series, which means that the data is not comparable over a period of time.

- Data interpretation and problems with the attribution of causality - e.g. decreases in detected UDW could be due either to the decrease of UDW or to changing priorities of inspectorates.

Such quality problems would restrict the applicability of administrative sources to produce EU-wide comparable estimates of UDW. As the extent of UDW uncovered depends on many independent variables (e.g. regulatory framework, tradition and efficiency of inspections), it would be very problematic to produce comparable estimates of UDW across the countries.

An important consideration for the use of administrative data in the measurement of UDW EU-wide will be the availability of data in the public domain. A number of national experts have reported difficulties encountered in trying to contact the relevant authorities and access the data in this research phase. This is an important consideration if the calculations based on administrative data are to be carried out on a regular basis in a cost-efficient way.

G H K

Overall, administrative data could be usefully employed to provide indications on the sectors where UDW is likely to be found and for assessing changes, albeit with the caveats identified above, in the level of UDW through time. They can also be used to assess efforts to combat UDW.

Although the limits of many of the administrative data mentioned above may be relevant for a number of countries, it should be noted that at least one specific category of these data has several favourable features and could be a unifying and widespread usable source of information on UDW. Data on Social Security contributions appear to be widespread among the Countries considered in the study and their overall quality is generally good. Furthermore, they appear to be more closely related to the UDW phenomenon than other types of administrative information, and they also allows for integration with the Labour Input method. Data on imputed and actual Social Contributions could hence be fruitfully used to provide a preliminary estimate of the UDW phenomenon, to be compared with that emerging from the labour input method. Therefore, a calculation using a comparison between actual and anticipated social security contributions (later referred to as the social contribution exercise, SCE) was tested during the study as a supplementary exercise to the application of the labour input method, to be applied at the EU level.

|G|H|K|

8 TESTING THE MOST APPROPRIATE METHOD AT THE EU LEVEL – LABOUR INPUT METHOD

8.1 Methodological approach

In the final stage of the study, national experts were asked to survey the information available in their countries for the application of the labour input method. While the national experts of non-core countries were asked to provide information on the availability of the data which are necessary to employ the labour input method, the experts of core countries were asked, in addition, to report on how the labour input method could be deployed in the context of their countries.

This section, therefore, provides an overview of testing of the labour input method, including:

- Summary and analysis of information collected by national experts on the applicability of the labour input method; and

- Detailed evaluations of the feasibility of the labour input method in the core countries.

8.2 Availability of data required for the application of the labour input method

An overview table (enclosed as Annex 3 to this report) summarises the information provided by national experts on the applicability of the labour input method in their countries. Countries have been categorised on the basis of the information provided by the experts whilst reviewing data required for the application of the labour input method.

In the following discussion, data have been grouped into the following eight main categories:

1. General data on economic activity,

2. Main labour supply data,

3. Data necessary to obtain the number of domestic workers in national accounts,

4. Additional data on labour supply,

5. Main data on labour demand,

6. Additional data on labour demand,

7. Additional data on supply and demand side,

8. Additional administrative data.

Table 8.1 summarises the information on the availability, accessibility and reliability of data required for the application of the labour input method in the 29 countries reviewed. This is further elaborated in sections 8.2.1 – 8.2.8 below.

$G|H|K$

Table 8.1 – Summary of information on the availability, accessibility and reliability of data required for the application of labour input method in the 29 countries reviewed

	Availability of data	Accessibility and reliability of data
General data on economic activity	All countries (except HR)	Good
Main labour supply data	All countries (except HR)	Good
Data necessary to obtain the number of domestic workers in national accounts	Mixed	Mixed
Additional data on labour supply	In the majority of countries	Mixed
Main data on labour demand	In the majority of countries	Generally good
Additional data on labour demand	In half of the countries	Good to sufficient
Additional data on supply and demand side	Sufficiently common	Good to sufficient
Additional administrative data	13 countries	Generally good

8.2.1 General data (aggregate and disaggregate) on economic activity

Although the labour input method focuses on supply and demand for labour, it is important to remember that it is also a thorough approach to GDP estimation to identify the underground economy, i.e. legal production that is not directly observed due to both economic and statistical reasons. It uses more than one technique in order to incorporate under-reporting of turnover, over-reporting of intermediate costs and other possible forms of evasion by enterprises.

Thus, an important source of information needed for the implementation of the labour input method is related to the main aggregate and disaggregate indicators for production and value added at a national level. These are typically retrievable in **National accounts** and **Supply and use tables**. The labour input method will then provide estimates by industry, size-class of enterprises and type of correction of GDP, to isolate the underground component of economic activity at both the aggregate and the disaggregate levels.

All countries reviewed in the study have National Accounts. In addition, the accessibility and reliability of national accounts data are generally good or, at least, sufficient for the application of the labour input method.

Supply and use tables are present in almost all countries, except Croatia. In addition, although they exist in Turkey, there are some problems in terms of accessibility and reliability of its supply and use tables. The tables are generally available only for internal use (by Turkstat, the national statistical institute), except for the provision of input/output tables once in a decade.

8.2.2 Main labour supply data

In estimating labour inputs, both the labour supply and the labour demand data are integrated and then compared. As for the labour supply, the main data sources are the **Population Census** and the household **Labour Force Survey** (LFS). Population census data are available for all the countries, except Croatia, Germany and the Netherlands. In particular, in Germany and the Netherlands the last available population censuses date back to 1970-1971. In the Netherlands, the reason behind the cessation of this data collection activity is new and stricter legislation on privacy. With these exceptions, the overall quality and/or accessibility of population censuses is estimated as good, or

G|H|K

sufficiently good, for almost all countries. Only Turkey reports the absence of breakdown of details of the 2008 census.

LFSs are a crucial data source in the labour input method. All the participating countries make their LFS available, and they are generally evaluated as good in terms of their accessibility/reliability. An exception is Croatia, where the difficulty in evaluating LFS reliability seems to be due to the fact that the survey generally does not cover population groups in certain institutions (in particular, persons serving military duty and those in student dormitories).

8.2.3   Data necessary to obtain the number of domestic workers in national accounts

The definition of domestic employment is different from that of national employment. Domestic employment does not include residents who work in production units not located in the domestic economic territory, while it does include non-residents working in resident production units. National employment includes all resident people employed in both resident and non-resident production units, and excludes non-resident workers. The concept of employment used in household surveys is very close to that of national employment.

The full harmonisation of the definition of employment in the LFS with the national account definition also requires the inclusion of workers living permanently in an institution, conscripted forces, and the military, etc. Thus, in order to retrieve the number of domestic workers, some adjustments need to be made. This requires the identification and quantification of a number of worker categories (f*oreign workers present on the national territory for more than one year, but not included in the population register; seasonal foreign workers who work in the country for less than one year not included in the population register; members of the country's armed forces in the rest of the world and conscripted forces; staff in charge of national embassies located abroad; non-resident frontier workers that work in resident establishments; unpaid trainees within enterprises; employed individuals under 15 years of age; workers employed in underground productive activities not covered by LFS*) to be added to the number of employed persons in the LFS. Also, the number of r*esident frontier workers who work in non-resident establishments* should be subtracted from the LFS total employment.

The availability, accessibility and reliability of these data typologies is mixed amongst the 29 countries reviewed. Only around a half of the participating countries reported the availability of data. The lack of data is particularly significant for the categories w*orkers employed in underground productive activities not covered by LFS*, u*npaid trainees within enterprises* and e*mployed individuals under 15 years of age*, for which only 5, 8 and 10 countries, respectively, report data availability. Also, the assessments of the accessibility/reliability are equally mixed amongst the countries reviewed.

8.2.4   Additional and integrative data on labour supply

The aim of the integration of data sources from the labour supply (households) is to obtain an exhaustive estimate of registered and unrecorded workers. The main reason behind this integration is that employed individuals may declare their employment in household surveys, whereas enterprises may conceal the same inputs in order to evade taxes or administrative regulations. The main integrative data source for labour supply is *Household surveys* and *Multi-purpose surveys*.

As for the first source – *Household Surveys* – a vast majority of countries reports the presence of this data source. It is absent only in Croatia, Portugal and Romania. The accessibility/reliability of the Household Survey is generally evaluated between good and sufficient: a low level of accessibility is declared only for Cyprus, the Czech Republic (in relation to the access to raw data required for estimations in the labour input method) and France.

$|G|H|K|$

The specific aim of the *Multi-purpose surveys* is to quantify employed persons in private households (housekeepers, assistants for older persons, etc.). This source of data is present in half of the countries (15 out of 29) and, contrary to the household surveys, the evaluations of its accessibility/reliability are heterogeneous. High, medium and low levels of accessibility/reliability are equally distributed among the countries where multi-purpose surveys are present.

8.2.5   Main data on labour demand

The other major category of information sources needed for the labour input method pertains to the labour demand side of the economy and relates to employment levels declared by private firms and other institutions. This information stems basically from two sources: **Industry, Services, Agriculture and Institutions Censuses** and **Ministry of Finance VAT data**. Other periodic surveys are used to supplement the basic information or to fill in gaps in the data.

Industry and services censuses appear to be present in a significant majority of the countries (20 out of 29). Among the countries reporting no industry censuses (Croatia, Estonia, Latvia and Lithuania), in Estonia the presence of regular surveys of businesses in certain sectors (in addition to the general Structural Business Survey) is mentioned. France, Luxembourg and the Netherlands provide no direct information on the presence of industry censuses (and Bulgaria for services census). In France, however, the INSEE (national statistics institute) provides an Industry description (*Enquête Annuelle d'Entreprise* - DGCIS-SESSI) every two years for services and trade sectors. However, the survey includes only firms with 10 employees or more. The same institute also provides employment estimates of domestic workers on a yearly basis, with a breakdown for 38 sectors. In the Netherlands, at the level of individual companies, yearly fiscal and census type data are available through the Chamber of Commerce. The IPO (*Inkomenspanelonderzoek*) gives an overview of the distribution of incomes of persons across Dutch households (excluding institutionalised people and student households). This is, however, a random sample from the merger of several registrations (the analysis started in 1989, it conducted data on 250 000 people and about 88 000 households in 2004).

The majority of the countries (19 out of 20 for industry census and 17 for services census) with regular censuses report a high or medium level accessibility/reliability for this type of data.

Agriculture censuses are more widespread among the participating countries. 26 countries report the presence of these surveys, the exceptions being France, Luxembourg and the Netherlands. For France and the Netherlands, the observations made above on industry and services census apply also to the agriculture census. All the countries reporting the presence of this type of data also show a high or medium level of accessibility/reliability (with the exception of Croatia).

Ministry of Finance VAT data (tax registry and other tax data) are common among the participating countries: 26 report the presence of these data bases. The reliability of these data is generally evaluated at a high or medium level (23 out of 26), while a low level of reliability is reported for Greece. In terms of accessibility, six countries (Cyprus, the Netherlands, Portugal, Romania, Slovenia, and Turkey) report a low level. In the case of the Netherlands, this is due to a high standard of protection of information which is considered sensible from the privacy perspective. Slovenia and Turkey mention the possibility of accessing only aggregate data.

8.2.6   Additional and integrative data on labour demand

The aim of the integration of data sources from labour demand (firms and institutions) is to produce exhaustive estimates of registered employment, covering primary and multiple jobs. This is due to the possibility of identifying labour inputs in enterprises that are not included in business surveys, for example, because these enterprises are too small to be

$|G|H|K|$

registered or because they are too small to be included within the survey. Clearly, enterprises may conceal the same inputs in some general surveys (such as the censuses or Ministry of Finance data collection activities) in order to evade taxes or administrative regulations. The main sources of this integrative information are the *Register of Productive Enterprises, Balance sheets for specific business sectors, and Periodical surveys of sectors prone to underground production.*

The *Registers of Productive Enterprises* are present in more than a half of the countries (18 out of 29), and, when present, these data are evaluated as generally highly or sufficiently accessible/reliable. *Balance sheets for specific business sectors* are analogously common among the participating countries (21 out of 29) and the evaluations of their accessibility/reliability are similarly good to medium on average. *Periodical surveys of sectors prone to underground production* are rarer - only nine countries report the presence of this additional source of information, and its accessibility/reliability is also significantly heterogeneous.

8.2.7 *Additional and integrative data for the supply and demand side (for public and private sectors)*

In addition to the sources mentioned above, useful additional information may be collected from other sources and institutions. This additional/integrative information may be related to the demand or supply side, or both. Data from *Social Security Institutes* related to *employees and home care workers* and to *Private Social Institutions (NPHI)* are relevant in this case. Also data from administrative sources, such as *Administrative data and statistical surveys on specific typologies of employees, Administrative data for specific business sectors, State General Accounting Office, Ministries and other Public Institutions* and *Surveys of local institutions* may provide useful information on supply and/or demand of labour.

Data from *Social Security Institutes* are sufficiently common among the participating countries, and the evaluations on accessibility/reliability are generally good or sufficient; data from public Social Security Institutes mark a relatively higher standard with respect to those provided by the NPHI. Administrative sources such as *Administrative data for specific business sectors, State General Accounting Office, Ministries and other Public Institutions* and *Surveys of local institutions* are common among the participating countries, and the recorded levels of accessibility/reliability are good or medium. *Administrative data and statistical surveys on specific typologies of employees* appear to be less common (half of the countries report the presence of these sources) and the scorings of accessibility/reliability are more unevenly distributed.

In addition to the sources mentioned above, country experts were asked also to check for the presence in their countries of additional sources that do not fall into the specified categories, but that may be useful for the implementation of the labour input method. As for this last group of sources, it should be mentioned that *Periodical surveys on the demand for labour* (among firms and institutions) are more common than *Periodical surveys on the supply for labour* (among households).

8.2.8 *Other administrative data already provided in the experts' reports on administrative sources*

As a final category of sources, the national experts were asked to mention the presence in their countries of administrative data that were already reviewed in the previous reports and that the experts consider as most important for the estimation of UDW, as well as being compatible with the labour input method. Only 13 countries report the presence of such administrative data. These are briefly summarised in Box 8.1.

Box 8.1 – Summary of administrative data, to be potentially used for the labour input method

Austria mentions the KIAB (Law Enforcement Unit to Combat Illicit Work) database, which provides information on the number of controlled workers, number of illicit workers (workers without social insurance registration) and on the number of illegal employed foreign workers. The data are acquired *via* random checks.

Bulgaria reports that the National Statistics Institute provides information on specific categories of incomes. In particular: (i) compensation received by the employees in kind that is not subject to taxes and social contributions (the incomes in kind include goods and services, or other assistance that is provided by the employers to the employees free of charge or at reduced prices); (ii) income of the independent agricultural activities that includes the value of the processed agricultural products (vegetable and fruit tins, juices, milk and meat products etc.) at the households (the producer prices for evaluation of the output are the same or similar to those of the products produced in the processing enterprises).

Czech Republic has the sources of the results of inspections from Labour Offices, results of inspections from Labour Inspectorates, data collected by the inspections of Labour Offices, Trade Licensing Offices and Alien and Border Service of the Policy concerning the illegal employment and entrepreneurship of foreigners; results of inspections of illegal work by Czech Customs Administration.

Finland mentions income statistics, household expenditure, income distribution statistic and construction statistic, all provided by Statistics Finland.

France indicates two main sources. First, there are data on the amount of repayment of back taxes resulting from illegal work, provided by the ACOSS-URSSAF, which measure the intensity of the control policy. Second, there are data on the number of attested law violations (from the Ministry of Labour).

Italy highlights the presence of data on irregular workers collected by labour inspectorates and INPS (National Social Security Institute).

Latvia suggests that the State Labour Inspectorate provides data on violations of labour regulations, aimed in particular at identifying the presence in a company of persons without a work agreement.

Lithuania reports that the LFS data on employment are compared with information from two other databases: (i) SSIFB (State Social Insurance Fund Board), providing data on employees and on hours worked in the Government Sector; (ii) LLE data (Lithuanian Labour Exchange) stemming from surveys on the demand for labour.

Luxembourg cites two additional sources of data. The first is the number of inspections and control operations carried out by the programme *Inspection du Travail et des Mines* (ITM), available for 2007 only. The second source is the Project "2Plus" conducted by LCGB - *Centre de Formation Sociale Jean-Baptiste ROCK* and *Syndicat des Indépendants et des Classes moyennes du Luxembourg* (SIC), which do not however provide estimations for the number of illegal workers.

Poland highlights three additional sources: (i) controls of legality of the employment conducted by National Labour Inspectorate (PIP); (ii) controls of *Służby Celnej* (controls of legality employment of foreign workers); (iii) controls of legality of the employment conducted by Ministry of Labor and Social Studies.

Romania singles out two sources. The National House of Pensions provides data on pension contributions collected from employers and employees in accordance with the provisions of the law (the so-called effective contribution rate), and data on statutory contributions (the so-called statutory contribution rate). The National Commission for the Supervision of the Private Pension Funds provides data on social security contributions paid to the private pension funds.

Slovakia points out that the National Labour Inspectorate provides information on its inspection activity, while the Social Insurance Agency provides data on social security payers (which are related to the SCE implementation).

Spain reports three typologies of data from the Labour and Social Security Inspections: (i) Registrations to the Social Security due to Labour Inspection activity; (ii) Registration of foreigners without work permits due to the labour inspection activity; (iii) Registration of workers receiving benefits wrongly.

United Kingdom stresses the presence of administrative data on fraud and error in the benefit system.

The evaluation of this additional administrative information is generally good or medium in terms of both accessibility and reliability. Low reliability levels are estimated only for Austria, Latvia and Luxemburg, while Austrian and Romanian sources are not easily accessible.

|G|H|K|

8.3 Estimations of time needed for the implementation of the labour input method

As part of the final stage in terms of testing the applicability of the labour input method, country experts were asked to provide an estimate of the likely period of time which would be required before the country could start to start the application of the labour input method. The responses are summarised in Table 8.2.

Table 8.2 – Estimations of time period required to start the application of labour input method

Less than 1 year	Between 1 and 2 years	Between 2 and 3 years	Between 3 and 4 years	Between 4 and 5 years	More than 5 years
Belgium Cyprus Estonia Italy Spain	Austria Bulgaria Czech Republic Denmark France Germany Greece Hungary Ireland Luxembourg Malta Netherlands Romania Slovakia Sweden	Croatia Finland Poland Slovenia UK	Portugal		Lithuania Latvia Turkey
5	15	5	1	0	3

Source: estimations of national experts.

The overall picture of the time period needed for the implementation of the Labour input method is an encouraging one. **Most of the countries (25 out of 29) can be ready within three years to start applying the Labour input method to produce estimates of the UDW**, making its start feasible in a medium-term horizon. The main problems and possible delays are reported for Lithuania and Latvia, mainly due to other priorities and issues on the agenda and for Turkey, which lacks reliable data on some crucially important sectors.

Specific issues raised by the national experts, concerning the implementation of the Labour Input Method, are listed below for each country.

- **Austria**. Some preliminary work would be necessary, e.g. clarification of institutional responsibilities and provision of data sets, check on data quality, testing of different calculation variants etc.

- **Belgium**. Comparison between LFS (supply) and National Social Security Office statistics (demand) can be done immediately as all data are available. However, the reliability of the LFS data diminishes as the level of detail increases (e.g. more sub-sectors, higher geographical division), because the number of respondents in the sample can become too small to be representative. In contrast, for NSSO statistics a very detailed sectoral and geographical division is available. NSSO data are administrative data, covering all (official) employees in Belgium. The employment situation of the Belgian population is verified with less detail in the national population census, compared to the LFS. The most recent census dates from 2001, so that no recent data is available. It is unclear whether a new population census will be held in 2011 (the standard time interval for population census was 10 years).

- **Bulgaria**. NSI is the organisation to organise, in a short period, a regular provision of information on UDW. It has the administrative capacity, well-developed information systems and already renewed methodology in line with Eurostat requirements. There are some drafts on agreements between the NSI

$|G|H|K|$

and some ministries for providing information additional to that of the LFS about employed persons.

- **Croatia**. The Croatian statistical system made important steps in improving the quality of its analysis and in widening its coverage; anyway, further improvements are less likely, due to the overload of tasks and duties on the Bureau of Statistics and to the priority assigned to issues other than surveying the underground or unofficial economy.

- **Cyprus**. The Statistical Service of Cyprus conducts censuses regularly of all sectors of economic activity (at the one-level digit), with the exception of private households employing domestic staff. In order to produce estimates of UDW based on the labour input method, it would be necessary to pool the data from the various censuses and then to compare them with the LFS data.

- **Czech Republic**. The implementation of the labour input method would require extensive cooperation of the administration and the development of a new methodology on the comparison of the two data sources. The estimated two year period is a somewhat optimistic forecast.

- **Denmark**. The estimated time is based on the observation that data for estimating labour input from the demand side are found in the employment statistics of the national accounts. The labour force surveys provide an estimate of labour input from the supply side. However, due to the statistical uncertainty related to the labour force surveys, the estimates would be somewhat unreliable. Thus, the confidence interval for the overall employment of around 2 770 000 persons in the first quarter of 2009 is reported by Statistics Denmark to be +/- 25 000 persons.

- **Estonia**. Statistics Estonia already produces estimates of UDW based on the labour input method (available since 1997), which in turn are used to adjust the GDP estimates. The main underlying data sources are the Labour Force Survey (Tööjõu uuring) and the Structural Business Survey (EKOMAR). However, the UDW estimates themselves are not currently published on a regular basis. Nevertheless, it should require relatively little time to produce up-to-date estimates based on a common methodology (once this is established), assuming that differences (if any) compared to the current methodology are minor.

- **Finland**. The optimal way to collect the required information would be to include an extra question in the Labour Force Survey (monthly and annual data), but the National Statistical Institute has limited resources and the Labour Force Survey is already very extensive. Experts of the National Statistics Institute also share the opinion that such an extension should be discussed and agreed by Eurostat and the task should be coherent with the regulations of the Eurostat. If this extra information implies an extension of the workload of the National Statistical Institute as a main responsible institution, then extra funding would be needed.

- **France**. Calculating UDW as the balance between officially employed and effectively supplied labour is a puzzle which has to be put together from various statistical sources. This requires the adjustment of definitions and estimation of parts of the indicators. Moreover, an accurate balance of indicators makes it particularly sensitive to estimation errors. Much of the time will have to be spent on calibration of data. In addition, UDW will have to be measured in terms of working hours rather than the number of workers as a relative share of UDW can be assumed to be part-time. This requires additional statistical sources and estimates.

- **Germany**. Comments are similar to France.

G|H|K

- **Greece**. A revision of the Enterprise Register maintained by the Labour Inspectorate (SEPE), so as to avoid double counting of enterprises and of persons employed, would be needed.

- **Hungary**. The Ministry of Finance already has considerable experience in this method, but it will take some time to negotiate regular access to the data.

- **Ireland**. Businesses are now obliged to complete a questionnaire each quarter on the number of employees in their business. They will need to provide the total labour costs, the total hours worked and the total hours not worked (e.g. annual leave) for each category of employee. This hails the introduction by the Central Statistics Office of the new Earnings, Hours and Employment Costs survey. This will greatly enhance the availability, detail and quality of demand for labour data for the application or use of the labour input method. The survey is already up and running and by mid-November of 2009 its quarterly publication will include all sectors of the economy excluding agriculture, forestry and fishing, the activities of households as employers, and the activities of extraterritorial bodies. The Quarterly National Household Budget provides a regular, reliable and accessible feed for supply data.

- **Italy**. The labour input method is widely developed. The ISTAT estimates the numbers of *irregular workers* (1991-2005) by use of the so-called *Demographic Employment Approach*. This methodology is based on the comparison between statistical labour supply-side occupational data (sources: *Censimento della Popolazione*, *Indagine sulla Forza Lavoro*) and integrated fiscal, administrative and statistical labour demand-side data (main sources: Ministry of Finance, INPS, *Registro delle Imprese Attive*, *Censimento dell'Industria e dei Servizi*, *Censimento dell'Agricoltura*). A positive discrepancy between data on the number revealed from these two different sources (households and firms) is considered a signal of irregularity.

- **Latvia**. The estimated period of five years is due to many difficulties; in particular, it is unclear whether and when the missing data will become available, and whether the required additional funds will be available.

- **Lithuania**. Taking as given the current situation (inter alia – in Lithuanian Statistics), if any additional information will be necessary in order to start to produce estimations of UDW based on the labour input method, this will require *more than four years*. The estimate is based on the fact that in the current economic situation the Government of Lithuania is reducing national spending. Lithuanian Statistics is also affected by this policy – during the last year the staff was reduced by 10%; the staff, financing as well as the number of surveys are going to be reduced further. Therefore it would be hard to expect that any additional surveys will be initiated.

- **Luxembourg**. The situation is similar to France.

- **Malta**. The time estimation is difficult to assess, due to the uncertainty in the priority attributed by Maltese government to this issue. Given the reduced country population, the amount of time to collect and analyse the data will surely be much less than that required for a bigger country. Thus, the maximum time needed for the implementation should not be greater than two years.

- **Netherlands**. An inventory of the availability and accessibility of the required data could be completed in few months. It takes another month to draft a plan for the collection of the data that are needed but not available or accessible. If surveys are part of the draft, questionnaires and sampling instructions have to be designed. Fielding surveys takes another few months. Then the data has to be

G|H|K

processed, analysed and reported. All these tasks can be completed in two years.

- **Poland**. LFS data are reliable and up-to-date but the population census data are somewhat outdated, thus to properly apply the method, some more up-to-date information would be needed.

- **Portugal**. Up to now, the efforts to measure UDW in Portugal have been very scarce, and this may be related to a lack of experience and to the low priority assigned by the government to the issue. The available information suggests that no change is expected in this area for the near future. The unfavourable economic outlook enforces this perspective. If tackling UDW was set as a priority, then the measuring of this phenomenon would become important, but there are no important signals in this direction from the involved national institutions.

- **Romania**. The National Institute of Statistics has most of the data required to produce reasonably reliable estimates of UDW using the labour input method. There are some data lacking and mostly pertaining to the number of Romanian workers abroad in other Member States, the estimation of which still proves to be difficult. However, taking this issue aside, all the pre-conditions to produce such an estimate are in place and it is possible that starting with the next Statistical Yearbook these data will start streaming out. Finally, there might be the option of the 2012 Census which will for surely provide an excellent opportunity for doing that, given the exhaustiveness of data collected on such an occasion.

- **Slovakia**. The period of time necessary before the method could be applied depends on data adjustment requirements.

- **Slovenia**. Institutions need to harmonise their methods of collection, evidence, analysis and verification (inspection) of UDW. They also have to establish a link of data collection (e-registers or common database) to connect all the information about UDW. Also the infringement inspections (tax evasion, UDW), especially those relative to resident and non resident economic migrants, need to be fostered.

- **Spain**. Most of the data are already available or easy to obtain. Nonetheless, some adjustments would be necessary in order to obtain appropriate data for UDW's estimations. The whole period for the activity would not exceed one year.

- **Sweden**. Statistics Sweden would be the best authority to perform such calculations, as they can connect several data sources. It seems reasonable that they need to plan their activities for at least two years in advance. The accessibility of data is classified as medium because the data can be obtained after contact with Statistics Sweden, and possibly a fee for data operations.

- **Turkey**. Agricultural employment data availability is a relevant problem. The LFS, representing all population and activities in the country, provides this data, but there is no other periodic data set to compare its results. Although a large proportion of farmers are enrolled in the third pension scheme, Bag-Kur, enrolment is not compulsory and its data are not comprehensive. For private industrial and service sector employment, there are reliable resources in addition to LFS. SSK reports average number of insured persons and average daily earnings. Its records should almost fully cover the formal sector employment.

- **United Kingdom**. Most of the relevant raw data is available in various sources, but it would require a commitment of resources from the ONS (and ultimately, the government) to do this. However, given the other priorities on public spending and the generally low level of awareness of UDW in the UK, it is likely to be some time before it could be enacted. Of course, the pressures of managing a large

G H K

budget deficit for some years to come may be a factor in persuading that more attention should be paid to the matter – with the expectation that it could lead to increased tax revenue and lower social spending through the reduction in UDW.

8.4   Detailed evaluation of the application of the labour input method in the core countries (Greece, Italy, Romania, Spain, Turkey)

The experts from the core countries undertook a more detailed analysis on the potential applicability of the labour input method in their countries. Their reports highlighted a number of important points on the feasibility of the labour input method that appear to be particularly related to issues of labour demand and supply data.

It must be noted that **Italy** has been excluded from the discussion below, given that the labour input method is well established in the country and that a detailed report on the procedure employed is contained in Annex 2 to this report.

- **Greece.** In this country **supply side data** are extremely rich, easily accessible and reasonably up to date. They are provided both in the form of aggregate figures (consistent with National Accounts concepts, the Population census and the LFS) and in the form of sectoral surveys (structural statistics). However, problems of reliability and accuracy are reported, as the series present significant discrepancies. These may be due to differences in the applied definitions and also to different methods of data collecting. As for **demand side data**, they are deficient and in most cases not well organized. The censuses of production at the sectoral level appear to be outdated, and the only consistent and updated data are limited to specific categories (e.g., civil service). Data series which could be potentially useful for the labour input method are *employment figures from social insurance data*, the *Business Register* (from the National Statistical Service of Greece) and the data collected by the *Labour Inspectorate* (SEPE). All of these sources present some problems in the light of the labour input method. Social insurance data have little potential for a useful comparison with supply side data (LFS); the Business Register (ESYE) data may present relevant error margins, as their unit of analysis is the enterprise. Finally, SEPE data consist of a mixture of stock and flow figures, so that double counting of enterprises and persons in employment is present.

- **Romania.** From the available information it seems that the National Institute of Statistics (NIS) of Romania is already capable of producing estimates of UDW. These estimates can be obtained by applying a methodology substantially coherent with the labour input method, given the availability in Romania of both **supply side** and **demand side data**. Furthermore, as data are processed on major sectors of economic activity as well as at regional level, it is possible to produce disaggregated data. Some problems related to reliability and availability of these data can be traced back to the specificity of the Romanian economy. For example, the high number of Romanian workers abroad and the presence of a vast subsistence agricultural sector may blur the accuracy of the employment figures provided by the LFS. Also, the LFS sample is based on the Population Census, which is carried out only once in a decade, and Romania has undergone a profound transformation over the last decade (not to mention the previous decade). For this reason, the data may provide an outdated picture. Nevertheless, the NIS could start producing estimates of the UDW based on its own derivation of the Labour Input method in a short period of time.

- **Spain.** In this country data for the **supply side** mainly come from the LFS, while the source of data for the **demand side** is the Registry of Social Security. Both these sources are of a good level of accessibility and reliability, and they also provide a high degree of disaggregation by gender, economic activity, etc. These features make the Labour input method highly applicable in Spain. Nonetheless,

|G|H|K|

in Spain there exist some methodological differences between the LFS and the Registry of Social Security, as they measure the level of employment in different ways. The main discrepancies are the following:

(i) civil servants are not registered in the general Social Security System, whereas they are registered as employed in the LFS;

(ii) domestic workers working less than 20 hours a week are not compelled to register in the Social Security, while they are included in the LFS;

(iii) some people in the Registry of the Social Security (pre-retirement agreements) may not be included in the LFS;

(iv) the LFS does not properly capture employment in some collective institutions (penitentiaries) while this is registered in the Social Security System.

To solve this heterogeneity between sources, some adjustments need to be made on the data of the Registry of Social Security, to make the resulting figures comparable with those from the LFS. The High Council of Statistics in Spain has developed a methodology for the required adjustments, so that the implementation of the labour input method is completely feasible for Spain. Some minor problems may be related to the need to properly take into account part/full time work or multi-activity and to the need for further adjustments in the sectoral distribution of workers.

- **Turkey.** The main source of *supply side data* in Turkey is the LFS. It gives the best representation of the whole population, including the informal sector and (together with other administrative records) provides a reliable employment picture that fully covers public and municipal employment. However, LFS has made data on employment income available only for 1988 and 2004-2006. After 1988, these surveys did not ask the question on earnings until 2000, and reliable data on working hours are lacking. As for *demand side data*, there are the decennial censuses together with nine additional sources of historical data concerning employment and wages. They present a scattered pattern with respect to degree of accuracy, coverage and relevance for the labour input method. A frequently **mentioned** issue is the lag with which many of these sources make their data available. A number of administrative sources may provide integrative information useful for the implementation of that method. These sources are the *Social Insurance Organization* (SSK), the *Civil Servants Retirement Fund* (ES), the *State Personnel Department* and the *Audition Administration for the State Economic Enterprises*. The last two of these sources focus mainly on sectoral or specific categories of workers. The SSK and the ES have instead a wider scope. The SSK covers non-agricultural employees (public sector blue-collar and all private sectors), while the ES covers white-collar public employees and military officers. SSK and ES employment records fully represent the formal part of Turkish employment. A recent reform should unify the Social Security Institutes, by forming a unified administration (SGK), whose records should be more comprehensive relative to employment and wage data. Information from the social security sources is of particular interest in Turkey, as many retirees are relatively young and continue to work after retirement. They constitute an important share (17%) of the working population, and may represent an important resource for the informal economy. Public employee administration sources and SSK registry data cover the formal part of the economy. Taking into account that many of the abovementioned sources make their data available with some lag, average occupational or sectoral wage computations may be made. From these, UDW estimations are possible to a certain extent.

|G|H|K|

The overall picture of the applicability of the Labour input method in the five core countries is a favourable one. For three of them - Italy, Romania and Spain - the method is already present, or could be implemented quickly (with the above-mentioned caveats for Romania). Some problems are, however, reported for Greece and Turkey. While for Greece these problems can be quickly overcome, allowing the method to be implemented within one or two years, the difficulties for Turkey appear to be more pronounced and a longer period of preparation and planning would be needed.

8.5 Conclusions on the application of the labour input method at the EU level

The review of availability of data required for the application of the labour input method showed (see section 8.3 above for further details) that, generally speaking, such data is mostly available in the countries reviewed during this study. The main data categories required for the implementation of the labour input method exist in all or the majority of the countries. Data gaps do exist in several countries, and these would need to be addressed if the implementation of the labour input method is agreed at the EU level.

The reliability and accessibility of data required for the application of the labour input method is also generally considered as good, or at least sufficiently good, for the purposes of such calculations.

The feasibility of the application of the labour input method across the countries is supported by the conclusion of experts' judgements on the time period needed to start the implementation of the method. Most of the countries (25 out of 29) can be ready within three years to start applying the Labour input method to produce figures of UDW, making its application feasible in a medium-term horizon. The main problems and possible delays are reported for Lithuania and Latvia, mainly due to other priorities and issues on the agenda and for Turkey, which lacks reliable data on some crucially important sectors.

The additional work carried out in the five core countries confirms such conclusions. In three countries, the method is already applied or can be implemented in a relatively short period of time. Issues with data exist, but they can be addressed given a concerted effort and attention paid to the issues raised.

It should be stressed that the country experts expressed their opinion based on data availability and reliability. It is well known that the actual implementation of the Labour input method requires statistical competence and effort; the time period needed to actually produce reliable estimations of UDW based on this method will hence depend on the quantity and quality of human and technical capital that each country would allocate to this task.

The national experts' reports indicate that the very understanding of the methodology seems so be interpreted through different levels of refinement. This is due to the fact that the Labour input method can be understood and applied at different levels of depth. This suggests the possibility to proceed by steps, starting from preliminary estimations based on a simplified version of the method, to be subsequently refined taking into account additional sources of information.

The first step, which could be developed in relatively little time, could be to develop a version of the method based only on the comparison between the basic data on the supply of and the demand for labour, disregarding, on the one side, all the data which are necessary to obtain the number of domestic workers in national accounts and, on the other side, additional/integrative data sources on labour demand (e.g., Register of Productive Enterprises, Balance sheets for specific business sectors and Periodical surveys of sectors prone to underground production) labour supply, or both (e.g., information from Social Security Institutes related to employees and home care workers, Private Social Institutions, Administrative data and statistical surveys on specific typologies of employees, Administrative data for specific business sectors, State General Accounting Office, Ministries and other Public Institutions and Surveys of local institutions).

|G|H|K|

As for the labour supply data, in all the participating countries (except Croatia) LFS data are easily accessible and reliable; Households Surveys are also widespread (being absent only in Croatia, Latvia, Portugal and Romania, and difficult to access only in Cyprus, the Czech Republic and France) and sufficiently reliable. Some adjustments of these basic data could be however necessary, to take into account important categories of workers which are excluded from the LFS (as discussed for the core countries, for example, by the Spanish and the Romanian experts). 15 out of 29 countries also have available multi-purpose surveys, but this source of data could be disregarded in this first step, as the evaluations of its accessibility/reliability are heterogeneous among country experts.

More problems seem to be present as far as the basic data from the labour demand side are concerned. 26 participating countries have fairly reliable Ministry of Finance VAT data, even though they are not highly accessible in six of them, but Industry and Services Censuses are present only in 20 out of 29 countries, even though among those reporting no censuses, other types of surveys or descriptions of businesses in certain sectors are available. The situation improves for agriculture, as 26 countries report the presence of generally fairly accessible/reliable Agriculture Censuses, and where they are absent other sources of information seem to be available.

Further steps could be based on the integration of data from Social Security Institutes, which seem to be fairly common, accessible and reliable among the participating countries and, subsequently, from administrative sources (administrative data for specific business sectors, State General Accounting Office, Ministries and other Public Institutions and Surveys of local institutions), which are also are common and sufficiently accessible/reliable.

There exists a trade-off between the reliability of the estimates and the time period required to obtain them. The labour input method can be applied at different degrees of refinement. Yet, it seems possible to obtain in the majority of the participating countries preliminary, but sufficiently meaningful results, within one or two years.

9 TESTING THE MOST APPROPRIATE METHOD AT THE EU LEVEL - ASSESSMENTS OF THE FEASIBILITY AND USEFULNESS OF THE SOCIAL SECURITY DATA

In the final stage of the study, the national experts provided an assessment of the feasibility and usefulness of the social security data, based on a comparison between anticipated and actual social security contributions. We refer to this as the 'Social Contribution Exercise' (SCE).

The method estimates the gap between total labour input and the part of this input that becomes known to the authorities; to this end, it uses the social contributions paid by employees and employers as a proxy for labour input. Total labour input is estimated assuming that all employees are paid at the average wage and that the number of employees equals the number recorded by official statistics, e.g., the Labour Force Survey. The sum of the imputed social contributions is then compared to actual revenues from social contributions. The difference between imputed and actual social contributions, expressed as a per cent of GDP can be taken as a measure of UDW (see section 9.2.1 below).

While the national experts of non-core countries were asked to identify the potential for carrying out the SCE in their countries, the experts of the core countries were asked to actually carry out the SCE and to provide a preliminary evaluation of the reliability of UDW estimates thus obtained. The outputs of core countries experts on the SCE were provided in separate reports.

This section provides an overview of the testing of the potential of social security data calculations, including:

- Summary and analysis of the results of the feasibility evaluation of the SCE, based on the information from the national experts;

- A brief presentation and discussion of the results of the implementation of the SCE by the core countries experts.

9.1 Assessment of social security data

Information from national experts on the social security data is summarised in Table 9.1 below.

Note: Where the countries are not included in some rows, they have not able to provide information.

G|H|K

Table 9.1 – Feasibility and utility of SCE in 29 European countries

1. Availability of data for the SCE	Yes	No
1.1. Data available on actual social security contributions	All countries	
1.2. Data available on estimated social security contributions	Belgium, Bulgaria, Cyprus, Czech Republic, Estonia, Germany, Ireland, Italy, Latvia, Lithuania, Malta (partly), Poland, Romania, Slovakia, Slovenia, Spain, UK	Austria, Croatia, Denmark, Finland, France, Greece, Hungary, Luxembourg, Netherlands, Portugal, Sweden, Turkey
	17	12

2. Nature of data on social security contributions		
Actual social security contributions	Austria, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Italy, Malta, Netherlands, Poland, Romania, Slovakia, Slovenia, Spain, Sweden, Turkey, UK	21
Regularised wages as % of total wages	Belgium, Czech Republic, Italy	3
Evaded contributions as % of total social security contributions	Belgium, Bulgaria, Cyprus, Czech Republic, Ireland, Latvia, Portugal, Slovenia	8
Number of the insured	Bulgaria, Estonia, Finland, Malta, Poland, Portugal	6
Number of organisations inspected	Czech Republic, Hungary	2

	Actual data			Estimated data		
	High	**Medium**	**Low**	**High**	**Medium**	**Low**
3. Accessibility of data for the SCE	11 countries (Austria, Belgium, Denmark, Finland, Germany, Greece, Ireland, Latvia, Poland, Sweden, UK)	11 (Bulgaria, Croatia, Cyprus, Czech Republic, Estonia, Netherlands, Romania, Slovakia, Slovenia, Spain, Turkey)	5 (France, Hungary, Italy, Luxembourg, Malta)		Belgium	
4. Reliability of data for the SCE	16 (Austria, Belgium, Bulgaria, Czech Republic, Denmark, Estonia, Finland, Germany, Ireland, Italy, Latvia, Poland, Romania, Slovenia, Sweden, UK)	7 (Croatia, Cyprus, Estonia, Greece, Netherlands, Slovakia, Spain, Turkey)	4 (France, Hungary, Luxembourg, Malta)			Belgium

	Actual data	Estimated data

|G|H|K|

	Yes	No	Yes	No
5. Availability of breakdown by socio-economic categories	18 countries (Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Estonia, Finland, France, Greece, Luxembourg, Italy, Luxembourg, Poland Romania, Slovakia Slovenia, Spain Sweden (gender) Turkey (gender))	11 countries (Croatia, Denmark Estonia, Germany, Hungary Ireland, Latvia, Malta Netherlands, Portugal UK)		Belgium
6. Availability of sectoral breakdown	20 countries (Austria, Belgium, Bulgaria Cyprus, Estonia, Denmark, Finland, France, Germany, Hungary Ireland, Italy, Luxembourg, Malta Portugal, Slovakia Slovenia, Spain Sweden, Turkey, UK)	6 countries (Croatia, Estonia, Greece, Latvia Netherlands, Romania)		Belgium

7.Type of UDW estimations that can be obtained	**Austria**: A survey on informal labour use in households analysing the forms, extension and welfare effects of this kind of employment. **Belgium**: evaded contributions / total contributions. **Bulgaria**: Not available as published data about UDW at national, branch, regional levels. Inspections of incorrect employers as tax payers and insurers provide information about hidden taxes; personal payment for labour that are higher than declared wages (consequently the employed are insured on a low insurance basis and this deflates the social security revenues). **Cyprus**: proportion of total employment that can be organized as UDW. **Czech Republic**: no direct UDW estimations. Rough estimates of UDW can be obtained by comparing actual and estimated social security contributions, or taking amount evaded as an upper bound of the UDW. **Denmark**: estimates of employment from Statistics Denmark. **Estonia**: Both the number of undeclared workers as well as undeclared employment incomes could be estimated by comparing actual and estimated social security contributions (SIC). As only the total amount of actual SIC paid (distinguishing between different types of SIC) is publicly available, analysis by business sectors, breakdown by socio-economic categories is not possible (unless the Tax and Custom Board is willing to release more information). **Finland**: A survey on the informal labour use in households analysing the forms, extension and welfare effects of this kind of employment. Another way around were a time use study +survey in combination. **France**: N/A. **Germany**: There are three parts of UDW: illegal employment without SS registration; tax evasion of self-employed work; illegal activities without legal approval (crafts business, medical advice, legal consulting etc.). The SCE approach only covers the first part. The concentration on SSC or evaded SSC therefore only reflects parts of UDW. **Greece**: estimates of UDW expressed as a % of GDP for employees. **Hungary**: N/A. **Ireland**: N/A. **Italy**: Data on the discrepancy between estimated and actual social security contributions (focus on a specific type of infringement: omissions: social security contributions to INPS). **Latvia**: An estimation of UDW can be obtained from imputed social security contributions and average social security contribution wage. **Lithuania**: The State Social Insurance Fund Board does not perform UDW estimations. **Luxembourg**: N/A. **Malta**: N/A.

|G|H|K|

Netherlands: N/A.		
Poland: The Social Insurance Institution (ZUS) can check individually whether social contributions are paid by employers; so we can find enterprises and employers who undertake UDW. SCE can allow controlling revenue of the Social Insurance Fund, the number of payers and insured persons.		
Portugal: N/A.		
Romania: under the assumption that formal payments are covered by social security contributions, it may become difficult to discern if a variation of coverage (i.e.: of the "covered wage bill") may reflect a variation of the extent of formality/informality in the economy.		
Slovakia: Data on social security contributions could refine the quality of data for the labour input method by enabling a comparison of SCE data (e.g., broken down by employment status) with the different data sources on the supply and demand sides.		
Slovenia: Estimations based on the gap between income/outcome of specific sectors (discrepancy method, monetary method).		
Spain: UDW as the difference between actual and estimated social security contributions and UDW as the number of emerged jobs promoted by the Inspectorate in the area of Social Security.		
Sweden: labour input.		
Turkey Formal sector is fully covered, excluding agriculture (30 to 40% of employment over the last couple of decades).		
UK. Difficult to say. The PAYE system covers employees – the self employed are required to pay various NI contributions but these are paid directly by themselves and offer a greater opportunity for non payment.		

	High	**Medium**	**Low**
8. Assessment on the usefulness of the SCE (within the context of the country – in some cases, other methods might be more useful)	3 countries (Cyprus, Romania, UK)	14 countries (Belgium, Bulgaria, Czech Republic, Estonia, Finland, Greece, Ireland, Italy (when a cross country comparison is envisaged), Latvia, Poland, Slovakia Slovenia, Spain, Sweden, Turkey)	10 countries (Austria, Croatia, Denmark, France, Germany, Hungary, Italy (when only the country context is considered), Luxembourg, Malta, Netherlands)

The data and information presented in Table 9.1 lead to the following conclusions.

The ***availability of data for the SCE*** appears to be a rather common feature among the participating countries, as more than half of them (18 out of 29) report the availability of data on *estimated* social security contributions. Data on actual contributions are present for the whole sample. Thus, according to the experts' opinions, the SCE could be carried out for a significant number of the participating countries. Also, the ***accessibility/reliability*** of data for the SCE is good overall: for more than four fifths of the countries the data on actual social contributions are at least sufficiently accessible and reliable. ***Sectoral breakdowns*** for actual contributions are also a rather common feature (reported in 24 countries). ***Socio-economic breakdowns*** are instead relatively scarcer: these breakdowns for actual contributions are present for 18 countries (only for gender in Sweden and Turkey).

As to the ***nature and accuracy of data on Social Security Contributions,*** most of the countries report the presence of data on the volume of actual social security contributions, while a limited number of countries (9 out of 29) records the availability of data more focused on contribution evasion, such as the percentage of regularised wages of the total of wages, or the evaded contributions as a percentage of total contributions. The number of insured persons is available in 6 countries, while only the Czech Republic and Hungary report the presence of data on the number of firms or organisations that underwent inspections.

$G|H|K$

The assessments on the **nature of UDW estimations obtainable through the SCE** are rather heterogeneous. Many different measures of the estimation of UDW or of the undeclared economy are mentioned, e.g. evaded contributions as a percentage of the total, estimates of the informal labour use in the households, the percentage of UDW on total employment, the share of illegal employment which is unregistered by the Social security system, undeclared work as a percentage of the GDP for employees, the number of emerged jobs promoted by the Inspectorate in the area of Social Security, etc. Even though such variability is a weakness of the SCE, the majority of the country experts gave a positive evaluation of the usefulness of the SCE as a complement to the labour input method.

9.2 Results of the preliminary implementation of the SCE in the core countries

9.2.1 Introduction

The methodology employed by the core countries experts to implement the SCE required the determination of two key data categories: the *imputed amount of social security contributions* and the *actual amount of social security contribution* paid in the selected time-span. As for the latter, the figures can be retrieved from data provided by the National Social Security Institutes (and by analogous institutions). The former figures need to be estimated starting from appropriate aggregate data.

The Spanish expert, however, proposed a different methodology and provided estimations for Spain, based on the comparison between the number of persons affiliated to social security (adjusted to take into account the papal clergy, registered civil servants with a second job, beneficiaries of special agreements, civil servants affiliated to mutualities and LFS domestic employees working less than 20 hours/week) – and the employees according to the LFS.

The measurement procedure adopted for the SCE by the other experts involved the following steps:

a) estimate average gross earnings (so as to obtain an estimate of the average gross individual wage at the national level);

b) estimate the sum of employees and employers contributions corresponding to the average gross earnings (if sectoral or disaggregated data on contribution rates are lacking, the contribution rate for the most representative category of workers can be used);

c) calculate the total sum of *imputed* contributions, by multiplying the sum of average contributions in b) by the number of employees;

d) compare the sum of *imputed* contributions with the sum of *actual* contributions (i.e. compute the difference: *imputed contributions – actual contri*butions);

e) express the difference (in €) calculated subdivided d) as a percentage of GDP;

f) alternatively, divide the difference calculated sub d) by the estimated average social contributions (found from sub b); this gives the number of workers corresponding to the difference calculating sub d).

Table 9.2 provides a summary of the results obtained by the core countries experts in implementing the SCE, and compares these results with the figures of UDW obtained with the labour input method, as shown in Table 5.8 in section 5.

Table 9.2 – Estimates of UDW according to the SCE and the labour input method

	Methods	
Country	**SCE**	**Labour input**
Greece	819 000	-

|G|H|K|

	(2006)	
Italy	7 732 700 (2006)	3 064 600 (average 2000-2003; X 1000 units)
Romania[(1)]	7.33 % (UDW as percentage of GDP: 2006)	20.2 % (UDW as percentage of GDP: 2006)
Spain[(2)]	635 900 (2006)	1 338 300 (2002)
Turkey	4.70% (UDW as percentage of GDP: 2006)	2 059 600 (average 2000-2003)

Notes:

(1) The figure refers to the "Covered Wage Bill" method (share of the gross wage bill that is "covered" by contributions to the social protection schemes) and the use of the average wage for the computation of imputed contributions.

(2) The figure is obtained by subtracting the number of ("adjusted") persons affiliated to social security from the employees according to the LFS.

The national experts in Romania and Turkey have also carried out an extension of the SCE which provided a time series of the UDW measurement (expressed as a percentage of GDP) for twelve years, and has compared it with the same measure obtained by adopting the labour input method. The results are shown in Figure 9.1.

Figure 9.1 – Estimations of UDW from social security data, Romania and Turkey
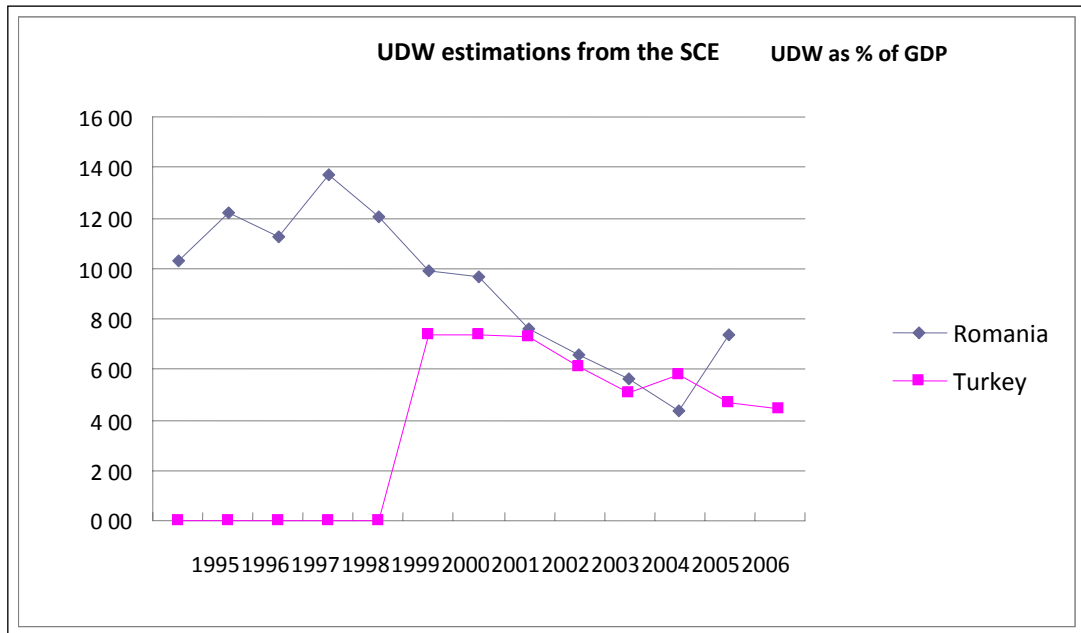
In carrying out the SCE, the core countries experts singled out a number of specific issues in the implementation of the exercise. Many of these issues pertain to specific problems, related to the availability of the required data in their countries and to their reliability and appropriateness (as detailed in the experts' reports). However, a number of common issues can be summarised as follows.

A first issue is related to ***inspections on social security frauds.*** In general, an estimate of UDW delivered by the results of inspections could realistically reflect the true magnitude of UDW. Some conditions should however be met:

- a reliable and reasonably updated register of enterprises and employed persons should be available as a sampling frame;

- the sampling fraction should be large enough so as to minimise errors and should be held constant from year to year;

|G|H|K|

- firms to be inspected should be chosen at random, irrespective of location, sector or class size;

- the detection of infringements should not depend on the inspectors' ability.

Usually, the inspection activity on contribution fraud carried out at the national level does not satisfy these four conditions, so that UDW estimates directly drawn from the inspection activity cannot capture the entire phenomenon of the irregular economy. These administrative data cannot hence be compared with the figures obtained using indirect approaches, and this provides a justification for the (preliminary) adoption of an *indirect* method based on social contributions, such as the SCE.

Of course, the method proposed by the SCE (as all other measurement methods) has certain limitations. An important one is that the method can yield realistic estimates only for employees, as the available **data on the self-employed** are generally less accurate in many countries. This may have serious implications for the UDW measurement, in particular when the share of self-employment on total employment is substantial and/or the propensity for UDW is higher among the self-employed. More refined estimates are possible, tackling issues such as early retirement, tax amnesties and (possibly) sectoral distribution of evaded social contributions.

A second limitation is the **stability of the structure of contributions rates** through time: a reliable estimation of the UDW through the SCE requires that the pension system and the structure of the contribution rates remain relatively stable, at least in the medium term. But in recent times different countries have put forward a number of pension reforms which included, among other things, a revision of the contribution rates for different categories of workers (this is true in particular for Italy, Spain and for Romania, where a private pension system was added to the existing one in 2007).

Another limitation refers to the need to use an **average to measure the wages of the economy**: this could imply a loss of information, but the adoption of very high and low wages would distort the result and affect the significance of the exercise. This problem may be solved by using sections of wages, and calculating the difference between the imputed and the actual social security contributions for different levels of wages. In Romania, the SCE was carried out for three different measures of the reference wage: average wage, minimum wage and a reference wage equal to 75% of the average. In Turkey, although the formal sector is fully covered, agriculture should be excluded (due to its large size in employment).

The main consequence of these issues taken together is that the estimates of UDW provided by the SCE could be upward-biased; the exercise would thus provide an **upper bound to the actual measure of UDW.** In the case of Romania, the situation may be different, due to the specificity of the transition process. Also in Spain, the UDW measurements obtained through social security data comparisons are lower than those obtained from the labour input method. This is because of the use of the different methodology described above which subtracts the (adjusted) number of non-affiliated persons from the total of employees according to the LFS.

Finally, in order to obtain more precise estimates of the discrepancy between imputed and actual social security contributions, more detailed data are necessary. Many of the aforementioned limitations may be partially overcome if information on specific contribution rates by economic sector and type of job, and disaggregated data on actual social security contributions were available.

These issues notwithstanding, the overall appraisal of the usefulness of the SCE by the core countries experts is good. It is generally stressed that the administrative data on the discrepancy between estimated and actual social security contributions are sufficiently reliable for many countries, and the prevailing assessment is that a more detailed and in-

|G|H|K|

depth estimation could provide useful information on the amount of evaded social security contributions, on the number of irregular firms and on the number of undeclared workers.

One of the main results of a workshop held in Rome on 13 October 2009 during the final part of the study – where the work on SCE was presented and discussed by all the core countries' experts and a representative of the European Commission – is that the SCE should be positively evaluated, mainly because it can provide useful preliminary information on UDW, given that its implementation time is substantially shorter than that of the labour input method. Furthermore, as it is reasonable to consider the UDW estimates from the labour input method as lower limits of the actual figure, while those from the SCE constitute an upper estimate, the degree of complementarity between the two methods appears to be very high.

9.3 Conclusions on the use of social security data for estimation of UDW

The final part of the study was designed to provide information on the availability, in all the 29 countries considered, of the national data which are needed for a proper implementation of the SCE. The offspring of this activity is worth summarising here.

Data required to carry out an UDW estimation using both estimated and actual social security data are present in 18 countries (out of 29 reviewed). The accessibility and reliability of such data is also generally viewed as good. The data would also allow a sectoral breakdown in most of the countries, but a breakdown by socio-economic categories would be available only in 18 countries.

The assessments of the nature of UDW estimations which can be obtained through the social security data are rather heterogeneous, such as evaded contributions as a percentage of the total contributions, estimates of informal labour use in households, UDW as a percentage of total employment, the share of illegal employment which is unregistered by the social security system, undeclared work as a percentage of the GDP for employees, and the number of hidden jobs identified by the Social Security Inspectorates. Even though such variability can be considered a weakness, the majority of the country experts have a positive assessment of the usefulness of the SCE *as a complement* to the labour input method.

Additional work carried out in the core countries has highlighted a number of issues in the use of social security data for estimation of UDW. Such issues would mean that the estimates of UDW provided by the SCE could be upward-biased, at least in some countries.

In order to obtain more precise estimates of the discrepancy between imputed and actual social security contributions, more detailed data (such as specific contribution rates by economic sector and type of job, and disaggregated data on actual social security contributions) are necessary.

Some difficulties notwithstanding, the overall appraisal of the usefulness of the SCE by the core countries experts is good. It is generally stressed that the administrative data on the discrepancy between estimated and actual social security contributions are sufficiently reliable for many countries, and the prevailing opinion is that a more detailed and in-depth estimation could provide useful information on the amount of evaded social security contributions, on the number of irregular firms and on the number of undeclared workers.

10 CONCLUSIONS AND RECOMMENDATIONS

The aims of the study were to undertake a review of indirect methods and administrative sources available in the 29 countries covered and, based on the results of such a review, propose and test options for the most appropriate methodology to estimate undeclared work at the EU level.

This section summarises the main findings of research undertaken in the study and puts forward several recommendations for further action.

10.1 Main findings

The main indirect methods to measure UDW are considered to be:

1. Discrepancy methods,
2. Labour input methods,
3. The degree of participation method,
4. The Tanzi method,
5. Global indicators methods,
6. Latent variable methods.

The methods differ with respect to estimation approaches used, data requirements, the possibility of breaking down aggregate national data by employment status of individuals, occupation, gender, etc.; and the potential for the method to provide data on undeclared work across sectors and/or countries and over time.

Conclusion 1: The review of the recent international literature does not provide new specific suggestions on the UDW method(s) to be preferred at the European level

The same is true for the national literature reviewed in the five core countries. The literature stresses however that all approaches, with the notable exception of the labour input method, yield no refined picture of undeclared work, and generally use a definition of the underground economy (including both legal and illegal activities) that is too broad, leading to upper biased estimates of UDW.

Conclusion 2: There exists rich and heterogeneous information on indirect methods and administrative sources

The review of indirect methods showed richness and variety in their application to estimate, directly and indirectly, the extent of undeclared work in the countries covered. Information on UDW obtained is varied, both in terms of years covered and the variables provided. The main reasons underlying this conclusion, which are of course partly intertwined, seem to be the following:

- the degree of research attention paid to the UDW phenomenon is different across countries;

- the degree of awareness of the limitations of each method in the provision of meaningful estimates of the UDW phenomenon is consequently different;

- the different methods require different sets of data, and some of these are not readily available in some countries.

The monetary (Tanzi) method is most frequently used in the countries reviewed, followed by the discrepancy and labour input methods.

$G|H|K$

The review of administrative sources showed a large variety of existing data and information, grouped into the following categories:

1. Evasion of taxes and other (relevant) infringements of fiscal regulations;

2. Evasion of (mandatory) social security contributions;

3. Infringements of labour norms and regulations (e.g. failing to declare a labour contract to deputed institutions/administrations, including hiring of irregular migrant workers and infringements of health and safety norms).

4. Other forms of irregularities providing UDW-relevant data.

General observations in relation to the data on UDW available through existing administrative sources include:

- The administrative data which are available in the different countries display a high degree of heterogeneity.

- For some countries administrative data are mentioned in the reports but are not provided – as the data sets are not always easily accessible and/or are not published for public access.

- Some countries (seven Member States) have no administrative sources providing data that can be used to measure UDW. In some countries, specific issues are raised, mainly relating to the relevance and importance assigned by administrative and institutional sources to the UDW phenomenon in their economies. This at least partially explains the paucity of administrative data in these countries.

- Administrative data could be usefully employed to provide indications on the sectors where UDW is likely to be found and for assessing changes in the level of UDW over time. They can also be used to assess efforts to combat UDW.

A specific category of administrative data has several advantages and was considered to be a useful source of information on UDW. Data on Social Security contributions appear to be widely available among the countries considered in the study and their overall quality is generally good. Furthermore, they appear to be more closely related to the UDW phenomenon than other types of administrative information, and they also allow integration with the labour input method.

Conclusion 3: The labour input method is methodologically appropriate for an EU-wide application

The review of key literature sources and the application of indirect methods across the Member States led to the conclusion that:

- Discrepancy, Tanzi (monetary), and latent variable methods (methods 1, 4 and 6 listed above) cannot be considered as suitable candidates for an EU-wide method as they focus on measuring all of the non-observed economy, of which undeclared work constitutes only a part. An estimate of the amount of UDW can be obtained only via supplementary hypotheses which undermine the methodological suitability of these three methods.

- The degree of participation method can be excluded from further considerations as a suitable option for an EU-wide method given its very limited potential applicability across the Member States.

- The global indicator electricity consumption method can also be excluded from further considerations as a suitable option for an EU-wide method because its disadvantages appear to outweigh greatly the advantages. .

|G|H|K|

- The remaining option for consideration as an EU-wide applicable method was considered to be the labour input method. The methodological suitability, statistical representativeness, reliability, feasibility and transferability of the method were further extensively tested and found generally to be positive (see conclusion 4).

Conclusion 4: The assessment of the labour input method is generally positive

The labour input method was assessed based on the following criteria:

- Credibility, reliability and statistical representativeness of method across countries,

- Judgements on the feasibility of the method to be applied at the EU level (e.g. in terms of information requirements)

- Comparability and transferability of the method across the countries.

The table below summarises in brief key observations in relation to each criteria, based on the testing of the labour input method as described in section 8.

Criteria	Key observations
Credibility, reliability and statistical representativeness of method across countries	The labour input method is considered to be credible and reliable by stakeholders. The reliability and accessibility of data required for the application of the labour input method is also generally considered as good, or at least sufficiently good, for the purposes of such calculations. It is applied already in many European countries, and can provide rather refined and statistically representative estimates of UDW.
Judgements on the feasibility of a method to be applied at the EU level (e.g. in terms of information requirements)	Information requirements for the application of labour input method are significant, but not insurmountable. Data categories required are already available in a significant number of the Member States. Experts judge that most of the countries (25 out of 29) can be ready to produce estimates of the UDW based on this method within three years.
Comparability and transferability of method across the countries	The method is considered to be generally applicable across the countries and can produce comparable results. One of the main sources used – the Labour Force Survey – is already harmonised across the Member States.

Issues and problems with data availability and reliability, and more in general with the application of labour input method of course exist. They must not be underestimated, but they can be addressed given a concerted effort and attention paid to the issues raised.

Conclusion 5: Most of the countries can be ready within three years to start using the labour input method; its application seems to be feasible in a medium-term horizon

According to the conclusion of experts' judgements, based on data availability and reliability, in 25 out of 29 countries the application of the labour input method could start within three years. The main problems and possible delays are reported for Lithuania and Latvia, mainly due to other priorities and issues on the agenda and for Turkey, which lacks reliable data on some crucially important sectors. It should be stressed that this conclusion

$|G|H|K|$

is based on the opinions of the country experts, although it is well known that the actual implementation of the labour input method requires statistical competence and effort. The time period needed to actually produce reliable estimations of UDW based on this method will hence depend on the quantity and quality of human and technical capital that the individual countries will allocate to this task.

This suggests the possibility to proceed by steps, starting from preliminary estimations based on a simplified version of the method, to be subsequently refined taking into account additional sources of information. The first step could be to develop a version of the method based only on the comparison between the basic data on the supply of and the demand for labour, disregarding, on the one hand, the data which are necessary to obtain the number of domestic workers in national accounts and, on the other hand, additional/integrative data sources on labour demand, labour supply, or both. As for the labour supply, in all the participating countries apart from Croatia, LFS data are easily accessible and reliable. Households Surveys are also widespread and sufficiently reliable. More problems are present on the demand side: whereas 26 participating countries have fairly reliable Ministry of Finance VAT data, Industry and Services Censuses are present only in 20 countries, even though among those reporting no censuses other types of surveys, descriptions of businesses in certain sectors are available. 26 countries have fairly accessible/reliable Agriculture Censuses, and where they are absent other sources of information seem to be available. Hence, it seems possible to obtain in the majority of the participating countries preliminary, but sufficiently meaningful results, within one or two years.

Further steps could be based on the integration of data from Social Security Institutes, which seem to be fairly common, accessible and reliable and, subsequently, from administrative sources, which are also are common and sufficiently accessible/reliable.

Conclusion 6: The use of social security data can provide useful information in the short-term, but national data must be carefully selected and employed.

The data required to carry out an estimation of UDW using both estimated and actual social security data is present in 18 countries (out of 29 reviewed). The accessibility and reliability of such data are generally viewed as good. The data would also allow a sectoral breakdown in most of the countries, but a breakdown by socio-economic categories would be available only in 18 countries.

In spite of some heterogeneity in the assessments of the nature of UDW estimations obtainable through the use of social security data, in line with the positive assessment of the usefulness of the Social Contribution Exercise (SCE) expressed by the majority of the country experts, this exercise can be considered as a useful complement to the labour input method.

The work carried out in the core countries has highlighted a number of issues in the use of social security data for estimation of UDW, in particular on the possibility that the estimates of UDW provided by the SCE could be upward-biased, at least in some countries.

10.2   Recommendations

Based on the conclusions above, three specific recommendations are presented.

1. **General organisational issues**

   - UDW should be regarded as an important area of activity of the Directorate-General for Employment, Social Affairs and Equal Opportunities of the European Commission, being of course strictly related to, and in some cases intertwined with, other existing areas, such as "Coordination of social security schemes", "Better working conditions", "Equality between men and women" and, even more, "Social inclusion and non-discrimination" and "More and better jobs through the European Employment Strategy".

|G|H|K|

- More specifically, there would be value in establishing a task force, dedicated to UDW in general and to the implementation of the labour input method in Member States, in particular. Such a task force would ideally be managed by the Directorate-General Employment, Social Affairs and Equal Opportunities to coordinate the methodological set up, the data collection and the method's implementation, as well as the dissemination of best practices among Member States.

2. **Implement the labour input method in the medium-term**. This would require an agreement and leadership at the European level. Furthermore, some specific issues should be addressed in order to fruitfully develop the method at the European level. Among these issues, the following are noteworthy.

   - Definition of a working schedule for the implementation of the pan-European labour input method, specifying all the actions to be taken in the timeframe required for the preparation of a common framework proceeding by steps, starting from preliminary estimations based on a simplified <u>version of the method, to be subsequently refined taking into account additional sources of information.</u>

   - Articulation of an implementation schedule across the participating countries, singling out and addressing the critical issues that can be envisaged in each country for the preparation of the common framework.

   - Definition of a common methodology to develop the labour input method.

   - Coordination of the organisation and provision of the required data from all the sources involved, starting from the National Statistical Institutes and from the LFS.

   - As for administrative sources, even though the data from social security Institutions, which are among the most useful in the context of the Labour input method, appear to be widespread and generally of overall good quality among the European countries, they should be provided in a format capable of assuring harmonisations and comparability across countries. The same applies to censuses and business surveys.

3. **Refine and use the calculations of social security data in the short-term** to estimate undeclared work. This can be done with a relatively low level of resourcing. Apart from the abovementioned recommendation on data harmonisation, some other specific issues on Social Security data should be addressed in order to provide a fairly reliable, although still preliminary, estimate of UDW.

   - Coordinate at the European level, but taking into account the national contexts, preparatory work to determine an appropriate measure of the average wage for each country, which should constitute the basis for the application of the Social Contribution Exercise.

   - Coordinate, at the European level, but taking into account the national contexts, preparatory work to determine the contribution rate which can be considered as the most representative.

   - Coordinate at the European level, but taking into account the national contexts, preparatory work to determine more detailed data, in particular, data on actual social security contributions, disaggregated by sector and job typology.

|G|H|K|