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Classification report: Quality assessment of estimates on stocks of irregular migrants

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Database on Irregular Migration (http://irregular-migration.hwwi.net)

Despite the political relevance of irregular migration, assessments of the size of the irregular migrant population are often vague and of unclear origin. This website aims at increasing transparency in this sensitive field. The database provides an inventory and a critical appraisal of data and estimates in the European Union and in selected member states. It contains estimates on the size of irregular migrant populations and indicators of their composition with regard to gender, age, nationality and sector of economic activity. The summarizing tables are designed to give users the best possible overview of quantitative data in the countries, in a simplified form. The researchers involved in the creation of this database are aware that irregular migration is a complex issue. Therefore, quantitative information is accompanied by substantial background materials, both on issues of general concern and on the situation in individual countries.

The database was created in the context of "CLANDESTINO: Counting the uncountable − data and trends across Europe", a project funded by the European Commission, DG Research, Sixth Framework Programme. CLANDESTINO started in September 2007 and will conclude in 2009 (http://clandestino.eliamep.gr/). The Hamburg Institute of International Economics (HWWI) hosts the database and aims at complementing and updating it in the coming years.

Working Paper Series

The working paper series aims at publishing papers supporting the aim of increasing transparency in the field of irregular migration. Particularly, it provides a format for documentation of new estimates which are not suitable for journal publication. If you want to propose a working paper, please go to

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1 Introduction[1]

A main part of the database on irregular migration consists of tables with classified stock estimates of irregular migrants in different European countries. These tables were compiled in the framework of the CLANDESTINO project, which aims at making a first step in creating more transparency in a difficult field. The information in the tables relies on information provided in the respective country reports, which also deliver background information for a better understanding of the context.

Creating the tables was a process that required a lot of communication, adjustments and revisions, first among the members of the HWWI team, and then between the team and other CLANDESTINO members[2], particularly between the HWWI team and the country experts. The database was tested from 15 November 2008 to 31 January 2009. During this phase, all country experts and selected other experts had the opportunity to access the database and suggest improvements.

CLANDESTINO country experts did their best to provide detailed and reliable country reports. The HWWI team made the effort to compile and classify estimates according to clear and consistent rules. The purpose of this paper is to explain how this was done. However, we consider all decisions as open to discussion. Comments, suggestions for improvement and corrections are highly welcome.

In section 2, we give a general account of the tabulation and quality assessment procedures. In section 3, we address the classification of estimates, with a focus on absolute numbers. In section 4, we explain the rules and general assumptions used to transform data into relative compositional estimates. In section 5, we address the compilation of tables for Europe.

2 Database creation

In this section, we explain how tables were compiled, how the general quality assessment procedure works, and the general way in which data bias is dealt with.

2.1 Compilation of country tables

Most numbers in the database are quoted from studies. In 2008, country experts surveyed studies and described them in their reports, which were finalised in November 2008. The HWWI team compiled tables on the basis of this information, remaining open for later adjustments and amendments.

After the publication of the country reports, new estimates may be found or produced. Other experts are welcome to propose the inclusion of additional estimates. In order to be able to include them, we need either an English publication or an English text summarizing how the estimate was achieved which can be included in the database. In the annex, we have included a questionnaire for texts about further estimates.

All country tables consist of total stock estimates in absolute numbers and of compositional estimates in absolute numbers or in percentages. Total stock estimates can be made for the whole country or for specific regions or cities. Compositional estimates concern gender, age, nationality, and sector of economic activity. As we tried to keep the focus on the whole

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[1] This report is identic with the Classification report published in December 2008 and quoted in stock tables as HWWI 2008. There are no changes as regards contents and it is taken over as working paper No.1 of the Database on Irregular Migration Working Paper series.

[2] Special thanks go to Michael Jandl for his critical and constructive comments.

country, we did not include compositional estimates for specific regions or cities, unless they could be presented as indicators for the whole country. A final, open category was suggested to include estimates that could not be filed under any of these headings as they concern irregular migrant groups with particular relevance.

Inclusion rules. For most countries, we have not included *all* the numbers that are mentioned in the report. Some country experts really made an impressive effort to include all suggested sizes of irregular migrant populations that were at some point quoted in public discussions, and indeed this gives a very interesting idea of the public discourse in the countries. Estimates that are only briefly mentioned and do not seem to have special relevance in the reporting period are not included. If a number without explanation is characterized as far-fetched, we have only included it in the table if there were indications that it was often quoted or otherwise particularly important for the public discourse in a country. The database is not designed to give publicity to poor estimates that hardly found national attention.

As a rule, we always included explicit estimates that were based on studies and address approximately our definitions of irregular foreign residence or irregular foreign work. If the definition deviated too much, we excluded it, although we are aware that defining irregular migrant populations is a tricky issue (Jandl and Vogel 2008). After some experiments with detailed definitions in the tables, it turned out that this lead to more confusion than clarity. Therefore, we decided to present only two broad definitions: those for irregular foreign residents and irregular foreign workers.

Irregular foreign residents (IFR) are the main focus of this study. Irregular or undocumented residents are defined as persons without any legal residence status, and those whose presence in the territory – if detected – would make them liable to expulsion. For the purpose of the database, we have restricted the latter part to 'working tourists' – persons who have entered from countries for which no visa is required for tourists or on tourist visas and who use their period of stay for irregular work. Of course, it is debatable whether persons on a short term stay may be called 'residents' at all. We define 'residence' as habitation in a country, without any 'length of stay' criterion.

Irregular foreign workers (IFW) are foreign nationals who work in the shadow economy. They may lack a residence status, have a residence status but no right to work, or have both a residence status and the right to work. This definition excludes economically inactive irregular residents such as children, while it includes persons who are protected from expulsion and deportation such as asylum seekers and EU citizens. When EU citizens are included, this is indicated explicitly and always refers to EU membership in the year of the estimate. For example, if an estimate for 2003 included Polish citizens in Germany, we would not indicate that the estimate included EU citizens, as Poland was not yet a member of the EU. If an estimate was for 2004, the year Poland's joined the EU, we would indicate that it included EU citizens (*incl. EU*). It is obvious that the growth of the European Union[3] should have a decisive influence on estimates in some countries.

In some countries, there are estimates for the economically active irregular foreign resident population, i.e. IFR not including unemployed persons, children and other family-supported migrants. This intersection of the two definitions is presented as *IFR/ working*. Other specifications were made as necessary, such as an indication that an estimate excludes specific age groups. We are aware that these are very broad definitions that hide a lot of variation between studies. However, they do allow for the differentiation between two broad types of estimation efforts that lead to widely diverging results in most countries.

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[3] EU enlargement with 10 new member states in 2004: Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia, Slovenia, Cyprus, and Malta. In 2007, Bulgaria and Romania joined the EU.

Some estimates consist of ranges, while others consist of single numbers. For all ranges, we presented the lower number under 'minimum' and the higher number under *'maximum'*, even if the authors did not explicitly state this. Single numbers were presented under *'central'*, unless they were explicitly characterized as conservative minimum estimates or as maximum estimates.

With the indication of the main type of data and a short explanation, the tables give a first impression of how each estimate can be understood, although it is certainly necessary to consult at least the country report – or preferably the original sources – for a full understanding. Where possible, we have indicated where more information can be found.

2.2   Quality assessment procedure

The HWWI team suggested quality classifications according to the logic developed in the methodological report (Vogel 2008). The classification chosen distinguishes three quality classes according to methodological criteria and makes a further differentiation in the low quality class between plausible and implausible estimates. Therefore, the main differentiation follows a *'method assessment logic'*, while the differentiation in the low quality class follows a *'size assessment logic'*.

The classification into the three quality classes according to methodological considerations required careful assessment of whether the methods of estimation were well documented, valid and reliable. The HWWI team suggested classifications on the basis of information in the country reports and communicated them to the country experts, who in some cases provided additional arguments that lead to a re-classification. All assessments that required knowledge of the national situation ultimately depended on the CLANDESTINO country expert for the country in question. However, the HWWI team had the task of making sure that the assessment methodology was applied in a uniform way. The main part of the paper will explain the rules according to which this was done.

The decision whether or not low-quality estimates should be presented with a plausibility warning was basically a comparative exercise. In some cases the country expert indicated that an estimate seemed to be much too high, much too low, or seriously misleading, and provided arguments for this, usually by comparing the estimate in question to other (ideally better quality) estimates or other available data in the country. In other cases, the HWWI team suspected that an estimate was implausible based on information in the country report or a comparison of estimates in this country report to estimates in other country reports. If a country expert expressed serious doubts about the quality of an estimate, the HWWI team checked this assessment and discussed the matter with the expert if a warning did not seem justified, or needed more substantiation. If the HWWI team indicated that a plausibility warning might be justified, their reasons were communicated to the country experts, who were asked whether they could follow the reasoning and (if necessary) include a corresponding assessment in their report. This way, all plausibility warnings were double-checked, and a plausibility warning was only issued when both parties agreed.

In some cases, estimates were presented as by-products of high quality scientific studies. Please note that we *never* assessed the quality of the study as such, but only the quality of the estimate. For example, a high quality study may have included an estimate in the introduction which was made by the rules of thumb and without sufficient documentation. In many cases, the authors of such studies know that their estimate does not fulfil quality standards and openly admit it. Researchers with a good reputation may have reasons for providing low-quality estimates if there is nothing better available. More than one member of the CLANDESTINO team has been involved in the production of low quality estimates in the

past. The following table provides an overview of the classification scheme with applicable quality criteria:

Table 1 Quality classes

Quality classes	Definition
High quality estimate	Estimate fulfilling usual academic standards: *Documentation:* sufficient information on data and methods provided, *Validity:* adequacy of methods and data convincingly demonstrated and method carefully applied, comprehensive and consistent study, only minor insufficiencies, *Reliability:* replicable study with limitations quantitatively indicated (e.g. ranges, alternative calculations, characterisation as minimum or maximum estimate).
Medium quality estimate	Careful estimate: *Documentation:* sufficient information on data and methods provided, *Validity:* methods are not fully adequate and/or not fully adequately applied and/ or underlying data are not fully adequate, *Reliability:* replicable study with reliability indication, although not necessarily in quantitative terms.
Low quality estimate	*Documentation:* insufficient information (time- and space frame, definition, estimation method or empirical basis not specified), and/ or *Validity:* inadequate method, inadequate method application, lacking or very weak foundation in empirical data, and/ or *Reliability* assessment is lacking or failing.
Low quality estimate with a plausibility warning	Low quality estimate as defined above, plus indications that the estimate is likely to be much too high, too low or misleading

Source: Own compilation

The annex contains two tables indicating examples with typical combinations of criteria, for both absolute numbers and indicators.

All classifications are open to scientific dialogue and may be adjusted if additional arguments appear. We do not claim that our procedure is infallible. A country expert may have overlooked a study or the documentation of an estimation procedure, or may not have fully understood what was done. The HWWI team may have misunderstood what was presented in the country report. Communication between the country expert and the HWWI team may have produced misunderstandings. The HWWI team may have made mistakes in handling the data.

However, we claim that the procedure has considerable positive qualities. As nobody has an overview of all country contexts, all data and all studies in all European languages, there is no

other choice but to find a procedure that involves communication and allows for the correction of mistakes and the discovery of additional arguments. Our procedure is summarized as follows:

- Firstly, the classification involved communication between the HWWI team, the CLANDESTINO team and the country experts, as described above.

- Secondly, in a test phase from November 2008 to January 2009, all country experts and selected other experts had access to the preliminary database so that there was time for corrections before the website was made public. A total of 43 experts from different countries and backgrounds were given access to the database during the test phase, and most of them provided the HWWI team with feedback, some of which was very detailed. However, we did not receive feedback about all countries.[4]

- Thirdly, this paper and the database were made public in February 2009, when there were still six months remaining in the CLANDESTINO project. One project partner, PICUM, is scheduled to visit all participating countries and present results to stakeholders in the field who may provide additional arguments and information.

As will be shown below, some classifications were easy to make, for example if there was no source and documentation. Others required judgement, for example in deciding whether omissions in the empirical foundations were major or minor, and whether they concerned small or substantial parts. In the few cases in which no consensus was reached, contrary arguments are documented in the annotations.[5]

2.3   Data bias as opportunity for minimum and maximum estimates

One of the key problems in assessing the size and composition of irregular migrant populations lies in the fact that it is not possible to collect unbiased information. Therefore, researchers have to find ways to deal with the data bias. Adequate ways of handling a bias include eliminating it statistically or making alternative calculations based on different assumptions about the bias.

We argue that another way of dealing with a bias has received too little attention thus far. If there is a clear and *uni-directional bias* in a data source, the information can be used to estimate the minimum or maximum size of a group or its composition. This is often the case with administrative (or procedural) data – information that is collected as a side effect of the work of an organisation. A minimum or maximum estimate gives a value below or above which the true unknown value is unlikely to be.

Firstly, data can be used to calculate a minimum or maximum estimate, applying a multiplier principle. There are data sources in which regular residents and irregular residents are included and can be distinguished, such as labour inspection data in some countries or NGO-counselling data. If we can assume that irregular residents are more likely to be represented in a particular data set than a measurable group of regular residents that is also included in the data set, the relation between irregular migrants and the reference group can be used to calculate maximum population numbers. If there is a clear indication that they are underrepresented, the relation can be used to calculate minimum population numbers. Qualitative information is needed to clarify whether the bias is really uni-directional – if there

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[4] We would like to thank all experts who helped to improve the database.

[5] The database is the result of a considerable effort within the limited framework of a two-year research project. It must also be noted that the country experts produced a country report for a limited amount of money, and that all communication that took place following the submission of the final versions of their reports rested on their scientific interest and voluntary cooperation.

are some reasons that irregular migrants are overrepresented in a specific data base and other reasons why they are underrepresented, no minimum or maximum calculation is possible. However, the fact that a minimum or maximum estimate can be made does not yet say anything about its quality. For a medium quality estimate, we would require at least an explicit written reliability assessment of the calculation, or a reliability assessment in the form of alternative calculations or ranges.

Two things in particular must be taken into consideration. First, if there are only few observations in comparison to the size of the relevant regular population, there is a strong leverage effect (small changes in the data causing large changes in results). For example, if there are only very few labour inspections in comparison to the working population, estimates from labour inspection data cannot deliver reliable results. Second, if irregular migrants are highly underrepresented in a data set, the true unknown value is likely to be much higher than the minimum estimate resulting from such data. Presenting only a minimum estimate is, in such cases, misleading. Therefore, we required that a minimum estimate from highly biased data always be accompanied by a maximum estimate to be qualified as medium quality, and vice versa. If there was a minimum and a maximum estimate, we classified the combined estimate as medium quality, even if it covered a wide range of values. For a high quality estimate, a more sophisticated estimation of the size of the bias is required.

Secondly, there are data sources which only contain information about irregular migrants, such as regularisation data, internal and external apprehension data, and data from organisations that supply services particularly directed at irregular migrants. These data are sometimes interpreted as minimum estimates for the following reason: As persons have regularized, they must have been in the country before the cut-off date (at least theoretically, see below). If persons were apprehended internally, they must also have been in the country. However, even if this can be said with some certainty, there should be a discussion of the selectivity of the data and a reliability assessment.

For example, if news about a regularisation was widely spread, most irregular residents applied for regularization, and non-residents had no access to it, regularisation data could be considered a medium quality minimum estimate for the irregularly resident population in the year before the regularization. Regularisation data can lead to high quality estimates if there are more sophisticated estimations of the number of non-applicants (and, if applicable, the number of non-resident 'fake' applicants that were attracted by the regularization). However, regularisation data should be considered only a low-quality minimum estimate if there are no considerations concerning non-applicants, or if the considerations lead to the conclusion that only a small part of the irregular migrant population had the opportunity to regularise.

The same applies to internal apprehension data. Whether apprehension data are really an indicator for illegal residence has to be considered carefully. If border apprehensions are included, apprehensions most probably include persons that have never been resident in the country. When internal apprehension data are not person-specific, it has to be taken into account that apprehensions are usually case-based and thus do not indicate the number of persons involved (i.e. one person could have been apprehended several times). Using this data as an estimate means that a multiplier of 1 is applied, and this multiplier needs justification, as does any other multiplier. There should be at least an assessment in words about the degree of underestimation. If it is missing, or if it is stated that probably only a very small part of the irregularly resident population is apprehended in a given year, using apprehension data is only a low-quality method to estimate the minimum number of undocumented immigrants in a country.

Administrative data sources that include irregular migrants – whether as one of several groups or as the only group – often include information on the *composition of a group* (e.g. gender, age or nationality), that can be presented as percentages of a total. At the same time, some

subgroups run a higher or lower risk of being represented in these data than others. Again, we can treat the bias as an opportunity to create a minimum and maximum indicator if it is uni-directional.

If a group is likely to be underrepresented in a certain type of data (e.g. women in apprehension data), the percentage of this group in the irregular migrant population is likely to be higher than in the data set (e.g. the share of women in the irregular migrant population is at least as high as in the apprehension data). If a group is likely to be overrepresented in a certain type of data (e.g. women in health service care data), the percentage of this group in the irregular migrant population is likely to be lower than in the data set (e.g. the share of women in the irregular migrant population is at most as high as in the health care data).

If we had no indication at all about the size of the bias, we classified percentages as low-quality minimum estimates. If there was at least a verbal indication of a moderately sized bias (e.g. based on expert interviews), we classified it as medium quality. Another way to come to a medium quality estimate is to combine data that overestimate and data that underestimate the percentage of a group. High quality minimum estimates require a quantitative assessment of the reliability that is often not be possible.

Even low-quality minimum or maximum estimates without ranges can be useful in a national context if they challenge generally shared assumptions about the size or composition of a group. However, if there is only one low quality minimum or maximum estimate, the estimate should not be used in a comparative context. When there is no assessment of the size of a bias that leads to a categorisation as minimum or maximum, there is no way to know whether inter-country differences are due to different data biases or to differences between countries.

3 Classification of stock estimates of the size of irregular migrant populations

Meanwhile, there are many different methods for estimating the absolute size of the irregular resident population in a country (for an overview, see Jandl 2008). However, most of them have never been applied, for a variety of reasons. This is mainly due to a lack of concern for the question, the non-applicability of the method in the country context, or the high costs of estimation combined with considerable risk of failure.

Only in a few countries have researchers been able to devote a considerable amount of time and funds to making such estimates. In most countries, no sophisticated studies have been conducted. The remaining estimates differ widely in terms of the degrees of documentation, reliability and validity.

3.1 High quality estimates

Only a few estimates resulting from extensive studies are labelled as high quality estimates, including several estimates based on capture-recapture calculations in the Netherlands (Van Heijden et al. 2003) and the centre sampling estimates in Italy (Baio et al. 2008).

Residual estimates based on the municipal and foreign registers in Spain and on census and administrative data in the UK, as well as estimates based on regularizations in Italy and Spain, were candidates for classification as high quality estimates. It was not always possible to assess whether insufficiencies in these estimates were of major or minor relevance for the result, so they were classified as medium quality. This classification is certainly open to debate. The ongoing efforts to make a sophisticated national calculation on the basis of an intense local study in the Czech Republic (Drbohlav and Lachmanová 2008:25) seem to be a promising candidate for at least a medium quality classification.

To the best of our knowledge, intensive efforts were made in the course of the two abovementioned studies to achieve a high quality result. As far as we can ascertain, the methods were adequately chosen, the results well-documented and their limits clearly outlined. As always in the case of irregular migration estimates, the researchers had to deal with biased original data, but found ways to address the bias with a combination of qualitative inquiries and statistical procedures.

In the case of the Netherlands, researchers used police data, calculating totals from proportions of repeated captures of the same individuals by the police in a sophisticated procedure that takes into account some of the data shortcomings. Quantitative calculations were embedded in extensive qualitative studies, including interviews with police experts to understand the data and with migrants to understand their position. These studies lead to the exclusion of estimates for Eastern European irregular migrants, as the preconditions for the estimation model were not even approximately fulfilled.

In the case of Italy, qualitative studies paved the way for a quantitative study. First, meeting places ('centres') had to be identified where migrants could be interviewed. Then a quantitative survey of migrants was conducted. For the estimation, centre size and individual centre frequentation were used to address the data bias in a sophisticated way.

While statistical estimation techniques were used in both studies to address data bias, sophisticated statistical techniques are no prerequisite for a high quality classification. A study relying on a residual or multiplier method with adequate data and documentation of all shortcomings could also provide a high quality result, and we argue that the estimates in the United States that use this method could be classified as high quality (Hoefer et al., 2007). On the other hand, studies relying on sophisticated calculations can be classified as low quality if the central problems for estimating hidden populations are not adequately addressed.

High quality estimates are not without any shortcomings. However, if the studies seem to have made all efforts to apply a principally adequate method in a comprehensive and consistent way, fully documenting the procedure and acknowledging the remaining shortcomings, we can say that the study fulfils usual academic standards. However, it remains an estimate, and even though we may have considerably more trust in it than in lower quality estimates, later developments could possibly bring to light that the true unknown size of the undocumented immigrant population was probably higher or lower than previously estimated.

3.2   Medium quality estimates

As outlined in Vogel (2008), data access, data quality and bias handling are key problems for achieving high quality estimates. Some studies that aim at estimating the size of irregularly resident populations address these issues, but the remaining shortcomings cannot be considered as minor. Researchers still have to rely on assumptions rather than data for important parts of their assessment.

After some consideration, we have classified an estimate for the UK in 2001 based on a residual method as medium quality. The study basically used census data from 2001 and subtracted different categories of regularly registered migrants (Woodbridge 2005). However, the arguments concerning the problems of this estimate seemed to be sufficient to classify it as medium instead of high quality. We are aware that this classification needs some interpretation: which inadequacies are considered to be minor and which are considered to be more than minor, without making an approach fully inadequate? What we present is the preliminary outcome of a discussion process which might be revised.

In many other cases, it is obvious that an estimate does not meet high quality standards, but that it has to be decided whether the medium or low quality label is appropriate. The most obvious candidates for the medium quality label are '*aggregate subgroup estimates*' that

make a careful assessment, subdividing the irregular resident population into subgroups and using multiple data sources and methods to estimate the size of each subgroup. If each subgroup estimate was high quality, the total estimate would be high quality. However, aggregate subgroup estimates usually rely – at least for some subgroups - on assumptions which are not empirically founded. The subdivision into subgroups allows for a more detailed estimation of groups for which more information is available, and a rougher estimation of other groups for which the data situation is worse. Aggregate subgroup estimates are usually considered medium quality, even if estimates for some subgroups are calculated on the basis of plausible assumptions alone. So where the line should be drawn between medium and low quality, if we concede that medium quality estimates may be partly based on plausible assumptions?

An aggregate subgroup estimate can only be of medium quality if it strives for *comprehensiveness*. It should consist of all relevant subgroups of the total that it aims to measure. Otherwise, the method is inadequate and should be classified as low quality (with regard to the aim of estimating the total population). However, an aggregate subgroup estimate may still be considered medium quality if the omission does not seem to impact too much on the result. An aggregate subgroup estimate should apply the same logic to all components. All components should either be conservatively assessed for a minimum estimate, make an effort to come as close as possible to the real unknown number for an central estimate, or be generously assessed for a maximum estimate. It is clearly inadequate if it mixes the minimum and maximum logic.

Another criterion is that the plausible but empirically unfounded assumptions not impact too much on the estimate. Whether or not this is the case, again, is a matter of interpretation. Plausible but empirically unfounded assumptions may or may not be challenged. They can be used for the estimation of presumably bigger or smaller subgroups, and the change of plausibility assumptions may have a larger or smaller impact on the result. If we judge too strictly on this, there is no way to distinguish comprehensive and consistent attempts to estimate the size of irregular migrant populations on the basis of the best available secondary material from inconsistent, non-transparent and unfounded guesswork.

The difficulty can be demonstrated with regard to the estimates by Biffl (2002) and Jandl (2003) for Austria. Biffl (2002) makes separate estimates for four subgroups of irregular foreign workers, combining indications from stock and flow data with assumptions. However, the country experts indicate that at least one important group of irregularly working foreign nationals is not addressed (family migrants without a work permit). Jandl (2003) addresses irregular foreign workers with a different approach, estimating illegal work, including foreigners working in Austrian companies, foreigners working in Austrian households as cleaners and as caretakers, and the number of foreigners working illegally as prostitutes. While his approach is more comprehensive, it also has to rely on weak empirical indicators for the company and the prostitution sectors (enforcement agents' assessment of multipliers) as well as plausible assumptions for the household sector. Both estimates caused considerable discussion in the team. They are clearly more than just a number without a source or explanation; they apply principally adequate approaches. As far as can be assessed from the country report, both methods would have benefited from a more consistently demonstrated conservative or maximum approach to the estimation of all subgroups. However, they are classified as medium quality, taking into account that medium quality estimates are usually based on weak empirical foundations for some subgroups. In addition, both estimates stem from academic experts with experience in the topic. We can thus assume that their opinion and assessment is made on the basis of comprehensive knowledge of the empirical situation.

A group of Greek researchers (IMEPO 2007) has made three separate estimates using three different residual methods and different data sets. Ideally, it should be clearly stated how a

merged estimate is derived from different calculations and data sources. However, such estimates are still classified as medium quality, if a final estimate is consistent with presented data and calculations.

There are estimations of the prevalence of irregular work in the shadow economy in general or in particular sectors, which have been produced using different types of estimation methods. These estimations usually take into account the total number of hours worked. Additional assumptions have to be made to calculate the number of persons that are involved in this work and the share of irregular foreign workers in this total. Often, they can only refer to the potential number of persons working there, assuming full-time employment. In other words they estimate the number of persons that would be involved if all persons involved in the production worked full time with a specified number of hours. It is acknowledged that the real number of persons may be higher, due to overtime, or lower, due to part-time work. We indicate full-time equivalents as an additional specification to irregular foreign workers (IFW/ FTE). As there are usually considerable insecurities in these calculations, they may be at best medium quality estimates. They are considered as low quality if the share of foreign nationals in the full-time-equivalents has no empirical basis.

3.3   Low quality estimates

In the case of estimates not accompanied by documentation relating to definitions, timeframes, geographical area and estimation procedures, it is unknown what exactly has been estimated and how. Therefore, the results cannot be trusted. Numbers without any closer explanation are always labelled as low quality. Many estimates reiterated in public debate have been assessed as low quality estimates, as they are without identifiable source and basis.

In the introduction to the proposal of the employer sanctions directive, the European Commission states: „The scale of the phenomenon is necessarily hard to quantify: estimates of the number of third-country nationals illegally staying in the EU vary between 4.5 to 8 million"(European Commission, 2007). This can surely be classified as low quality. If one follows the quotations chain, it turns out that the original source and the empirical foundation cannot be established, but that the calculations were made before the new member states joined the EU. There are no recent estimates with identifiable source that indicate a number between 4.5 and 8 million illegally staying third country nationals. In many member states, we find a similar phenomenon: numbers that are quoted and re-quoted and later applied to recent situations. Such numbers are always classified as low quality.

If documentation requirements are fulfilled, the method can be assessed. An estimate should also be classified as low quality if the critical discussion of the estimation leads to the conclusion that the estimate relies on inadequate methods, involves serious shortcomings in the implementation of a principally adequate method (e.g. lack of comprehensiveness and consistency), or is based on inadequate data. Our general approach was to concentrate on aspects that are crucial for our topic. For example, the estimate of the number of irregular migrants who are active in Austria's shadow economy (Schneider 2007) is considered to be of low quality, as the source for the share of irregularly working *foreign* nationals cannot be established. This is crucial for our topic and leads to a classification as low quality, so that further discussion of other open questions in this method is not necessary.

We want to emphasize that researchers are not necessarily to blame if their estimates are classified as low quality. A study may have been conducted under conditions and in the context of developments that were not foreseeable in the beginning. Researchers undertake a risky task when they put energy into estimating an irregular population, particularly if they cannot build on earlier studies in their country or region. This may be one reason why so few

researchers make such efforts. The publication of their results may be discussed and promote the development of more appropriate methods in the future.

Many estimates were put forward by experts or groups of experts without explicit explanation why. The character of these assessments differs, depending on the *size of the space and group*. Experts' opinions are highly valuable if it can be assumed that they refer to first and second hand experiences – cases they know personally or about which they have heard in the context of their ethnic community or work environment. If researchers ask experts to make estimates about a group and a space that they are likely to oversee, they tap into an unwritten empirical source that is not counted and exact but nonetheless fact-based. They may have to make extrapolations from first and second hand experiences, but in a context they know well. If experts give their opinion about a group or space that they cannot oversee and that is likely to be heterogenous, they have either made calculations or repeated or adjusted numbers that they heard or read. Therefore, such expert opinions either reflect a discourse or consist of estimates without any documentation. This is also true for Delphi surveys in which individual experts may adjust their own estimates in reaction to other estimates in subsequent rounds. Expert opinions without further explanation are generally assessed as low quality estimates, whether they are individual expert opinions, results of group discussions or Delphi surveys. However, expert opinions may be qualified as medium quality estimates, if it can be reasonably assumed that the experts can oversee a field individually or collectively.

4   Transforming data into compositional estimates

While the HWWI team did not make any calculations of its own on estimates the size of the irregular migrant population, it actively transformed data provided by some country experts into compositional estimates. In the country tables, we present indicators for the composition of the irregularly resident population with regard to the following characteristics: gender, age, nationality, and sector of economic activity.

Estimates on the composition of the irregular migrant population were made in three different ways. This is exemplified by the Italian report (Fasani 2008).

First, *surveys* involving efforts to delete a bias statistically do also estimate the size of subgroups. In our tables, we included absolute numbers and percentages from such studies, if information was available. The compositional estimates from the centre-sampling surveys in Italy provide such compositional estimates.

Second, the composition of an *irregular group in administrative data* can be used, indicating the probable bias. For example, regularisation or apprehension data can be used. In the example of Italy, the gender composition was indicated by the gender composition of the 2002 amnesty, and by data from a health-service organisation.

Third, the composition of the *most similar regular group* for which there is information can be used. Information on the selectivity of the regular migrant group can be used to assess whether specific subgroups are more or less likely to be included in the regular population group than in the irregular group. For example, the data from the work permit applications in the Italian 2007 Flow Decree was used as an indicator of the nationality composition of irregular migrants, as it could be assumed to include workers with similar backgrounds, even including workers who were formerly irregular.

If there were concrete absolute estimations about specific groups, we also included them in the table. If there were several indicators from data, we included what seemed to be the best indicator for the specific compositional estimate, unless we were not able to identify it.

As a rule, we did not transform data that was indicated as being misleading (requiring a plausibility warning) into compositional estimates, unless there was no other indicator and the indicator seemed relevant.

There may be more compositional indicators than we presented in the tables. We only became aware of some possibilities to present indicators while reading the reports, so that they may guide the way to future improvements in the conduction of country reports.

In order to increase the amount of information included in compositional estimates, we have made some general assumptions regarding which percentages should be considered as minimum or maximum estimates. These assumptions are explained below. They are used as rules for transforming data into compositional estimates, but they are meant to be default rules that are applied unless other evidence indicates that another treatment is more appropriate.

4.1   Border enforcement data

Border enforcement data are collected in all EU countries. Differentiations between men and women, age groups and nationality groups are usually feasible, accompanied by a number of characteristics that relate to the character of the violations.

Summarizing reports from 20 countries, Futo and Jandl (2007:10) describe demographic characteristics as represented in border enforcement data:

"Most illegal migrants are still single male individuals in their best working years, the majority of them having been educated until the secondary school level. It is not typical that whole families attempt to enter the responding countries illegally. ...they are typically between 17-55 years."

The authors clearly identify these features as characteristics of groups that *enter* a country illegally and not as characteristics of groups that *reside* illegally in a country. However, as border enforcement data is widely available, it is often used as an indicator of the structure of residing groups, too.

There are two main reasons why border enforcement data are problematic indicators for the composition of the irregular migrant population *residing* in a country:

- Entering strategies are likely to differ for people of different genders, ages and nationalities. Visa overstayers are not represented in this group. The opportunities for visa overstaying are likely to differ by age, gender and – particularly – nationality.

- In many countries, there are indications that a substantial number of those apprehended at the border would not have become part of the irregular migrant population of the country. They would have either transited to other countries or applied for asylum or a humanitarian status.

As a rule, we did not use data on apprehensions at the border or on smuggling as a basis for compositional estimates, unless country experts explicitly indicated that this would be useful.

4.2   Internal police data

If internal police units are involved in the detection of irregular residence, there can be data that is differentiated by gender, age and country of citizenship. In Germany, for example, as in many other countries, illegal residence is considered a crime and thus appears in police records in case of detection. It is not always possible to differentiate between border-related data and internal data, making the use of police data in these cases problematic. This is the case, for example, in data published by the German and the Austrian police forces. Indicators from such mixed sources were used if there was no other data available.

We have good reason to believe that women are generally less likely to be subject to police investigation than men. Therefore, we conclude that the representation of women in the population without residence status is at least as high as it is in internal police data.

The first reason for this is that irregular residents may come to the attention of the police in the course of labour inspections. As the irregular residence of women is less likely than that of men to be discovered in labour inspections (because women work more often in private households than men), they are also less likely to appear in police records.

The second reason lies in the selectivity of crime and the selectivity of police controls. The likelihood to commit crimes is not evenly distributed in a population. Generally, youth and young adults commit more crimes than children and elderly people, and women are less likely to commit crimes than men. Therefore, young persons and men are more likely to be monitored more closely by the police, increasing their probability of being included in police statistics.

We assume that the percentage of women in police statistics can be considered to be a minimum value, while the percentage of men can be considered to be a maximum value.

This is a default that may be revised should information to the contrary become known. For example, if there was a large campaign against prostitution, women would be more likely to be subjects to identity checks by police, as they are overrepresented in this sector.

Concerning age selectivity, we assumed that children and elderly people are less likely to be represented in internal police data than youth and working-age persons. While adults are expected to carry identification cards with them in some countries, this is not the case for children. If children are not the subject of police attention for other reasons, they are unlikely to be asked for identification. In some cases, our assumption may not hold true. There may be regions in which children are systematically used for criminal acts, such as shoplifting, begging or drug dealing. If this pattern is dominant in a region, police efforts may be targeted specifically at children. Of course, forming age groups is a bit of a problem. Particularly youth may be as much at risk of being subject to police checks as adults, so that we counted them as part of the adult population where possible. Children are defined as persons up to 14 years of age, elderly persons as those above 60 or 65, depending on the available data. Elderly people are less likely to hang around places in which they are at risk of being subject to an identity check, such as railway stations or discos.

It can also be assumed that police forces are likely to monitor foreign-looking and foreign-sounding persons more closely than native speakers whose appearance is similar to that of the majority population. There are indications that black persons are more likely to be subject to identity checks than white, European-looking persons. However, the effect of discrimination in identification practices may easily be offset by specific targeting practices that are the result of local or national agendas. Irregular migrants are mostly first-generation immigrants. , There are a lot of characteristics that may distinguish first-generation immigrants from the majority population, aside from the colour of their skin. These include clothing habits, language problems and accents. Specific targeting practices might relate to these characteristics. Without more precise information on police targeting practices, we do not feel confident in making the generalization that persons from specific countries (e.g. African countries) are overrepresented in police data and that their percentage should thus be considered as a maximum value.

4.3   Labour inspection data

Labour inspection data often provide information on apprehensions by economic sector. As with all enforcement data, these data reflect enforcement practices. Those sectors that are

more intensely policed are more likely to be represented with high percentages than those sectors that are less intensively policed.

We have good reason to believe that some sectors are *generally* less likely to be policed than others. Therefore, we conclude that persons working illegally in these sectors are at least as much represented in the illegally working population as in the enforcement statistics. The percentage statistics from internal enforcement can be considered as minimum estimates of the percentage in the population in which we are interested. At the same time, the percentage of persons working irregularly in sectors which are more likely to be policed can be considered as maximum estimates. As we will rarely have information on this likelihood for all sectors of the economy, it may be possible to make minimum or maximum assessments only for some sectors, while the sector percentage for other sectors cannot be presented with confidence as maximum or minimum.

We argue that there are two sectors for which we can make a general assumption concerning the likelihood of policing (although this assumption may be discarded if information to the contrary arises in relation to specific countries):

- Workplaces in private households (cleaning, private care) are less likely to be policed than workplaces in companies.

- Workplaces in construction are more likely to be policed than workplaces in other sectors.

In both sectors, there are incentives for irregular work, as they produce non-tradable goods. It is not possible to compete with lower prices by shifting production to low wage countries, as neither houses nor household work can be transported elsewhere. Enforcement agencies are more likely to check sites where they are likely to be successful, i.e. where they are likely to find irregular workers.

With regard to private households, there are several reasons why they are less likely to be policed in all countries. Firstly, checks in private homes are more sensitive than checks in public places or companies and thus more likely to generate political protest. Secondly, private homes usually have some additional legal protection from intrusion by authorities. Thirdly, domestic workplaces as such are less interesting as targets because there are usually only one or two persons working in a single household, often only for a limited number of hours. Fourthly, domestic workplaces are not publicly visible and thus less likely to the attention of authorities. Therefore, we are confident that private households are underrepresented in enforcement data and have set their percentage as minimum value. As women are overrepresented in private household work, they are underrepresented in labour inspection data.

On the other hand, we set the percentage of workers in construction as a default maximum value, although not with quite as strong arguments as in the case of household workers. In addition to producing non-tradable goods, construction often involves large numbers of workers who work in public. As construction sites, be they buildings or roads, are easily visible to the public, they invite denunciation by competitors or neighbours and are easy targets for observational preparations by inspection units. As men are overrepresented in the construction sector, they are overrepresented in labour inspection data.

For other sectors, arguments can be made in contradictory directions, or are not as strongly. We may add additional sectors on a country basis, but do not intend to set any more general default values.

4.4   Regularisation data

Regularisation data usually include information about the gender, age, and nationality of regularized persons. In order to assess whether they can be used as indicators of the characteristics of the irregularly resident population, the regularisation rules and the context of the regularisation campaign must be taken into account.

If regularisation rules are very strict and highly selective, the composition of regularisation data is not transformed into indicators. For example, regularisation data from the Spanish programme in 2001, which allowed preferential regularisation for persons with Spanish roots, cannot be used as indicator for the nationality distribution of the irregular migrant population (Gonzalez Enquirez 2008).

If a programme was relatively broad with a uni-directional bias, these data were used, indicating percentages of probably overrepresented subgroups as maximum indicators and of probably underrepresented groups as minimum indicators. This was the case with the Italian amnesty programme of 2002, which was aimed particularly at undocumented household workers. Therefore, the percentage of domestic workers regularized in this programme is considered a maximum percentage, as is the percentage of women, given that they are generally overrepresented in domestic work.

If a programme was relatively broad with no clear selectivity with regard to a characteristic, we presented the indicator in the central column.

4.5   Administrative data of supportive NGOs

In many countries, there are non-governmental organisations that seek to counsel irregular migrants and help them when problems arise. They are working in a difficult environment, as they provide assistance to a population that is not supposed to be in a country. However, in principle, it is uncontested that irregular migrants should have access to basic human rights and may seek help if these rights are injured. Usually, NGOs have limited capacities and serve relatively small numbers of people. Generally, needy persons in serious trouble are more likely to seek help than healthy irregular workers who are able to manage on their own or with the help of networks. Thus, one might assume that persons with children and elderly persons are more likely to seek help from NGOs than young, working age persons.

The use of NGO services is probably highly selective with regard to nationalities and, thus, cannot be used as nationality indicator. Nationality selectivity can be due to the fact that NGOs are religiously based. For example, irregular migrants from mainly Catholic countries are more likely to become aware of a service provided by a Catholic NGO. If they serve irregular migrants in the same context as refugees, they are likely to be selective with regard to the countries of origin of refugees. In addition, they may have been founded, or may be dominated, by migrants from a specific nationality. They may also only be able to provide consultancy in a specific language.

However, if there are NGOs that provide health services, women are more likely to consult them than men, as pregnancy and birth are typical reasons why women seek access to professional services. Therefore, we assess the percentage of irregular women using health services as an upper estimate of their percentage in the irregular migrant population. Of course, it has to be assessed whether a regional bias may point in another direction.

4.6   Data about regular migrant groups

Even if there are no regular data sources on identify irregular migrants, there are usually data on the composition of regular migrant groups. Country experts were not specifically asked

whether there are regular migrant groups with a probably comparable composition, so there is less information in our tables based on similarly structured groups than there could be.

If data on the regular foreign population are used, we assume that children and elderly people are less likely to be found in the irregular migrant population than in the regular population.

5 Compilation of tables for Europe

Estimating the irregularly resident population of a single country is tricky, and European-level estimates are even more difficult to obtain. European estimates thus far are, at best, very rough calculations (e.g. 1% of the EU population) and, at worst, of unclear origin. We believe that only a country-by-country approach will lead to improvements and present two steps in this direction in the database: a sorted selection of estimates and – based upon them – our own estimates.

5.1 Selected estimates

Selected estimates of the number of irregular foreign residents are presented in an overview for three time periods, corresponding to the growth of the European Union. A key comparability problem lies in the fact that old estimates are recycled again and again, and without proper adjustment. One reason for this lies in the fact that numbers are scarce in this field: we would also have to present virtually empty tables if we attempted to compile them for every single year. Therefore, we decided to make three groups of years: 2000-2003, 2004-2006, and 2007 to present. These time frames were chosen because 10 new states joined the EU in 2004, as did Romania and Bulgaria in 2007. These accessions turned large groups of formerly irregular residents into EU citizens, although these citizens may still be working irregularly and may still have problems similar to those experienced by irregular third country citizens. With regard to definitions, only tables for irregular foreign residents have been compiled so far, as the country reports suggested that there was less variance in concrete definitions. The quality indications from the country tables apply to the EU table.

The countries involved in the study thus far contain about 83 percent of the regular population of the European Union in its current state (EU27). Estimates of irregular populations for these countries already give a good impression of the total size of the irregular migrant population in the European Union.

5.2 A new dynamic aggregate country estimate

The HWWI has produced a dynamic aggregate country estimate of irregular foreign residents in the EU 25.[6] For this EU estimate, country estimates were selected and aggregated. Country estimates were selected as (a) best estimates from CLANDESTINO country reports, adjusted for better comparability, if necessary; (b) unclassified estimates found in other reports; and (c) estimates calculated as percentages of the total population, transferring the percentage from a country with available background information and relatively similar conditions compared to other countries in the CLANDESTINO study.

According to this estimate, there were between 2.8 and 6 million irregular residents in the EU in 2005 (including foreign nationals without any valid residence permit and working tourists, but excluding asylum seekers and officially tolerated persons). This range is considerably lower than the proposed 4.5 to 8 million circulated to date. It is the first transparent, country-

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[6] The estimate was produced in collaboration with Hannah Prescott (Oxford University).

by-country calculation of a European estimate with the potential to improve scientific dialogue as more and better country estimates become available.

A calculation table for the 2005 estimate was prepared in February 2009. A detailed description and more estimates are in preparation.

6 Concluding remarks

This classification report has provided some details about the considerations underlying the database on irregular migration in order to encourage scientific dialogue. We put forward three main ideas in this paper:

First, approximate comparability is better than no data at all in a situation where a high degree of comparability may never be achieved. We have tried to achieve progress towards comparability by developing reasonably broad categories.

Second, we have developed standards for medium quality estimates. Given that high quality estimates are often infeasible, there has, until now, been no systematic way to distinguish between mere guesses and serious attempts to make the best possible use of the available information. By introducing standards for medium quality estimates, we want to promote attempts presented in a scientific way – i.e. ones that are well explained, consistent and comprehensive.

Third, we promote the consistent use of minimum and maximum assessments in estimates, as they are often feasible with biased data.

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Annex

Annex 1 Proposal for including an additional stock estimate

Name and contact details of person putting forward the proposal:

Year of estimate	Estimate		
	Minimum	Central	Maximum

Source of estimate (in original language and in English translation):

Definition of irregular migrant population to be estimated (as detailed as possible):

Explanation of data sources, estimation method and calculation (as detailed as possible):

Discussion of estimate and proposal for a quality classification:

Annex 2 Proposal for including an additional compositional indicator or for substituting an indicator

Name and contact details of person putting forward the proposal:

Year of indicator	Estimate		
	Minimum	Central	Maximum

Source of estimate (in original language and in English translation):

Definition of irregular migrant population to be estimated (as detailed as possible):

Explanation of data and calculation of indicator (as detailed as possible):

Discussion of indicator and proposal for a quality classification:

Annex 3 Estimate of the size of irregular migrant populations in absolute numbers

Quality classes	Explanations and examples
High quality estimate	Estimate fulfilling usual academic standards: full documentation, comprehensive and consistent, limitations clearly indicated • Study with trust-based micro-data survey and adjustment for data bias (e.g. centre sampling in Italy) • Study with micro-apprehension data and adjustment for data bias (e.g. capture-recapture in the Netherlands) • Comprehensively and rigorously implemented and well documented multiplier or residual study
Medium quality estimate	Careful estimate: short explanation, largely consistent and comprehensive, limitations clearly indicated (at least explicit written statement) • Simple multiplier calculation • Simple residual estimates • Adjustment of older estimates with partly insufficient data • Aggregate estimates for different groups, partly relying on plausibility calculations
Low quality estimate	Unexplained or unreliable estimate: • Documentation: no explanation • No indication of reliability, or indication of poor reliability, particularly if empirical foundation for substantial aspects of calculation is lacking • Inadequate method (e.g. national level Delphi study, or plausibility calculation from econometric estimate), or inadequate method application
Low quality estimate with plausibility warning	Misleading low quality estimate: • Relevant in national discourse • Indications that it is much too high or too low

Annex 4 Estimates of compositional indicators of the irregular migrant population

Quality classes	Explanations and examples
High quality estimate	• Indicator from micro-data study with a credible claim to have eliminated data bias (e.g. ISMU in Italy) • Indicator from large data set that is not likely to have a considerable bias with regard to the compositional criterion
Medium quality estimate	• Double minmax: combination of two indicators using data with uni-directional data so that minimum and maximum assessment is possible (e.g min. 10% and max. 50% women) • Indicator from small data set that is not likely to have a considerable bias with regard to the compositional criterion • Indicator from large biased data set with careful reliability adjustment and discussion (e.g. Greek residual calculations)
Low quality estimate	• Indicator from data with strong uni-directional bias with minimum or maximum assessment (but not both) • Indicator likely to be biased, but unclear or unknown direction
Low quality estimate with plausibility warning	• Indicator from data with strong or unclear bias, no minimum maximum assessment possible, indications from other data or research that the indicator is seriously misleading