

Use of non-official data in imputations/estimations made by international organizations

Final draft for discussion, August 2009 ¹

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A. Introduction and background

The relationship between International Organizations –created and funded in their majority by national governments– and non-governmental institutions has always been a complex issues. ² In the specific domain of statistics, the CCSA had to review in 2006 the implications of using international estimates, processed by the statistical branches of international organizations (IOSBs) when generating the indicators used to monitor the Millennium Development Goals. The governments concerned, through a United Nations' ECOSOC resolution in 2006, called for transparency in the methodology, and consultation with the respective national authorities, when imputing such MDG indicators. The resolution remains silent on methods and sources. The debate is still open for some basic indicators when national sources are often conflicting and not internationally comparable.

In 2007, the CCSA had another opportunity of analyzing the issue of imputations, thanks to a paper presented by the UNECE. In line with the ECOSOC resolution on MDGs, the paper recommended to consult with the countries concerned if the imputed country-level data were to be published as official statistics. For estimates used for analytical purpose and used internally or to build regional estimates, consultation was not required.

More recently, the global economic crisis has increased requests for up-to-date, high-frequency data for which the supply cannot be always be satisfied entirely with official sources. It not only requires the use of "nowcasting" (estimates of current developments), i.e., the imputation of most recent values using

¹ Prepared by Hubert Escaith, WTO. I wish to thank Lidia Bratanova, Andreas Maurer and Steven Vale for comments received on earlier versions; their suggestions greatly helped me in filling some of the numerous gaps that plagued the initial drafts. Despite their much appreciated contribution, remaining errors and shortcomings are mine. Indeed, the usual disclaimers apply and the views expressed in this document, which has not been submitted to formal editing, remain those of the author and do not represent a position, official or unofficial, of the WTO Secretariat, WTO Members or the CCSA participants.

² The rather exclusive relationship between OIs and national governments is perhaps contingent to the post-WWII period; older organizations, such as ILO, included non-governmental entities in their governing bodies, while most recent international organizations often result from, or answer to, social society' s initiatives and concerns.

inferences based on expert judgments and/or statistical models, but also the use of additional information that is collected from non-official sources.

The request for additional data is not limited to the present conjuncture, it evolves with the needs of human societies and has a long-term dimension. Adapting to these needs create objective tensions for OISBs: Institutional arrangements tend to alter only slowly, while developments of modern economies are fluid and data requirements change accordingly. Most structural changes occur first at the micro-level (household, firms) before their sectoral and macro implications are being picked up by official statistics, often struggling with budgetary restrictions in adapting their information systems to most recent economic developments.³ The issue has also a political dimension that the international community cannot ignore: there are unfortunately situations where international organizations dealing with humanitarian affairs in conflict zones cannot rely only on governmental sources for their data.

More structurally, with the move from official statistics – considered as a function of the State – towards official statistics being considered a public good for the benefits of all citizens, there is an increasing need to disaggregate official data in order to analyze sectoral and micro phenomena, or at the contrary, to build synthetic indicators facilitating the international comparisons of national outcome.⁴ National statistical organizations (NSOs) are often reluctant to enter into non-traditional fields (e.g., business climate indices) that are of increasing interest to many decision makers in the public and private sphere, especially with respect to short-term economic developments or social issues.

Sub-national disaggregation, cross-country comparison or the construction of composite indices that allow the direct comparison on countries with respect to a specific dimension, such as the international competitiveness index, often require to supplement or complement official sources with "private" sources. At macro-level, examples include the Global Trade Atlas (Global Trade Information Services, Inc.), which responds to the need of monthly trade data by country and the Global Trade Alert (an initiative formed to monitor policies that affect world trade). At micro-level, AMADEUS is an example of a private database put together by electronic publishers of business and company information, and containing financial information on over 11 million public and private companies in 41 European countries.⁵

Even for those fields traditionally covered by official statistics, the "statistical time" of NSOs (and even more so for the statistical branches of International Organizations that depend on NSOs data) does not coincide with "economic time". Y-1 (even Y-2) is a good benchmark for timeliness at NSOs and IOSBs. But decision makers need high frequency data and now-castings. Quality control at NSOs does not usually permit releasing "beta" versions (unstable data sets) of key indicators.

Thus, official statistics has a natural tendency to "leave widely open" information gaps, which are naturally filled by non-official sources. Private providers are more ready to build on preliminary data (from public and non-governmental organizations) to track short-term developments, or to pool resources

³ Also, the revision cycles of statistical classifications, leaned towards guaranteeing historical consistency of time series, are slow to incorporate new economic phenomena.

⁴ Two examples of such requirements, at sub-national and international levels: In many developing countries, most economic and social indicators related to rural development at sub-national level are not regularly produced by NSOs and would have to be estimated using available information, often from non-official informants. Imputing purchasing power parity in order to compare per capita GDP and impute international poverty lines is a well known example for such demand for international data that cannot always be derived from existing national sources.

⁵ When it comes to measuring international trade in services by sector, for example, business associations often provide information on professional services, construction, etc. that cannot be taken from official statistics. This non-official information is central for trade policy making and export promotion activities of the sector concerned.

from with other private providers and form trans-national consortia supplying cross-country micro-data. Moreover, it is not because the information is not officially available that it is not relevant to public administrations. At the contrary, the information gathered by OISDs from non-official sources and private providers can be of strategic interest to the national authorities. For example, when it comes to measuring international trade in services by sector, for example, business associations often provide information on professional services, construction, etc. that cannot be taken from official statistics. This non-official information is central for trade policy making and export promotion activities of the sector concerned.

When producing the data required by their stakeholders, statistical departments of international organizations have to care for the quality of the information produced. Official statistics offer a quality stamp for data, and international organizations have been cooperating closely with NSOs to define and promote common standards. It is therefore natural that any debate regarding the use of non-official statistics by those same agencies which promote the "official quality stamp" include a discussion on quality standards. Yet, the separation line between official and non-official statistics does not always coincide with quality or institutional dimensions, as some private providers are producing statistics that have acquired an international recognition (all economists know the Dow Jones, for example).

Indeed, the issue is complex and needs to be analyzed in its various dimensions: statistical, managerial and institutional. The ambition of the paper is to open the debate by reviewing some of the technical and institutional issues, without any pretension of offering a ready-made solution for defining "best practices" which, ultimately, should depend upon the corporate culture of each international organization (in particular, their level of risk aversion) and their specific missions and responsibilities *vis à vis* the international community and its various constituents.

B. The boundaries between official and non-official statistics.

Analyzing this issue cannot be done without raising first a series of questions. What is the definition of official statistics (see Box 1)? Can we infer from it what are non-official data, and is it an homogenous criteria for decision making, especially with respect to quality?

If criteria in Box 1 define boundaries of official statistics, it would be mistaken to restrict non-official data to private sources. In particular, non-official statistics may have been collected by public institutions (research institutes, specialized agencies, development projects), or may be collected by private sources but respond to the interest of the general public (data on environment, on population well-being).

In addition, some non-official sources may respond to most of the criteria required by official statistics, in particular quality. From a statistical point of view, three quality dimensions of statistical production are especially important: credibility, representativity and time consistency. Credibility (based on independence) is an important criteria for both official and non-official statistics, it is certainly the most relevant one for international organizations. If information is not produced independently of the "expected result", there is risk of ad-hoc bias in the results. And (non-systemic) bias is perhaps the main problem in statistics, because it cannot be controlled.⁶

Quality control is obviously a critical dimension, and is closely related to credibility. Often, private sources privilege timeliness over robustness. It is particularly the case in business statistics, where the emphasis is on high-frequency data, more than on data validation. But it should not be overstated from a

⁶ Nevertheless, as it will be reviewed in the next section, private sources used for complementing a known official series can be checked for their past occurrences against their official benchmark.

statistical perspective, (i) provided that the statistician has access to other related series, and (ii) the errors in these series are uncorrelated. Indeed, by pooling together poor quality sources, a statistician can derive unbiased estimates.⁷ In addition, timeliness is also a quality dimension in statistics, and this is where private providers compete more successfully with official NSOs, i.e., where the complementarity between public and private sources is the greatest.

Box 1. Delineating the boundaries of official statistics

The definition of official statistics is a moving concept which differs across countries and changes with time. It can be defined according to the following questions:

What official statisticians want to measure? The boundaries are defined by what is considered of "public interest" vs. private or corporative domains, but also by budgetary constraints.

Why is there a need for public information? In the past, official statistics was clearly delimited by, and identified with, the government's policy making.⁸ Nowadays, official statistics are also expected to serve a wider constituency and move towards "statistics for the citizens".

How do official statisticians collect data? This question can be answered through three aspects: coverage, sustainability and quality control: It is often recognized that official statistics should be based on nation-wide compilation program (representative sampling based on censuses or comprehensive administrative registers maintained at national level, even when the surveys are intended to obtain data at sub-national level); sustained in time (instead of being ad-hoc initiatives), independent of pressure groups and submitted to quality control. *

Who does the measurement? Official statistics are collected by a variety of government institutions constituting the national statistical system. While NSOs are supposed to coordinate the production of official statistics and ensure that homogeneity criteria and quality standards are met, the truth is that it is not always the case. ** This legalistic dimension is far from irrelevant in international statistics (as demonstrated, for example, by the complaints received from some countries on the monitoring of MDGs, which were voiced at the UNSC in 2006 and led to an ECOSC resolution).

* For example, the results of an ad-hoc survey made by a municipality or a project on a specific objective population would not qualify as "official statistics", even if initiated or implemented by civil servants. Situation changes when several of such surveys are coordinated at national level by a public authority, such as a line ministry. The ideal institutional situation is when the coordination at national level is also supervised by the national organism in-charge of coordinating the national statistical system (usually the NSO, but institutional arrangements may change from country to country).

** There are perfectly valid explanations for divergence, especially on coverage, when a line ministry needs the data for specific administrative reasons (e.g., to measure an indicator of performance in relation to a objective that is specific to this ministry).

⁷ Yet the variance of the estimator will be higher than when using a single source based on a representative sample. This situation is not uncommon in statistics, when the variable of interest is not measurable directly and the statistician needs to use proxies. Another example is the use of instrumental variables instead of the original series, in order to obtain unbiased estimates.

⁸ As mentioned once by Sir Derek Rayner in his white paper on the UK Government Statistical Services "information should not be collected primarily for publication. It should be collected primarily because the government needs it for its own business" Source: Great Britain, Privy Council Office (1981) Government Statistical Services, Report of the Rayner Review, London: HMSO .

Providing data on sub-groups of the population that are not singled out by official statistics is also one of the major market niche of the private providers, and therefore one of their main interest for the international statisticians. Incomplete samples, leading to systemic bias in the results, are not so problematic as long as the statistician is aware of the bias. Because the bias is systematic and well documented (for example, statistics on R&D collected by a professional association regrouping small and medium enterprises), the data are still useful for inter-temporal comparisons, even if they are not representative of the national average. In addition, as was mentioned in the previous paragraphs, compiling various sources and pooling them together would provide, under certain conditions of independence of the errors and proper weighting, an unbiased estimator.

More generally, the separation line between official and non-official statistics does not always coincide with quality or institutional dimensions. Some of the non-official providers of statistics are well-known institutions (Chamber of Commerce, of Industry, etc.) that have a quasi-official status. Quality-wise, analysts often recognize their indicators as benchmarks, which implies, at least for the most widely used, that their quality is guaranteed by the scrutiny they receive from the media and the research community. The Dow-Jones index and most of the similar indicators specific to financial and commodity trading are well-known examples of non-official statistics that have acquired an "official" status among analysts and have a large public recognition. More specialized data, such as the Baltic Dry Index for shipping fares, are also recognized source for sectoral analysis. Moreover, the information provided is publicly available, and often at no cost.

C. A closer look at the practical issues

It is important, on both objective and subjective aspects, to clearly distinguish two separate issues: (i) imputing missing data points with the help of additional information and (ii) deriving new series out of non-official sources are separate issues. In the first case, the technical objective is to complete a time series; the second case involves creating a new variable, proper to the IO, by deriving an entire time series from two different sets of sources. From the subjective perspective of international organizations involved with producing and disseminating statistics, the issues are also fundamentally different. While it is difficult to find objective reasons⁹ not to use good non-official sources when interpolating values (punctual estimation) to "fill gaps" in an official time series, deriving "international" estimates partially or entirely from entire non-official time series requires a careful analysis.¹⁰

1. Point estimates to complete missing values in time series

When performing a point estimate (filling a gap in a data set), the statistician has to choose between interpolating the missing value from the other observations in the data set, or using external variables to model the data point.

For example, in the case of a time series, the methodological decision-tree takes into consideration:

⁹ By good "objective" reasons, we refer to the guidelines provided by the theory of statistical inference. The technical parameter in order to include additional variables in an estimate will be reviewed later and are well documented in the literature.

¹⁰ We use the example of time series for ease of reference, but the reasoning can be applied to other type of samples, as long as the international statistician has an a priori on the nature and parameters of the underlying data generation process. But, as will be mentioned later, deriving micro-data poses a ctotally different range of issues, particularly confidentiality, that need to be addressed properly.

- (i) the informational gain from using additional explanatory variables outside the available sample, rather to a “simple” or refined time series model using existing information (ARMA, ARIMA, filtering techniques, etc.);
- (ii) whether the statistician suspects that an autoregressive model should not be useful because there is a structural break in the time series (a statistical "innovation" due, for example, to a larger than expectable shock, as it is typical of a crisis).

Imputation of a missing variable x_i using an external data set z can be done through classical statistical methods (e.g., one of the many variants of linear regressions) or Bayesian inference (such as maximum a posteriori estimate). The general idea is to maximize the likelihood function $L(\theta; z, x_i)$, where θ is the parameter vector, z is the observed instrumental data series and x_i represents the unobserved missing value. If the agency's decision is to use additional (official or unofficial) variables external to the original time series x_t ($t \neq i$) to impute a missing value, the stability of the statistical model relating the variable to be estimated with the external variable needs to be checked.

If the relationship is stable and the additional information is reliable, there is no objective basis in differentiating for a point estimate between official or non-official sources. Obviously, the estimated data needs to be flagged as an estimate, but for such a point estimate, there is no need to disclose the full estimation procedure.¹¹ A foot-note such as "Preliminary estimate elaborated by the secretariat on the basis of official and non-official sources would be enough. Obviously, the estimation procedure needs to be documented internally, in order to replicate it when necessary or provide the detailed information if required by a user. "

If the statistician decides to use an external variable because of suspected breaks in tendencies, or because she suspects the missing value is not due to random factor (see Box 2), the process is technically the same as (i), but the predictive error on the estimate is certainly higher, as the previous relationship observed in the past between the official and non-official time series may have been broken by the structural break. From a subjective standpoint, it is therefore important for the international statistician to understand why the official information is missing, and if it is an unexpected occurrence, act with caution.

This said, imputing on the basis of non-official data is the least-worst solution. It is sometimes heard in official circles that no data is better than international estimates, and that agencies should let the users generate their own inferences. I do not share the opinion: this is at best too rigid a restriction imposed to international agencies in providing the public goods expected from them, at worst a allegation that the average user is better at statistics than the international statisticians. This said, particular precaution should be taken when publishing the data, and avoid presenting them "as if" they came from national official sources.

When the estimates are not generated only for internal analytical use only, but are also disseminated to the public, a series of "rules" could be identified:

- (a) when possible, present only regional aggregates, properly documented with metadata.
- (b) when national series including agency's have to be disseminated, dissociate as much as possible the agency's series from the original national data by (i) normalizing the various national series using a common base year for indexes and/or a common international currency; and/or (ii) presenting the national and agency's series with different names, in different and clearly identified areas.¹²

¹¹ There is no objection to provide the information to users, except that it can be impractical when the inference is based on complex procedures involving a mix of objective and subjective methods.

¹² For example, presenting the estimated series in an analytical addendum to the main statistical yearbook. This option is particularly suited for printed publications. Differentiating series in electronic format is more difficult

Box 2. Imputation and randomness

It might be useful to remember one of the necessary conditions for imputing missing values in statistics: that the value is unreported due to randomly distributed factor, and has not been left unknown for specific reasons that may be specific to the reporter or to the period. This randomness criteria is not always the case; in household surveys, for example, questions on income may return –for very different reasons– a higher probability of missing values for both the poorest and the richest deciles.

When the data is not yet available, a situation quite frequent in international statistics, it should therefore be assumed that the missing data follows the same data generation process than the rest of the series. In other words, that the probability that an occurrence $\{x_i\}$ from a sample x_n is missing is unrelated to the value of x_i . In this case, and in this case only, the analyst's model used to infer the unobserved data is an unbiased estimate of the missing records. This means, in particular, that the missing data is not an outlier, nor does it result from a new data generating process which would cause a structural break in the series.

This statistical consideration is also important from a non-technical perspective, when an international agency wishes to "nowcast" an official indicator – for example inflation or unemployment – in situations of macroeconomic instability due to domestic or global crisis. In this case, the unexpected delay in publishing the official data may be due to an out-of-range realisation. Here, the IOSBs can find themselves locked into a lose-lose situation: (i) if the agency uses standard imputation techniques, the "nowcast" may, for example, underestimate the (absolute) true value measured by government statisticians; at the contrary, (ii) if the agency infers more correctly the true value through including an experts' guesstimate, or a set of additional instrumental variables such as non-official sources, and publishes its "nowcast" before the official data become available, then it can expect its estimates to receive a lot of attention (and criticism) from media and national authorities; (iii) if the agency decides to avoid confrontation, and do not release its estimate, despite having trust in its statistical quality, then it fails to its mission of public services.

Proper documentation of the data with particular respect to the "Principles" should guide the international statistician in this situation

2. Systemic use of non-official data by International Organizations for generating and/or disseminating time series

Estimating missing data points to complete an official series is basically, as we saw, a technical and dissemination issue. A quite different case however is when an international agency either re-disseminates whole data sets generated by non-official sources, or constructs new variables on the basis of a mix of official and non-official data (or entirely on the basis of non-official data). Producing a synthetic indicator, even on the basis of official data, is a strategic decision which needs to be carefully weighted.

There is definitely a clear appetite for such indicators, which provide internationally comparable information on topics of interest to the specialised or to the general public. The best known indicator in international statistics is UNDP's human development index, other examples can be found in the field of

when users can do multiple selections across the various series available in the data base. The differentiation will rely only on the series name and the metadata.

trade facilitation and cost of doing business (World Bank) as well as international competitiveness, or other indexes measuring institutional governance and transparency. For *supra*-national organizations, comparing and ranking countries is almost by definition a controversial field which creates tensions with national authorities, irrespective of the statistical quality of their elaboration. In addition, the comparative indexes are often misinterpreted by the users and the media, creating additional issues.¹³

The decision-making process needs to take into consideration the value of the additional information brought by the new indicator vs. the objective and subjective costs of producing it, and this is proper to each agency. Including non-official information in the computation of the synthetic indicator will obviously add to the complexity of the decision making process. The marginal value brought by the new estimator depends fundamentally on what is already on the official table. It is probable that international organizations dedicated to macro-economics will be satisfied with the array of official statistics published by governments and may not find any interest in complementing them from additional sources. At the contrary, agencies dealing with wider societal issues (social, political, humanitarian, environmental, etc.) or, at the contrary, specific sectoral aspects (for example, international trade in services such as transport, finance and banking, or tourism), and looking for indicators reflecting the particular situation of specific population groups or economic actors, will be eager to opt for complementing government sources with non-government data.¹⁴

While this paper focuses basically on synthetic indicators, let's open a brief parenthesis on the specificities of processing or re-disseminating microdata sets. Because many of the data sets of interest to sectoral analysts are based on surveys, their proper international re-dissemination requires finding a balance between conflicting statistical and confidentiality criteria. As usual in official statistics, this requires a proper balance between objective and subjective criteria. Re-disseminating microdata should provide good statistics (unbiased estimates of minimum variance) for the analysts, while confidentiality calls for censoring the data sets or including enough noise to avoid inferential disclosure by advanced users. This subject is of increasing importance today, with the emerging interest in sharing and analysing microdata. It poses a series of complex statistical issues that lead to a set of equally complex solutions which would require a separate analysis.¹⁵ Parenthesis closed.

From a more general perspective, the decision-making process needs also to be based on the stability of the non-official data sets, both in the past and in the foreseeable future. Stability in the past refers directly to the quality of non-official data sets, in particular the use of consistent methodologies over time (similar samples, etc.). Methodological consistency in the past can be assessed by statistical techniques if and when the private series are related to a data-generating process which is also covered by official statistics or other benchmark data, after taking care of the possibility of spurious correlation.¹⁶ It is also recommended to look at the metadata provided by the private source, as an indicator of the seriousness of

¹³ Such indices usually reduce complex multidimensional variables into a single data point, normalized and scaled. The statistical challenge is to reduce complexity while losing as little information (variance) as possible, but the results, especially country ranking according to the new scale, can easily be misinterpreted. See for example, "Use and misuse of models and indicators", WTO Data Day, May 2009.

¹⁴ There are situations where IOSDs should definitely refrain from publishing non-official data, even of good quality, when they compete directly with official sources and are part of the public debate. For example, an alternative inflation or unemployment index. If the OI does not trust the official source, better not to publish anything, except "...", leaving the users to make their own judgement on the best option. This is one of the few cases when no data is better than bad data.

¹⁵ This optimal balance is a fascinating field for the statistician. See, for a recent example, Jerome P. Reiter: "Using Multiple Imputation to Integrate and Disseminate Confidential Microdata", *International Statistical Review* (2009) 77, 2, 179-195.

¹⁶ A rule of thumb for time series would be to ignore correlation in levels and prefer correlation in first differences as a first indicator. A full co-integration analysis would provide for a better statistical diagnostic.

its statistical production. Going for a statistical audit of the non-official institution is not necessary at that point, unless the agency wishes to establish a long-term relationship with the data provider, something which may be considered if the new indicator has a strategic importance for the agency (i.e., its future discontinuation would have a serious institutional cost).

Because the private data production is not supported by public funding, its sustainability in the future is also at risk. A rule of thumb would be to use established data sets, on the hypothesis that the stability in the past is an indicator of stability in the future. Using established data sets from recognised institutions (Chambers of Commerce, professional associations) or well established private providers (e.g. financial indicators like the Dow Jones) is also an indication of seriousness, if not of “quality”. Depending on the capacity of the agency to enter into technical assistance project, using data provided by non-official institutions should, most probably, be accompanied with a technical and capacity-building programme to develop at national level the required official statistics and/or promote a better coordination between the non-official sources of information (e.g., professional associations or established NGOs). As these parameters for decision-making are agency-dependent, this document is not the place for entering into more details.

Copyright issues have also to be taken into consideration. When the agency plans to re-disseminate “as such” or with only minor alterations, a series produced by a private provider, it is necessary to obtain a written authorization for doing so, even when the sources are fully documented.¹⁷ In the case of composite indicators where several private series enter as an input in the data generation process, the copyright issue is legally unclear. The accepted rule of thumb is that when the series is publicly disseminated at no charge, it can be recycled by other users as long as the sources are properly recognised. Here, legal aspects converge with good practices. If the series were obtained at a cost (if the information was not publicly available), then it is advisable to obtain the written authorization from the provider.¹⁸

Nevertheless, if the institution plans to produce this estimate for a long period, it is recommendable to enter into some kind of Memorandum of Understanding with the private providers in order to avoid any possible misunderstanding on copyrights and build common trust. Such memoranda would also foster a long-term relationship with the provider which would improve the transparency of the production process, and the probability of sustained quality in the data production itself. The option to enter into long-term arrangement with non official data providers is certainly a topic for careful discussion, and not all agencies would have the same attitude.

- These arrangements with non-official institutions are certainly more easily feasible between international agencies specialising into a specific subject and a recognised international institution federating relevant professional actors (for example, in the field of civil aviation and other international transportation, international chambers of industry, etc.).¹⁹ It is nevertheless important to make clear to the users that the agency's indicator is NOT based on national official statistics. This is particularly important

¹⁷ Even when the private data seem to be part of the "public domain", such as the Dow-Jones index, they remain covered by copyright conditions that should be closely analysed.

¹⁸ This is particularly true if (i) the synthetic series produced by the agency may compete for the same market niche with the initial private sources, and (ii) the initial data contained confidential information.

¹⁹ This said, there are some systemic considerations, specific to the nature of "official statistics", that needs to be factored-in. International statistics is an expression and an extension of the official statistical community. The relationship between international agencies, which are usually intergovernmental institutions, and national administrations is complex: on one hand, agencies are demand-driven "secretariats" that are supposed to provide services to these governments; on the other hand, they have a supra-national dimension which give them the mandate to adopt a more proactive attitude. Keeping the balance between both aspects is always a complex exercise, and international statistics is not an exception.

when the objective is complementing official aggregates with more detailed indicators (e.g., sub-national series of farm-gate prices based on information obtained from professional associations), or complementing annual values provided by NSOs with higher frequency data based on data provided by industrial organisations. As mentioned in the previous section, the series should be clearly identified and separated when disseminating both official and non official data, in order to avoid confusion.

- International agencies involved more directly with governments on development objectives in a specific region would prefer to restrict their long term arrangements to governmental agencies. There is a risk of antagonizing NSOs by relying, even partially, on non-official data, and it is an issue that must be carefully analyzed, especially for regional organizations. In most countries, NSOs have a mission of coordinating and developing the national statistical system, but in many developing countries, NSOs do not always have the resources needed to do their tasks. The role of the international agencies in developing national capacities should reinforce, as far as possible and practical, this coordinating role. Sidelining official statistics to use non-official sources runs the risk of being misunderstood by NSOs as "unfair" competition, or inference in their supposed "official" domain or monopoly.

Disseminating international statistics entirely or dominantly based on non-governmental sources runs the danger of creating a double standard which deviates from the national "Official Statistics" ones, with a series of risks: creating confusion with the users, frustration with the official providers when agencies favor non-official sources over their own production, weakening the defense of international standards in the production and dissemination of statistics, etc.

The risk of destabilizing international standards should never be minimized. The merits of implementing common and internationally acknowledged data standards and conventions are obvious and serve as an important aid to communication and understanding. On the other hand, the establishment of this common framework with uniform definitions and classifications, creates almost by nature the need to rely to non-official sources when more flexible and ad-hoc approaches are needed to spot and understand micro-changes, or simply disseminate up-dated information.

Agencies that are developing their own indicators based on non-official sources may separate these activities from their institutional statistics departments. Hosting the project in a research or substantive department has the advantage of lowering its institutional profile, maintaining therefore a clear separation between the domain of official statistics, and the domain of research. But the agency runs the risk of confining its statistical department in the most routine activity, while the operational and technical aspects move to other departments, together with the best statisticians. A middle-ground option could be to have the research and development activities functionally attached to the statistics department, albeit with a clear and separate mandate.

D. Concluding remarks

Imputing a missing data point with the help of additional information and deriving a new time series out of non-official sources belong to separate institutional perspectives. The different nature of the two types of imputation is not one of scale (estimating a data point vs. estimating an entire series), but a difference of policy (redisseminating existing official information vs. creating a data set proper to the agency). Disseminating such estimates to the general public requires also special attention.

When estimating a data point to fill a gap in an official time series, the concepts and definition of the series does not change, and respond – if the initial series were build according to best practices and the imputations are well documented – to the international standards. Deriving entire series or synthetic

indicators out of a mix of official and non-official sources, at the contrary, creates a new data set which is independent from the official national sources.

From a purely statistical perspective, the rule for decision-making in using point estimation could be the following: *if you would accept the un-official data for research purpose, you should use them for improving the coverage and opportunity of the data you disseminate to the public.* Exceptions to the rule refer to macroeconomic data of special political relevance, such as inflation or unemployment. The estimate should be clearly identified when disseminating the information. When many of such estimates are included in the series (typically, when the agency "nowcast" official data from various countries to provide updated information to their stakeholders), it is recommendable to clearly separate the updated series from the original ones, to avoid confusion between national sources and agencies' reconstructed data.

When it comes to deriving entire data sets, quality standards are more stringent than for punctual estimates of missing or un-reported data.. More emphasis should be put on the statistical capacity of the non-official provider of producing an output which is stable and sustainable in terms of quality. The derived indicators should also be clearly flagged as agencies estimates, albeit the risk of confusion with national data is usually lower when the synthetic indicator is associated with a supra-national dimension, the most common occurrence for international organizations.

In addition to these technical considerations, there is a second set of corporate issues. They are legalistic (copyright issues, for example) and strategic (cost-benefit, risk-rewards). In particular, relying on non-official sources, especially private sources, for an institutional product presents specific risks that should be analysed in terms of dependence and sustainability.

Finally, there is a third dimension which is systemic, and specific to the nature of "official statistics". Disseminating international statistics entirely or dominantly based on non-governmental sources runs the danger of creating a double standard which deviates from the national "Official Statistics" ones, with a series of risks: creating confusion amongst users, frustration with the official providers, weakening the defense of international standards in the production and dissemination of statistics, etc. Mixing official with non-official data is a complex exercise that should be undertaken with care.

On balance, nevertheless, there is a strong case, even from a non-statistical perspective, to incorporate non-official sources of data in the work of international statisticians. As was mentioned, institutional arrangements tend to alter only slowly, while modern economy is fluid: demand for relevant and timely statistics is expanding far more rapidly than the governments capacity to officially supply all the required information. Indeed, if international statisticians want to stay behind their mission of creating statistical value added and providing a relevant public good, using non-governmental sources remains an option to fill the information-gaps left by official statistics. Private providers, as well as other non-official sources, occupy a market niche because they respond to a need. When the information respond to the statistical criteria of quality, they should be exploited to fill the gaps left open by the official statisticians. This is particularly true for international agencies specializing in a specific subject, while institutions focusing on a specific region may wish to restrict their relation to governmental organisms.

Taking a longer term perspective, the issue may nevertheless emerge eventually for all agencies: In the era of Internet, bundling together existing governmental statistics and disseminating them is no more a function that justifies the cost of international statistical departments. International agencies will eventually have to slot into new fields, entering into new territories and cooperating with new partners. Indeed, some agencies are already present in this market. One of the best-known examples in the domain of trade and business facilitation is the "Doing business" database implemented by the World Bank. Aware of the statistical limitation of some of the non-official sources used to build the indicators, this

agency has taken special care to properly document the methodology and provide the users with an independent evaluation of its strength and weaknesses.²⁰

²⁰ <http://www.doingbusiness.org/>