LEGITIMACY, CONTROVERSIES AND TRANSLATION IN PUBLIC STATISTICS

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97ST0311

"Public statistics," or "official statistics," refer to the statistical information produced by government statistical agencies - census offices, statistical bureaus and similar institutions. They are of special interest to the sociologist of science because they are done in institutions which are, simultaneously, research centers - pertaining, therefore, to the scientific and technological values, perspectives and approaches typical to their fields of enquiry - and public, or official institutions, bound by the rules, values and constraints of the public service. Their products - figures related to income, national product, urbanization, employment, human fertility, and many others - are published in the press, used to support government policies and evaluate its outcomes, and can lead to legal and financial entitlements to specific groups. This plurality of roles, contexts and perspectives associated with public statistics is at the very origin of the field. Alain Desrosières, who has written extensively on the subject, shows how modern statistics emerged from at least two major traditions, one from Germany, another from England. The German tradition is essentially descriptive, taxonomic, and concerned with providing the government with the necessary information to run its state. The association between these two terms, "state" and "statistics," is not fortuitous. The birth of German statistics is thus summarized by Desrosières:

Elle propose au Prince ou au fonctionnaire responsable un cadre d'organisation de savoirs multiformes disponibles sur un État, c'est à-dire une nomenclature dotée d'une logique d'inspiration aristotélicienne. Cette forme a été codifiée, vers 1660, par Cornring (1606-1681). Elle a été transmise ensuite, tout au long du XVIIIe siècle, par l'université de Gottingen et son "école statistique", notamment par Achenwall (1719-1772), réputé comme le créateur du mot "statistique", puis par son successeur à la chaire de statistique, Schlözer (1935-1809). Celui-ci, auteur d'un "Traité de Statistique" traduit en français en 1804 par Donnant (ce qui fera connaître ce mode de pensée allemand dans la France du début du XIXe siècle) a été le premier de ce courant à recommander l'usage de chiffres précis plutôt que d'indications exprimés en termes littéraires, sans pour autant le faire beaucoup lui même. Une formule de Schlözer est significative de la tournure plutôt structuraliste et synchronique de la statistique allemande: "La statistique est de l'histoire immobile, l'histoire est de la statistique en marche" (Desrosières, 1993, p. 30).

Desrosières links the British tradition, known in the past as "political arithmetic," to the relatively smaller place of the State in that country, regarding other social groups and institutions. These groups and institutions needed precise indicators for specific goals, and developed methods for sampling and indirect estimations, bringing statistics close to mathematics. The English statisticians, he says,

"Ce ne sont pas des universitaires théoriciens qui édifient une description globale et logique de l'État en général, mais des gens d'origines diverses qui ont forgé des savoirs pratiques dans leurs activités y que les proposent au "gouvernement." [. . .] Ainsi s'esquisse un rôle social nouveau: l'expert à la compétence précise qui propose de techniques aux gouvernants, en essayant de les convaincre que, pour réaliser leurs desseins, ils doivent en passer par lui. Ils offrent un langage précisément articulé, alors que les statisticiens allemands, s'identifiant a l'État, proposent un langage général englobant. (p. 30).

This brief reference to the birth of statistics is enough to show the links that existed between statistical methods and approaches and the social conditions of their emergence. Like other fields of knowledge, public statistics had to get legitimized on the eyes of their sponsors, and for that it had to get established both as a reliable scientific discipline and as a practical endeavour. One of the more interesting insights of the sociology of science is that what is usually known and understood by "science" and "technology" are just segments of much larger networks of people, institutions, instruments, hardware and nature itself. A personal computer (one of the examples elaborated by Latour, 1987) links academic physicists and mathematicians, engineers,

hardware and software producers, patent offices, standards committees, marketing agencies, shops, technical assistant networks and users of all kinds; and it depends on the physical properties and availability of semiconductors and a wide array of raw materials. People at one end of the chain usually do not understand what others are doing at the other, which means that there is a constant work of translation going on between adjacent actors. Application producers have to understand the possibilities and limitations of operational systems, which depend on hardware, which depends on the physical properties of the materials that can be delivered by industry. In the other direction, users have to understand the language of programmers (who, in turn, strive to translate their devices in terms of natural languages), and vendors have to anticipate the needs of buyers. Once in place, these chains affect the way work is organized in offices and companies, influence the curricula of schools, and introduce changes in the labor market. These chains are never created linearly, either from top down (a conceptual theory leading to an experimental model, leading to a tested product, leading to further development and marketing, and so forth) or from bottom up (a consumer demand leading to a product, leading to research, leading to new concepts and theory). Innovation may take place in all links anytime, and dead ends and brilliant failures are common throughout (David, 1992; Latour, 1993; Gibbons and others, 1994) . At the end, to paraphrase Bruno Latour, it is not necessarily the best product, theory or technology that gets established; rather, it is the product, theory or technology that gets established that becomes the best, not only because it is the "winner," but because it will benefit from increasing investments from all parts concerned. One of the most striking features of modern society is the establishment of such networks, which is not necessarily a peaceful and harmless procedure, as witnessed by the expansion of western science and technology to the rest of the world. Nevertheless, once established, these networks lead to increasing benefits to all participants, forging alliances that seem to grow without limits and barriers.

A similar picture of networks, translations and alliances can be used to describe a well established statistical procedure carried on by a public statistical agency. Take the cost of living indexes, used almost everywhere to measure inflation, to set income policies and to evaluate the prospects of a given economy. For the economist, prices are linked to a series of concepts such as investment, consumption, saving patterns, exchange rates, productivity, interest rates. Several of these concepts are used by governments in their efforts to control and direct the economy, and for private actors to make decisions about investment, consumption and employment. Trade unions use cost of living indexes to set targets for their negotiations, and political parties use them to mount campaigns in favor or against governments. For the press, cost of living indexes can be a hot topic for their readers, particularly if they can be easily interpreted in terms of their private expectations and the image of the performance of public authorities.

Going in the opposite direction of the chain, the economist's concepts are translated by statisticians in a series of procedures to measure variations in the index. They include the identification of items and sectors that are to be monitored (consumption goods, durable goods, capital goods, services); their relative weight, based on consumption patterns of specific groups (workers, middle class, poorer segments); and their distribution in the geographic space. Samples of informers, regions and products are to be established, accepted limits of error are defined, and permanent mechanisms for data collection and processing are put in place. These two last tasks go beyond the realm of the statistician's work, and include other actors in the process. Data can be collected by specialized firms, temporary workers or permanent staff, which establish their own routines for getting into the field and bringing in the data. Information processing is handled by computer specialists that make decisions about the equipment to be used, the appropriated software and the timing for data processing and delivery.

Similar descriptions could be made about other types of indicators, such as employment, poverty levels, crop forecast, industrial production, international trade, migration patterns, population growth, national income and income distribution(1). To keep the analogy with the personal computer, all actors would have problems if they had to contend with different and incompatible products - IBM PCs, Macintosh and Amiga - or three different indexes of employment and inflation and two different values of per-capita income. Whenever a technological chain reaches the size of mass consumption markets, the tendency is for one product or industrial standard to prevail, while the others either disappear or find special niches of users and applications.

Sources of legitimation and credibility

This logic of standardization explains the uneasiness created whenever competing figures or information are presented to describe or quantify presumably identical "realities." International statistical institutions, such as the United Nations Statistical Commission, Eurostat and other regional bodies spend most of their efforts trying to establish standards to unify and make compatible data produced by different countries. National statistical agencies want to have their data accepted within their countries and in the international community, and react whenever competing figures or indicators are presented by other national institutions or international organizations. Newspapers complain and talk about "confusion" whenever different figures appear. Governments, of course, are not happy when the figures they use to set their targets and evaluate their achievements are placed against competing and diverging information. Conceptual and empirical standardization is always a very complicated, costly and uncertain process. The irony of it is that, at the end of the day, all parts involved are committed to the notion that they are talking about the same "reality" which was already there from the beginning, making it very hard to explain why it cost so much to get there.

One would expect from this confluence of interests that public statistics would naturally evolve toward unification along well established standards, leaving little space for controversies and disputes. This is not so simple, however, since, whenever a research agenda is defined and a sequence of procedures gets established, others are rejected, and stakeholders are displeased. The agenda of public statistical offices is set by a combination of government requests, social demands, concepts developed by economists, demographers and social scientists, and methodologies developed and tested by statisticians. International agencies, such as the United Nations Statistical Offices, the United Nations regional and specialized offices, Eurostat, the World Bank, the International Labor Organization and similar institutions play a very important role of setting the agenda, establishing standards for comparability and providing statistical offices throughout the world with technical training. In spite of this constant pressure toward standardization, a survey of current practices will probably show a wide range of variation in the way statistical offices respond to the demands of their different clients and professional communities(2).

There are many reasons for resisting standardization. On its simplest form, it is just a matter of who will get the resources or the contracts to do the job. If the figures produced by one institution are adopted by everybody, this institution will get the resources and support to continue its work, while others will wither away. But the consequences can be much wider, since, for instance, different estimations of income distribution could lead to different policies of investment and resource allocation from governments. The reasons why such conflicts do not linger forever are the same that explain why other social conflicts eventually get settled: on the long run, the collective gains of stabilized systems tend to be higher than the private benefits gained through protracted conflicts. Statistical concepts and technical devices play important roles in this process of stabilization of social interaction, a "moral role" which is not apparent from their deceptively simple technicalities(3)

As could be expected, statistical offices strive to keep their information stable, non-controversial and technically well grounded. One simple expedient is the use of figures. In modern society, if you can express yourself in numbers, your credibility increases (Porter, 1995). The trouble is when the numbers are unstable, or conflicting. Ivan Fellegi, Canada's Chief Statistician and a leading personality in the field, insists in a recent paper that "the core values of effective statistical systems are legitimacy and credibility" (Fellegi, 1996). Authoritarian governments can define what the official figures should be, but the question is whether anyone would believe them (one is reminded of the 99% of votes always obtained by official candidates in elections in the Soviet Union). Credibility, thus, is an essential component for the acceptance and adoption of uniform standards and procedures. But what are the origins of credibility, from where does it come?

A credible information is one that comes out from a credible institution, and may not be rigged in favor of a specific interest group or ideology (Fellegi refers, in the above mentioned paper, to "non-political objectivity"). Institutional credibility is very much a matter of political culture. Public institutions in Germany or France are supposed to be credible, while similar institutions in the United States(4) or Brazil can never take their credibility for granted.

Another source of credibility is technical and scientific. Information is accepted as credible if they are provided by people or institutions with a strong scientific and technical profile. This is a curious paradox, since empirical sciences are dominated by provisional, tentative, probabilistic and even contradictory findings and controversies, rather than by hard-rock logic, evidence and demonstration. Matters are made still more complicated by the fact that the production of public statistics is not limited to a single discipline, that of the statistician. Statistical offices are staffed by economists, social scientists, computer analysts, statisticians and mathematicians, each with their own professional culture, biases and preferences. Besides their differences in origin, these different professional groups keep ties with their professional communities, and disputes of turf and professional precedence are likely to occur. It helps if one could argue that one discipline is central, and responsible for keeping the coherence and integrity of the whole. The introduction of national accounts and the elaboration of input-output matrices in most statistical offices gave economists a preeminent role, appeared to offer a rationale for the whole system, and linked it to another important imagery, that of economic planning (Fourquet, 1980). As the strength of the planning imagery faded, this argument lost much of its strength, being replaced by the search of another disciplinary framework, that of statistics itself as a comprehensive and all encompassing discipline.

Another source of credibility is stability and consistency. Figures produced always according to the same procedures are easier to be accepted than figures that vary depending on shifting methodologies, concepts and procedures(5). Institutions organized to defend the interests of specific groups are less credible than those supposed to be independent, at least for other sectors of society. A research center financed by the tobacco industry will have difficulties gaining acceptance for their findings showing that secondary smoking is harmless. Research institutions associated with trade unions will have a hard time convincing others that their figures for unemployment and cost of living are the best. To gain credibility, they should try to disentangle themselves from their supporting sectors, and raise their scientific and technical credentials.

Other factors, related more specifically to the nature of the data, may influence the credibility of public statistics. Whenever the data affect specific interests (like the consumer prices indexes, when used to correct salaries or pensions for inflation, or population figures affecting the distribution of tax revenues, subsidies and electoral apportionments), they are likely to be challenged; if the affected sector is narrow, the challenge is probably less threatening than when it affects the whole society. One-of-a-kind surveys are more likely to be challenged than the results of permanent, on-going statistical practices; data on "hidden" or illegal practices, such as tax evasion, gambling and "informal" economic transactions are also prone to disbelief. Sometimes the mistrust goes to the informer, sometimes to the real independence of the statistical office, sometimes to its technical competence(6).

Given the plurality of actors and interests which participate or can be affected by the work of statistical offices, stable alliances supporting alliances have to be constructed to support this work. Michel Callon deals with this issue in very broad terms, suggesting the following scheme for the constitution of what he calls a "sociology of translation," but could be better called a "sociology of alliances" (Callon 1986, 196-233). The first step in his scheme is "problematization, or how to get indispensable." An essential element in this first stage is the "definition of obligatory passage points." If I want to develop a new survey on technological innovation, for instance, all interested parties should be convinced that, if they want to incorporate modern technology in their activities, they would have to get the proper data to measure and evaluate it, and my institution or research group is the best one for doing this work. The second step is "interessement," a very complicated and unpredictable process of convincing all potential actors that they have a common interest, to be fostered in this specific way. To use Callon's words, "for all groups involved, the interessement helps to corner the entities to be enrolled. In addition, it attempts to interrupt all potential competing associations and to construct a system of alliances. Social structures comprising both social and natural entities are shaped and consolidated." (Callon, 1986, p. 211). The third step is "enrolment," how to get all actors to behave in compatible ways. In our example, I must convince the companies to respond to the questionnaires, to convince the government to provide de necessary resources, and the policy makers to consider this information in their future investment decisions. The fourth step is "the mobilization of allies." All actors must agree that the research institute is their spokesman, that the data produced expresses the common realities and interests of all parts involved.

A case study: Brazil's IBGE.

The Brazilian Institute for Geography and Statistics - IBGE - was created in the 1930s as one element in an ambitious attempt to organize a modern and authoritarian state which could know and rule upon a vast and unknown territory and a scattered population. The ideologies of the time assumed that the central government should draw its strength from the country's grassroots, the municipalities, bypassing the traditional state oligarchies. At the beginning, the goal was to coordinate the statistical work carried on by the municipalities throughout the country, and the German inspiration was explicitly acknowledged by its founder, José Bulhões de Carvalho. A National Council of Statistics (Conselho Nacional de Estatística) was formally established in 1936, followed by a National Council of Geography (Conselho Nacional de Geografia) in 1937. In 1942, as Brazil joined the Allies in World War II, a very tight system of economic and administrative centralization was established under U. S. inspiration, and the statistical and geographical institutions followed suit - the local statistical and geographical entities were abolished, and absorbed into a national bureaucracy which remained for the decades to come(7).

Geography was probably more important, in the early years, than statistics itself, for the fulfillment of this task. The more direct influence came from French geographers, which had also a strong presence in the establishment of Brazil's first universities at the time, but again, the geopolitical thinking derived from German authors was strong. The introductory volume of the 1940 census, the first done by the Institute, was a lengthy and ambitious book called The Brazilian Culture, written by Fernando de Azevedo, a sociologist of education which was influential in the creation of the Universidade de São Paulo, and who edited, some years later, the first comprehensive survey of Brazil's scientific institutions and groups (Azevedo, 1971 and 1955). It was the geographer's task to depict the land, define its borders and identify the available resources for the construction of a powerful nation state; it was the task of the sociologist and educator to identify the cultural elements that were turning the country into a modern, Western-type society.

In the sixties and seventies economics took precedence over geography. The Institute was placed under a new Ministry of Planning, which included also the National Research Council and the National Development Bank, and its main task was redefined as to be the provider of basic information for the country's economic development plans (Fishlow) no date, . Besides the usual demographic information and mapping, the institute became responsible for organizing the national accounts, and its centerpiece was to be an ambitious input-output matrix allowing for the identification of bottlenecks and evaluation of the potential impact of investments in energy, transportation, steel production, petrochemicals and other inputs in the country's economic fabric. France, again, may have provided the intellectual and organizational model - not the geographers any longer, but the economists at INSEE, perhaps in combination with technical assistance coming from the United Nations (and particularly the Latin American Statistical Commission - ECLAC). A whole new generation of economists was recruited and charged with redrawing the Institute's research strategy, under the assumption that all information should fit together in a comprehensive economic model.

Writing in 1972, IBGE' s President Isaac Kerstenetzky presented his view of how the country's planning system had to be organized, and the role the statistical office was supposed to play in this grand scheme (Kerstenetzky, 1972):

The policy theory implicit in the synoptic, or decisional model, follows a sequence which is the inverse of the one used by conventional economic analysis. First, we identify some goals we consider desirable; second, we look for what should be done in order to manipulate the instruments we have at our disposal to reach our goals (8).

And later:

The set of activities in the field of statistics and socioeconomic research would bring together and organize data and carry on studies needed to construct models with the more salient aspects of the country's socioeconomic structure. These models would allow for the identification of alternative development paths. The political sector, based on an evaluation of the main social objectives, would establish a plan according to the chosen path (underlines in the original)(9).

The association between geography, statistics and economic planning was not difficult to justify, at least in principle(10): planning was not to be done by simple manipulation of macroeconomic variables, but by direct intervention in the country's physical and economic landscape. Less easy was to link this whole project with the awareness that Brazil's modernization project was leaving a large part of its population at its margins, and was affecting society in unpredictable ways. Neither geography nor economics provided good answers to these questions, and a group of social anthropologists was brought in to develop a system of social indicators which would, hopefully, be integrated with the global model for economic planning, rendering it more humanitarian and socially aware(11).

In practice, the Brazilian economy was never run through the Ministry of Planning(12), and it is doubtful that the data produced by the Statistical Office were ever used systematically by governments for their long range planning, except in very general terms. But the planning imagery had deep consequences for the internal organization of the office. Now each research line could be said to have a definite place in a coherent picture, and could not be easily challenged or changed. As long as the planning imagery retained its appeal, the office's legitimacy would remain intact. When, years later, the office went through a difficult period of lack of resources and loss of prestige, the usual interpretation for the crisis among its technicians was that it was a consequence of the governments' loss of its planning capabilities. Today, the office's organization and research agenda is still very much that of those times, and it is difficult to reconcile it with the current skepticism about government planning and comprehensive modeling.

Statistics itself however, as a discipline, does not seem to have ever been a central intellectual component of the Institute's technical and professional make up(13). In an attempt to follow the French tradition of government controlled "grandes écoles," the Brazilian census office created its own National School of Statistical Sciences (ENCE), which was supposed to become its main source for professional recruitment. Although the school still exists, it never fulfilled this role, for several reasons. The Institute never succeeded in assuring employment to ENCE's graduates(14); as an isolated establishment, it was not able to keep abreast with the scientific and intellectual developments in the field, and lost place to other courses and degree programs in universities; and, above all, statisticians did not seem to have the knowledge and skills associated with the prevailing planning imagery.

It would be interesting to examine how far this Brazilian experience was unique, or similar to what happened in other countries. As other subject matters enter the agenda of statistical offices - issues like employment, education, health, agriculture, environment conditions, social and political participation, race, language, social discrimination - the professional profile of statisticians also changes. Other professional identities - that of the economists, of course, but also sociologists, educators, environment and health specialists - may be stronger in many statistical agencies than that of the statistician. This proposition should be verified empirically, since users of data are not necessarily trained and interested in the chores of data gathering, processing and validation, which are typical of the daily work of statistical agencies. But, if true, it would be related to the fact that statistics today, as an academic subject, is essentially a specialized branch of mathematics, while statistical skills are an increasing component of the education in all social and economically related fields, and greatly simplified by ready-made software. In many countries, these separate specialties are associated with the multiplication of statistical institutions - the United States is probably the extreme, but not the only case. When statistical offices are unified - as in Brazil or Mexico, which include also geography under their umbrella - the consequence may be the development of internally differentiated technical cultures, more related to each academic field outside than with the other sectors within the institution.

To this fragmentation of academic disciplines one should add the widespread tendency of research centers and institutions to become much more pragmatic and goal-oriented than in the past. There is growing skepticism

about comprehensive systems of social analysis and interpretation, which are associated with the demise of comprehensive planning as a tool of government policy; and the expansion of applied, goal-oriented and product-oriented research. An important element of this change is the breaking down of disciplinary barriers and the development of all kinds of interdisciplinary and interinstitutional cooperation and networking in all knowledge fields (Gibbons and others, 1994). These trends are related, in turn, to the growing pressures upon universities and research institutes to link more closely with industry and to relate to many other social groups besides the conventional students - to leave the ivory tower and to respond more pragmatically to short-term demands. For the statistical offices, this trend suggests a pressure to move from comprehensive statistics to service-oriented work, not only in terms of how data is to be distributed and disseminated, but even in terms of what data should be collected and processed.

Translations and controversies

We have argued that there is a tendency in the field of public statistics to look for unified and consistent figures and concepts which would be accepted by a wide range of actors, including social scientists of different disciplines, professional statisticians, bureaucrats in statistical offices, governments, legislators, interest groups, the press, political parties and international organizations. For each actor, the advantage of unified concepts and figures is that they can always argue that they are not just defending their own interest, but are relying on "objective" and "scientific" data that are beyond dispute. At the same time, they would prefer to get the figures and concepts that are more convenient for their particular interests and professional cultures. In other words, the tendency toward unification is not without its tensions, since what is at stake is who, or what, will set the standards and control the process of data production and evaluation. Our further contention is that these tensions find their outlets and feeding grounds in the fissures and inconsistencies that take place in the translation process between different actors and milieux. Michel Callon deals with the question of translation in the sense of transformation, of turning the actors into something else. "To translate is to displace". "Translation is the mechanism by which the social and natural wolds progressively take form. The result is a situation in which certain entities control others" (Callon, p. 223-224). I use the term here in a more conventional sense, also adopted by Glifford Geertz (1983): to translate is to be able to communicate, however imperfectly, among cultures and languages that remain different. What is natural and proper in the academy may be questionable and problematic in other contexts(15). Once published, public statistics gain a life on their own, which is usually not fully compatible with the way they are constructed. Sometimes they are translated into legally binding decisions; sometimes they are taken by the press, and translated to the general pubic in simplified terms. Sometimes they are taken by political parties and non-government organizations, which use them to justify their actions. Whenever concepts and expectations from one sector are used to evaluate what takes place in the other, tensions and misunderstandings are likely to occur. Still, since there is a tendency for each sector to look for its legitimation elsewhere, keeping them apart is impossible. The examples below, taken from the Brazilian experience of the last several years, illustrate that.

Translation I - from empirical research to legal entitlements

In Brazil salaries, rents and other prices have often been pegged to cost of living indexes, which cannot be defined in probabilistic terms. The way it is done, the president of the statistical office signs an official act each month announcing what the official inflation figure is. What differentiates this act from an arbitrary decree is the assumption that this figure was obtained through valid scientific procedures, open to anyone to inspect and replicate. The practice is complicated. Although the general statistical procedures, weights and sampling techniques are public, details are kept confidential to protect the privacy of informers, and to protect

the index from actual or presumed manipulation from outside, including the government itself. Statistical errors are usually not published, and the systems of data collection and processing, including the weights attributed to the different items in the consumers' basket, are kept stable for long periods. This situation is further complicated by the existence of several inflation indexes produced by different institutions and yielding slightly different results. These differences are not difficult to explain on technical grounds, but, particularly in times of high inflation, they are almost impossible to explain to the public. For the specialist, prices clearly do not rise and fall at the same time in the whole economy, and the existence of different institutions producing independent estimates of similar data can be seen as a positive trait of an open and democratic society. Government, however, needs just one figure to establish its policy, and can come under suspicion if he can choose, among several indicators, the one that suits him best.

Another example is related to population estimates. Yearly population figures provided by the statistical office are used to distribute part of the federal tax resources among municipalities (the so-called "Fundo de Partipação dos Municípios"). Because of this legislation, the number of municipalities in Brazil increased about 50% in a few years, reaching a figure close to six thousand, and in each case the statistical office was asked to inform the population and the boundaries of the new jurisdiction. The reliability of the figures provided, however, depends on the quality of the previous population census (the last one in Brazil was in 1991) and on assumptions on migration patterns, fecundity and mortality rates derived from different studies. Statistical errors are unavoidable, and are likely to get bigger the smaller is the population group to which the projections refer. Besides, one of the main findings of Brazil's 1991 census was a dramatic reduction on fecundity rates in the previous decade, leading to a much smaller population, and lower projections for the 1990s, than was generally expected. Thousands of complaints and requests from municipalities for revision of population estimates flooded the statistical office. The Federal Accounting Office (Tribunal de Contas da União) decided to keep using the population estimates of the 1980's instead of those based on the 1991 census for the distribution of resources. In 1996 the statistical office obtained government support to do a mid-decade population enumeration to adjust the country's population estimates. The population specialists at the Institute believed that this was necessary on technical grounds, and the budgetary request got ample support in Congress, largely because of the municipalities' complaints. There is no assurance, however, that the new population estimates would be any more favorable to the municipalities than before.

Other examples could be taken from the institute's cartographic and geographic activities. Boundaries between countries, states and municipalities depend on detailed and precise maps, but, before that, on legally binding decisions, based on agreements, negotiations, litigation and even warfare. If a conflict cannot be decided by force or negotiation, would it not be possible to get a "technical" solution to the problem, coming from the country's geographical institute? If one knew how to divide the open seas between the states of Paraná and Santa Catarina, facing each other in the Atlantic, one would know how much each should get in royalties from the oil being produced by Brazil's oil company, Pretrobrás, in this area. Since there is no single technical solution to the problem (straight lines can be drawn based on different kinds of assumptions about an irregular shoreline), the Institute is under constant accusation from one part of being partial to the other, while it is impossible for the parts to get a binding decision from the Supreme Court.

The pattern in all these examples is similar. There are interests in conflict, and the statistical office is required to provide a technical solution. It is a request for arbitration, which is usually better for all parts involved than a protracted conflict. But arbiters are bound to decide in favor of one of the litigants, and therefore may have its authority challenged by the loser. To play this role, the arbiter has to convince the litigants that his moral, legal and technical virtues are beyond doubt and criticism. There is a constant process of translation going on - conflicts of interest being translated into technical questions, and technical and scientific processes being translated into legally binding decisions. As in any translation, communication between different languages and cultures is possible, but something is also lost in the process.

Translation II - from social concerns to statistical research

Professional sociologists and economists would expect that concepts, categorizations and procedures used in their research would come from social and economic theories in their fields. In practice, society places demands on the statistical office which are not only not derived from existing theoretical and conceptual models, but are often extremely difficult to conceptualize and measure in technically acceptable ways. Three outstanding examples are race, poverty and employment.

Should Brazilian statistics include figures on race? Brazil is a multiracial country (native Indians, Portuguese and Dutch colonizers, black African slaves, German, Italian, Central European, Jewish. Arab and Japanese immigrants in this century) with a large mixed-blood population. Racial discrimination is a criminal offence, but there is evidence that race (or color of the skin) is strongly related with all indicators of social mobility and well being. Social discrimination, even if not explicit, is common. Differently from the United States, however, the dividing line between whites and blacks is blurred. In the United States one are "black" if one of his parents (or even grand parents) is black; in Brazil different shades of blackness bring different social definitions, and it is very easy to "pass" from one race to another if one can associate a fair skin with some education and a reasonable income. The prevailing interpretation is that Brazil does not have a "racial question," but a large social question, and a high correlation between poverty and the color of the skin, explained by the fairly recent history of black slavery. For some time, race was kept outside the census and the official statistics. First, because it would be impossible to have an "objective" racial classification for the population, given the high levels of miscegenation; and second, because the collection of figures on race could lead to the development of race cleavages that did not exist.

When the question about race was finally introduced in the 1980 census questionnaire, it was phrased in terms of "color of the skin," and the answers were classified into back (preto), white (branco), brown (pardo) and yellow (amarelo), the last one combining Japanese and Chinese descendants with Indian natives(16). Since it was a self-classification, it could only be interpreted culturally. The data confirmed that race or color of the skin had an independent effect on social conditions, but did not challenge the dominant view that race (or color) was not a criterion to be used for social policy. More recently, however, there has been a demand from black militant groups to introduce policies of affirmative action similar to those adopted in the United States, a demand associated with the request to introduce race questions in all kinds of pubic documents, including the public registry for birth, marriage and deaths. The expectation is that, through these means, a racial classification will be introduced in Brazilian society, creating entitlements for social and economic benefits. The argument is that this classification already exists, and is just not well portrayed by existing statistics; the opposite view is that the collection of these data would sharpen and shift the current social issues to other arenas, converting the current shifting racial self-classifications into sharply defined categories. On the long run, people may freeze their identities according to officially defined classification, race identification may be required in identity cards and even in arm bands, and sharp and scary race cleavages, which do not exist today, may materialize, in a rather scary self-fulfilling prophecy.

Poverty and employment, or unemployment, are similar concepts in popular perception, but very different issues both from historical and from the official statistics' point of view. Desrosières links the first statistical studies on poverty with 19th century England, and the emergence of unemployment statistics with the New Deal in the United States almost a century later (Desrosières, 1993) Poverty has been a constant presence in man's history, but its meaning has changed through time (Castel, 1995). Most people in traditional societies were poor, and this was accepted as natural and unavoidable. Pauperism becomes an issue when the poor are displaced from their usual environment and life patterns and move out of their regions looking for food, shelter or work. Poverty was a constant source of concern and debate in England since the inception of the Industrial Revolution, most of the discussion being on whether the poor should be treated as victims, and therefore entitled to protection and support, or morally inept, to be left to their own fate. The second view was to prevail, not only among hard-core liberal economists, but for Marx himself, with his well-known contempt for the lumpenproletariat. Poverty became a moral issue, a question of character and good will, not something related to the way society was organized.

If you did not work, but wanted to, you were not poor, but unemployed. Economic fluctuations created unemployment, and the 1929 crisis produced millions of unemployed in the United States and Europe. Different from poverty, unemployment was understood to be a cyclical by-product of modern industrial

economy, and mechanisms had to be devised to reduce it, or compensate for its consequences. Everybody, in principle, should have a stable work, and action was needed when it did not happen. Anti-cyclic policies, on one hand, and unemployment compensation, on the other, were landmarks of the post 1929, Welfare State capitalism. Unemployment had to be measured, and proper statistics were needed, but it should not be confounded with poverty. To be unemployed was an attribute of industrial workers, not of people outside the productive system - housewives, old people, beggars, the lumpenproletariat. The current standard statistical definition of unemployment, adopted and implemented by the International Labor Organization, measures precisely that. Unemployed are those who are without jobs, but are actively looking for one, or living from unemployment benefits. If you are not looking for a job, if you live from welfare, if you live from handouts from your family, if you beg in the streets, you are not unemployed, but simply outside the economically active population. Unemployment statistics became an excellent instrument for measuring the short-term fluctuations of economic activity, and the widespread use of similar methodologies allowed for meaningful international comparisons.

The assumption that everybody should have a stable job, however, is being questioned in industrialized countries, and never really existed in developing and underdeveloped societies. The concern that economic development was leaving large segments of the population at its margins led to the emergence of marginality, first (Germani, 1973), and poverty, more recently, as objects of social research and, gradually, to the establishment of regular statistical procedures in statistical offices. Statistics on poverty and on unemployment developed independently, and today in Brazil they are subject of two, quite separate controversies.

The unemployment controversy is centered on the existence of two regular, independent unemployment surveys in Brazil. One, PME (Pesquisa Mensal de Emprego), is done by IBGE, and the other, PED (Pesquisa de Emprego e Desemprego), is carried on by the statistics office of the State of São Paulo, Fundação SEADE, in association with a research center maintained by the trade unions, DIEESE. The most evident aspect of the controversy is that PED figures are consistently higher than those of PME. Part of the difference is well explained on technical grounds: PME is centered on the concept of "open unemployment," while PED includes also "hidden unemployment." But even when this difference is eliminated in the analysis and comparisons are made for the same period of reference, there are still discrepancies, which may be attributed to the sequence in which the questions are presented to the respondent during field work, duration of the interviews and other technicalities. The technical differences between the two surveys do not seem unsurmountable, although this statement in itself may be controversial. Besides the final single figures, both surveys measure different types of unemployment (those looking for jobs in the last week, or in the last month, for instance). Both include information on the quality of the jobs held, distinguishing among stable employment (which in Brazil requires a formal contract and the payment of several taxes on social security) and different types of precarious work.

The Brazilian Ministry of Labor, which provides funds for the SEADE-DIEESE survey, established an expert group to analyze and try to reconcile the two surveys, with the expectation that a methodological unification could lead to economies of scale and an extension of the unemployment surveys to other parts of the country. The reason why a technical solution is not readily worked out to reconcile the two surveys is that there are many other layers in this controversy besides the technical one. Part of the discussion is precisely on whether the differences between the two surveys are just technical or have an underlying ideological or political content. The arena for the controversy changes completely if one accepts one or the other interpretation; or, conversely, one may wish to displace the controversy to the arena where one feels stronger. The fact that one survey is carried on by the Federal Government and the other by an institution linked to the trade unions may be used on both sides as an argument for the political hypothesis. And a unified methodology would lead to questions about who will receive or stop receiving resources for doing the survey, processing the information and publishing the results.

The controversy on poverty hinges around the question of how many paupers and indigents there are in Brazil: the figures may vary from eight to 64 million, for a total population of 157 million. A similar controversy exists about the number of destitute children living in the countries streets, with figures varying from a few thousand to several million. Contrary to the unemployment controversy, all data used on the poverty controversy comes from a single source, IBGE.

This issue has an obvious public opinion appeal, and figures on absolute numbers of paupers, indigents and destitute children are eagerly sought after by the Brazilian national and international press. Marginality and poverty are morally charged issues, raised by religious groups, charitable foundations and, more recently, non-governmental and mission-oriented international organizations, which build their reputation on the strength of their condemnation of social ills. High poverty figures mean an overall condemnation of the society that produces them, and from this perspective the issues of employment and unemployment are minor or irrelevant. From another point of view, however, it would seem obvious that meaningful social policies of poverty alleviation would require detailed and well-differentiated information on the needs and conditions of specific groups, for which specific policies could be devised.

The translation of the poverty issue into internationally comparable statistical procedures, required by international agencies that have raised the social questions to the top of their agenda, has led to an almost impossible quest for an objective definition of absolute poverty (United Nations, 996; The World Bank, 1993; Rocha, 1992; Barros and others, 1994). Declared income in a national survey or census is obviously inadequate, not only because of under-reporting, but because of unsurmountable problems of exchange rates and the different weights of non-monetary earnings in different regions and cultures. Nutrition and health conditions of the population are possible alternatives, but systematic information on these issues is difficult to get, and there are no consensual definitions of their meaning except for extreme conditions. Another possibility is to try to define a minimum basket of products considered essential for survival, and to use the access to this basket as the dividing line. Shifting consumption habits, shifting availability of staple products and, for international comparisons, fluctuating exchange rates makes these evaluations extremely unreliable and unstable.

These difficulties do not mean, of course, that the issues of poverty should be left aside. It is possible, and necessary, to measure and compare indicators of social inequality, and to develop instruments to evaluate how different population groups are facing the problems of social deprivation, and the policy alternatives that could be devised to support them. Overall figures mean very little, because they vary widely depending on shifting assumptions, and in any case encompass many different situations and social conditions. From the public opinion perspective, however, as reflected in the printed press and militant groups involved on the poverty issues, different figures are unacceptable demonstration of statistical confusion," lack of clarity or technocratic obfuscation.

Conclusion: the sociology of science and the future of public statistics

Sociology of science can do for public statistics the same service it can provide for science and technology in general: to show how knowledge production is organized in a particular field, the different actors that take part in their production, the complex translations, shifts of meaning, interpretation and responsibilities that take place, and the shifting alliances and conflicts that accompany this whole process. It is not its purpose of this article to take side in controversies, to take a stand for or against science," but to make explicit what is often implicit and not said, and, in this process, allow for a work that is useful and necessary, but should not be mystified. It may be a self defeating task. Whenever one makes translations and shifts responsibility from the political, legal and public opinion to the technical sphere, one starts to reveal the uncertainties that exist also in the technical area. The first and typical reaction of the statistical office to this invasion of its technical realm is to stiffen its stand: "this is the correct figure, we do it scientifically, we are legally empowered to do it, we stand by our reputation and tradition, our technical procedures are too complex (or confidential) for you to see and understand." This reaction may limit the office's ability to improve its methodology and remain open for criticism, innovations and new approaches; but it can be successful

on the short run, since it reduces ambiguity. The opposite reaction is to be more candid, to recognize the limitations and implicit choices present in all kinds of statistical and cartographic procedures, and to insist that it is impossible to provide technical solutions to conflicts of interest which cannot be accommodated. This kind of reaction is more in tune with the ethos of academic research and the usual patterns of intellectual honesty, but runs the risk of not being well received, and may be translated, simply, in the idea that the institute lacks competence to provide proper and unquestionable information on economic realities and social needs(17).

There is no coming back, however, from the second alternative. The dividing lines between producers and users of knowledge are breaking up almost everywhere, not in the sense that science is becoming accessible to everybody (which it is not), but in two other important senses. First, producers of knowledge are being evaluated more closely by the worthiness of the products they provide, and have to strive to get their products at the consumers hands. It is not enough to produce complex statistics to be published in lengthy volumes full of tables or interpreted in esoteric journals; it is necessary for the knowledge producers to travel through the whole chain of translations from data production to product dissemination, making sure that the translations are reliable and credible. Second, thanks in large part to the new computational and information facilities available to the informed user, he is much more able to revise and reorganize the information he receives for his personal use than in the past. To respond to this demand, the statistical offices must be able to travel also in the opposite direction in the translation process, from products to production, making more open and explicit the technical and methodological choices that are part of the daily life of any research institution. Combined, these two tendencies can make the life of the public statistics institutions more difficult than in the past, but perhaps also more challenging and interesting.

NOTAS

1. A very interesting analysis of the development of professional classifications in the French, German, British and American statistical offices can be found in Desrosières, 1990.
2. There is a growing literature on the development of contemporary statistical practices, but little, it seems, in terms of systematic comparisons among countries. Extensive bibliographic references on early and contemporary historical developments are given by Alain Desrosières in his publications. For a flavor, see Bulmer, Bales, and Kish Sklar, 1991; Fourquet, 1980; INSEE, 1977 and 1987; Wagner, Wittrock and Whitley, 1991.

3. This observation comes from "Le fardeau moral d'un porte-clefs", in Latour, 1993b, 47-55,, and other related texts in that volume.
4. This article is followed by comments by Katherine K. Wallman, Chief Statistician, U. S. Office of Management and Budget, an others. It is clear, from Mrs. Wallman's comments, that the statistical institutions in the United States do not enjoy the same degree of legitimacy as their Canadian counterpart.
5. There is an obvious parallel here with two of Max Weber's sources of political legitimacy, rationality and tradition. One could speculate about the possible role of the third one, charisma, in this context.

6. "All this adds to the following: credibility ceteris paribus is a function of the degree of threat (acute or diffuse, widespread or narrowly focused); the element of surprise (notable in one-off surveys); the gossip value of the statistic; and whether its publication takes place in a rapidly changing environment. These elements are not exhaustive but indicative of the kind of analysis that the public reaction to the activities of a public agency requires" (Jacob Ryten, personal communication).

7. Penha, 1993.See the bibliographical references for sources on IBGE's history, available at the Institute's library in Rio de Janeiro.
8. "A teoria da política, contida nos modelos de tipo sinótico ou de decisão, apresenta (...) uma seqüência inversa à da análise econômica convencional. (...) Identificamos, em primeiro lugar, alguns objetivos que consideramos desejáveis e indagamos, em seguida, o que deve ser feito de modo a manipular os vários meios (instrumentos) à nossa disposição no sentido de alcançar os objetivos desejados"

9. "O conjunto de atividades da área de estatística e pesquisa sócio-econômica reuniria e sistematizaria dados e realizaria estudos capazes de permitir a construção de modelos com os aspectos mais salientes da estrutura sócio-econômica do país. Estes modelos permitiriam a identificação de trajetórias alternativas de desenvolvimento. A esfera política, em função da avaliação dos grandes objetivos sociais, estabeleceria um plano de ação segundo a trajetória escolhida".

10. In practice, there were problems, sometimes severe, as in the early fifties, when the whole statistical system organized by Teixeira de Freitas came under threat by a newly designated Institute' s president, a military man associated with the field of cartography (Freitas, 1952).
11. In recent years there has been an effort to include environment issues in this grand scheme. The idea, put forward by international organizations and already being tried in several countries, is to develop national systems of "environment accounts", which could be linked with the national accounts, hopefully, with associated measurements of "human welfare", or human development.

12. Still today, the Ministry of Planning is responsible for the budgetary process, investments and long term, general planning, while the Ministry of Economics, through the Central Bank, handles the main economic variables, such as the exchange and interest rates and the control of government expenditures.
13. The Italian statistician Giorgio Mortara provided, for many years, the Institute's main intellectual and professional orientation in statistical matters (Mortara, 1985).

14. In the Brazilian civil service, only the military and the Foreign Service can guarantee employment for students of their educational institutions.
15. René Padieu provides the following list of contrasts between legal and statistical concepts from his experience at INSEE, showing how the issue is general: legal status of business companies versus economic nature or organizational feature; officially married versus concubines; fiscal rules for stocks evaluation and equipment devaluation versus economic `fix capital consumption`, toll and tariff classifications versus technical or economical ones; town administrative border versus agglomeration limit, etc (René Pardieu, personal communication). Peter Wagner has suggested a more systematic distinction between the two kinds of languages, the statistical and the legal ones: In the first case, statistics is, so to say, on the soft side, collecting data from the diffuse social reality, and it is another social 'language', the one of law, which makes them 'hard', creates real boundaries where there have been 'only' statistical classifications. In the second case, in contrast, the move is from the 'soft' observation of social problems towards statistics as a 'hardener', a tool to get a grip on something fixed and identifiable. If you agree with this observation, it might be useful to reverse the order: to go from, first, the desire to 'hold things together' which turns to statistics as a methodology, to (which in some cases may really be a second policy step) the case where statistical classifications are translated into rights and obligations. And one could try to think of examples where the process is reversed (or threatens to be reversed): When legal entitlements are abolished, figures lose their meaning and the social world returns to diffuseness. (Peter Wagner, personal communication)..

16. This classification should be compared with the usual classification adopted in the United States between "White Anglo-Saxons", "Black", "American Indians" and "Spanish".
17. René Padieu provides the following list of contrasts between legal and statistical concepts from his experience at INSEE, showing how the issue is general: legal status of business companies versus economic nature or organizational feature; officially married versus concubines ; fiscal rules for stocks evaluation and equipment devaluation versus economic `fix capital consumption`, toll and tariff classifications versus technical or economical ones; town administrative border versus agglomeration limit, etc (René Pardieu, personal communication). Peter Wagner has suggested a more systematic distinction between the two kinds of languages, the statistical and the legal ones: In the first case, statistics is, so to say, on the soft side, collecting data from the diffuse social reality, and it is another social 'language', the one of law, which makes

them 'hard', creates real boundaries where there have been 'only' statistical classifications. In the second case, in contrast, the move is from the 'soft' observation of social problems towards statistics as a 'hardener', a tool to get a grip on something fixed and identifiable. If you agree with this observation, it might be useful to reverse the order: to go from, first, the desire to 'hold things together' which turns to statistics as a methodology, to (which in some cases may really be a second policy step) the case where statistical classifications are translated into rights and obligations. And one could try to think of examples where the process is reversed (or threatens to be reversed): When legal entitlements are abolished, figures lose their meaning and the social world returns to diffuseness. (Peter Wagner, personal communication).

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Paper presented to joint meeting of the Society for the Social Studies of Science and the European Association for the Study of Science and Technology, Bielefeld, Germany, October 1013, 1996, session on "The Sociology of Public Statistics", organized by the Research Committee on the Sociology of Science and Technology of the International Sociological Association (revised version).

XXI Encontro Anual da ANPOCS