Emission data – a mission for statistics

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Check against delivery.

Ladies and Gentlemen,

It is both a pleasure and an honour for me to be here. This conference is very timely. On one hand, extreme weather events, such as the wildfires around Los Angeles currently in the news or the floods in Spain, underline the urgency of the topic of the conference. On the other hand, it seems that the relevance attributed to combatting climate change is about to be lessened among relevant international players, with a larger focus potentially being placed on economic competitiveness. I have just returned from a discussion among policy-makers and researchers in Washington D.C., where many of the exchanges touched on the economic outlook in a potentially more fragmented world economy. Therefore, anything that can help resolve the potential trade-off between fighting climate change and improving economic competitiveness will be helpful, and official statistics in Europe can play an essential role in that.

I would like to address this topic by discussing three main questions with you in the next few minutes: Why do central banks care about climate change and how do official statistics play into this? What are the challenges and opportunities with regards to official statistics on sustainability going forward? In this opening address I will highlight the issue, and then I will give you our Bundesbank perspective on the third question: How can the challenges be addressed? What do we as statistical agencies and central banks have to do in this area going forward?

Let me start with the first question on central banks and climate change – why do we care about it? The simple answer is, we have to do our job. Our mandate is price stability. Climate change imposes stability risks mainly through two channels: physical risks related to extreme weather events that can destroy assets and infrastructure, and transition risks arising from increased investment needs to decarbonise production processes. Beyond this, there is biodiversity loss. In other words, climate change and nature degradation affect a central bank's core tasks. For banking supervision, financial stability analysis, and monetary policy, we need reliable and timely climate data, financial and non-financial data at both aggregated and micro level.

Turning to statistics, what has been done in official statistics? In macro statistics, a lot has been done and with great success. I will focus on two examples. First, at the macro level, fundamental concepts are provided by the Environmental Economic Accounting System, which maps the interaction between the economy and the environment. A second example is the G20 (Group of 20) work on improving sustainability-related data, where seven of the 14 new recommendations of the third Data Gaps Initiative (DGI (Data Gaps Initiative)) relate to climate-relevant aspects.

Official macro statistics are important but not enough to fulfil central bank tasks. Data about financial aspects are also important but difficult to find in public, structured data sources. To address this issue, the Network on Greening the Financial System (NGFS (Network for Greening the Financial System)) has developed a data catalogue for seven stakeholder categories and eight main use cases, providing an overview of a variety of data sources. [1] The final directory references, for example, 748 links to data sources based on the needs of financial sector-stakeholder use cases.

In the European System of Central Banks (ESCB (European System of Central Banks)), aggregated indicators based on microdata are constructed for the carbon footprint financed by financial institutions and the physical risk to which the collateral of financial institutions is exposed. [2] This work is challenging not only due to existing data gaps but also due to the linking of information from different sources.

In addition, new technologies offer opportunities to verify or generate information. For example, the BIS (Bank for International Settlements) Innovation Hub, a collaboration among central banks on innovative technology, is working on extracting sustainability-related information from company reports using AI (artificial intelligence) algorithms, particularly large language models, to automatically extract relevant climate-related indicators. [3]

The Bundesbank supports these projects and works together with academic institutions on using new technology to improve the climate data situation. One research collaboration is examining the extent to which satellite images and street-view images can be used for data quality control.

To summarise, central banks care about climate change as part of their price stability mandate and therefore need high-quality data.

Let me turn to the second question: What are the challenges and opportunities with regard to sustainability data going forward? All in all, much has been achieved and is ongoing in official statistics. However, the challenge for central bank analysis is not only the limited availability of data but also their quality, which often does not meet the standards of established statistics as defined by the European Statistical System (ESS (European Statistical System)) code of practice[4] or the ESCB (European System of Central Banks) public commitment. [5] Microdata are currently almost exclusively supplied by private sector data providers.

Let's look at an example. The figure on the slide #9 shows the emissions of companies – each data point representing the emissions of one corporation – provided by two private data providers, provider 1 on the y-axis and provider 2 on the x-axis. The orange points are reported emissions, and the blue points are estimated emissions by the data provider. If the information were identical, the observations would lie on the angle bisector, which one could expect given that the figures are not estimated but come from company reports. The visibly broad scatterplot illustrates that the data from the two providers differ significantly. Please note the log scale. In some cases, the difference is by a factor of 1,000.

The whole picture is shown on slide #10. The discrepancies visible there are even larger. Not all of these deviations can be explained by errors in the reported dimension of the data. Clearly, there is a need for action to improve quality.

So, what can we do to overcome the problem? From my point of view, the quality of economic microdata will be best if the data are directly taken from or at least derived from financial accounts or corporate reports. In this regard, the Corporate Sustainability Reporting Directive (CSRD (Corporate Sustainability Reporting Directive)) offers a window of opportunity, not only for statistics, creating a burden for companies at the same time. The new standards are already mandatory for many European listed entities and will apply to many more in the coming years – more precisely, to around 50,000 European companies, implemented in phases, with optional and simplified standards for small and medium-sized enterprises (SMEs (small and medium-sized enterprises)).

So, CSRD (Corporate Sustainability Reporting Directive) is fantastic from a statistics viewpoint! And yet there are two perspectives (at least): one from the statistical side and the other from the reporting agents. From the statisticians' perspective, the CSRD (Corporate Sustainability Reporting Directive) will lead to a rich and high-quality source of microdata for climate-related and emission statistics. Statisticians need to work step by step. We have established the JECED task force, embodying a pan-European perspective. Let me explain this acronym in an iterative process. You know the CMFB (Committee on Monetary, Financial and Balance of Payments Statistics), the Committee on Monetary, Financial and Balance of Payments statistics.[6] You may also know the ECCBSO (European Committee of Central Balance Sheet Data Offices),[7] the European Committee of Central Balance Sheet Data Offices. This latter body specialises in collecting and analysing financial statements of non-financial enterprises as well as publishing aggregated results – freely available for everyone. JECED stands for a joint venture of these two: Joint ECCBSO (European Committee of Central Balance Sheet Data Offices)-CMFB (Committee on Monetary, Financial and Balance of Payments Statistics) Task Force on Environmental Data.

Anticipating the stream of incoming data, the JECED proactively tackles issues such as identifying the data points to be expected in the CSRD (Corporate Sustainability Reporting Directive) reports, ensuring report accessibility, and dealing with simple but crucial issues such as "who reports what and when?" The goals of JECED are manifold: to statistically benefit from high-level disclosed corporate data, to develop ideas on integrating forthcoming environmental data with existing statistical datasets, and to avoid any redundant data collection in statistics. I have the impression that we all will benefit from this initiative. I would like to take this opportunity to specially thank my colleague Robert Kirchner, who was chair of the CMFB (Committee on Monetary, Financial and Balance of Payments Statistics) up to the end of 2024 and is still chair of the ECCBSO (European Committee of Central Balance Sheet Data Offices), for using his double-chairmanship to initiate this joint journey of discovery of the European System of Central Banks and the European Statistical System. I am also very thankful to all colleagues who actively support this task force.

From the corporates' perspective, the CSRD (Corporate Sustainability Reporting Directive) is designed as an information tool to make firms (and their stakeholders) aware of the environmental consequences of their decisions. At the same time, the data requirements are extremely costly for the corporates. Look at slide #13: According to a recently published research paper based on a survey among company executives in Germany, different dimensions of bureaucracy of all kinds sum up to 22 % of the working time of white-collar employees. Eighty percent of businesses see the need to hire external service providers, and total costs are estimated at around 6 % of turnover. Managers consider the reporting burdens originating from the EU (European Union) and the (German) Federal Government as especially onerous. This is why discussions on reducing bureaucracy routinely lead to calls for eliminating statistical reporting requirements.

To summarise, firm-level data challenges persist regarding availability and quality, and the CSRD (Corporate Sustainability Reporting Directive) offers an opportunity to address them. Yet, the burden for companies to fulfil the reporting requirements needs to be kept low from a competitiveness perspective.

Let me turn to the third question: What are the challenges and opportunities with regard to sustainability data going forward? Do we have an obligation to help lower the burden of enterprises to fulfil CSRD (Corporate Sustainability Reporting Directive) reporting requirements? One could interpret the UN (United Nations)'s 10 fundamental principles of official statistics in this way. See slide #14: the first principle highlights the role of official statistics for a democratic society, mentions the economy as an addressee, and refers to the environment as a relevant topic. The question is: How can we be of help?

A big challenge for firms is the reporting of indirect emissions. Let's take the perspective of an interconnected producer of goods and look at slide #15. The producer has to disclose not only their own emissions but also those embodied within intermediate inputs. This is to ensure that the producer takes into account that their decisions on the concrete structure of the supply chain influence the carbon emissions embodied in products. However, input providers may not always be able or willing to disclose their products' carbon content. This makes the calculation of embodied emissions extremely difficult for enterprises. A pragmatic approach could be to use suitable averages from statistics as a second-best alternative if no direct information is available. This could help enterprises estimate indirect emissions and make comprehensive carbon accounting functional.

Statistics can learn from disclosed direct emissions, and corporates can learn from statistical averages if no better data for intermediate inputs are provided. As this is the opening session, I dare to share with you a general idea, knowing that many details are missing, and I am confident that you will discuss this further during the conference. As currently foreseen, corporates would send their sustainability reports in a standardised and machine-readable format to national data hubs, which will be interconnected through the European Single Access Point (ESAP (European single access point)) provided by the European Securities and Markets Authority (ESMA (European Securities and Markets Authority)). The ECCBSO (European Committee of Central Balance Sheet Data Offices), which also consists of the ECB (European Central Bank) and national central banks, can quality check the data and assist ESMA (European Securities and Markets Authority) in this regard, and national central banks can use the data for their credit assessment. The same data can also be used to further improve ESS (European Statistical System) and ESCB (European System of Central Banks) statistics. Enterprises can use relevant statistical averages to estimate indirect emissions to be disclosed in their sustainability reports if no better data for intermediate inputs are provided.

A recent Bundesbank study by Ulf von Kalckreuth shows that accounting results will converge to the true values over time, even if the initial estimates are far from perfect. [8] See slide #17: on the y-axis, the graph shows the root mean squared error (RMSE (root mean squared error)) of carbon content for different groups of products in a system of encompassing carbon accounting. This can be seen as a measure of the incorrect amount of carbon emissions of products due to incorrect information on the necessary indirect carbon emissions of their respective intermediate input products. What you see is a simulation based on microdata and aggregate figures for the US (United States) economy. The simulation starts out with industry averages instead of precise figures, meaning that there is only rough information on carbon emissions embodied in intermediate inputs. However, if companies report their direct emissions correctly and if they compute carbon contents based on the correct input mix, the indicators quickly converge to their true values, even if the starting values are wrong. Input providers report their results to the next level in the value chain, replacing the rough estimates with exact information on direct emissions and company-specific input composition. With each iteration, this exact and truthful information is pushed further up in the value chain and replaces initial estimates. The influence of the initial deviation from true values diminishes quickly. Each iteration on the x-axis is thus an updated approximation of the carbon emissions of intermediate products. The graph shows that only a few "rounds of updates" are necessary to converge to true overall (direct and indirect) emissions.

To achieve these results, several preconditions must be met. Firms need the relevant statistical averages. This is a task for statistics: to deliver easier access to existing data. What is exactly needed should be determined by enterprises, standard setters, and IT (information technology) program providers, who could make these second-best options available in their software solutions for enterprises. More and more input providers need to communicate the carbon content of their products to the users of inputs. For this to happen, incentives are needed. These can also be created with the help of statistics. What is the incentive problem and how can statistics alleviate it?

The incentive problem has at least two sides: the incentive to disclose and deliver emissions data, and the incentive to use directly delivered information from input providers even if they are less clean than the statistical averages. Just offering statistical data as a second-best solution may create an outright disincentive, as companies may be tempted to use official statistical averages whenever their real-world inputs are less clean than this. However, with dispersion measures, standard setters can fix a proper mark-up for using aggregate data instead of direct information, such as two standard deviations or the 95 % quantile of the distribution. Then, corporations would have an incentive to disclose and provide their emissions if their emissions are lower than this threshold. Dispersion matters! This is what the graph on slide #18 shows. It is a plot of direct emissions on the x-axis and indirect emissions on the y-axis for US (United States) companies in the chemical industry. Each point represents a company. The indirect emissions are partly simulated. The profile of companies is quite different and depends on their narrow field of activity, depicted by the different colours. So even for similar products, the direct and indirect carbon emissions can be quite differently distributed. Statistics can offer relevant data, but determining the mark-up is the task of political decision-makers.

As we have seen, effective solutions require collaboration between standard setters, statisticians, companies, and international organisations. This has started with the so-called Hamburg workshop, which was jointly organised by the IMF (International Monetary Fund), the BIS (Bank for International Settlements)/IFC (Irving Fisher Committee on Central Bank Statistics), Eurostat (European statistical office), the Central Bank of Chile, the University of Oxford Blavatnik School of Government, and the Bundesbank almost one year ago. [9] Please look at slide #19. And the conversation continues! Businesses have shown strong and marked interest in statistical averages as a second-best solution if no input provider information is available – both at the Hamburg workshop on carbon content and at the Hamburger Forum für Nachhaltigkeitsberichterstattung with about 140 participants, most of them from the private sector. [10]

To summarise, statistical agencies, central banks, policymakers, and corporations need to get into an iterative learning process that can substantially lower the corporations' CSRD (Corporate Sustainability Reporting Directive) reporting burden on emissions and increase the competitiveness of Europe as a business location. A process has to be initiated and set in motion. We here in this room – the ESS (European Statistical System), the ESCB (European System of Central Banks), the ESF (Economic Stabilisation Fund), the CMFB (Committee on Monetary, Financial and Balance of Payments Statistics), the ECCBSO (European Committee of Central Balance Sheet Data Offices), and the international organisations – have a joint mission! Let's do it together and put it into practice!

Thank you for your attention!

Footnotes:

1. The Data Directory can be found here: The NGFS (Network for Greening the Financial System) Directory (masdkp.io) *[https://ngfs.dev.masdkp.io/]*. Further information regarding the directory is published in the NGFS (Network for Greening the Financial System) Final Report on Bridging Data Gaps: final_report_on_bridging_data_gaps.pdf (ngfs.net)*[https://www.ngfs.net/sites/default/files/medias/documents/final_report_on_bridging_data_gaps.pdf]*
2. For the indicators and detailed further information, see Climate change-related indicators (europa.eu) *[https://www.ecb.europa.eu/stats/all-key-statistics/horizontal-indicators/sustainability-indicators/html/index.en.html]*
3. On the BIS (Bank for International Settlements) Innovation Hub and Project Gaia see Project Gaia: enabling climate risk analysis (bis.org)*[https://www.bis.org/about/bisih/topics/suptech_regtech/gaia.htm]*
4. See European Statistics Code of Practice – Eurostat *[https://ec.europa.eu/eurostat/web/quality/european-quality-standards/european-statistics-code-of-practice#:~:text=It%20defines%2016%20key%20principles%20for%20the%20institutional,and%20standards%20for%20each%20of%2*
5. See Public commitment on European Statistics by the ESCB (European System of Central Banks) *[https://www.ecb.europa.eu/stats/ecb_statistics/governance_and_quality_framework/html/escb_public_commitment_on_european_statist*
6. See Committee on Monetary, Financial and Balance of Payments statistics*[https://www.cmfb.org/]*
7. See ECCBSO (European Committee of Central Balance Sheet Data Offices)*[https://www.eccbso.org/]*
8. On this argument, see von Kalckreuth, U (2022): "Pulling ourselves up by our bootstraps: the greenhouse gas value of products, enterprises and industries", Deutsche Bundesbank Discussion Paper No 23/2022, July, resubmitted at the Latin American Journal of Central Bank Research. The paper also contains a formal model and a simulation for Germany.
9. See International workshop organised by the IMF (International Monetary Fund) *[https://www.bundesbank.de/en/service/dates/carbon-content-measurement-for-products-organisations-and-aggregates-creating-a-sound-basis-for-decision-making-913014]* , BIS (Bank for International Settlements)/IFC (Irving Fisher Committee on Central Bank Statistics), Eurostat (European statistical office), Deutsche Bundesbank, Central Bank of Chile and the University of Oxford Blavatnik School of Government, Hamburg, 21–23 February 2024.

10. The conference was organised jointly by the DRSC (Deutsche Rechnungslegungs Standards Committee e.V.), the Wissenschaftsplattform Sustainable Finance, and the University of Hamburg in November 2024.

Presentation

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