

External statistics in a fragmented and uncertain world: addressing novel analytical challenges

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Executive summary

In an increasingly politically fragmented yet economically and environmentally interconnected world, **external statistics are paramount to address new developments in international economic relations arising from global challenges**. They are the lenses through which to observe the main drivers of the global economy, ranging from globalisation, digitalisation and climate change to the new trends in international trade and financial flows shaped by the fault lines of geopolitics.

Yet in an uncertain world changing with unprecedented speed, external statistics need to quickly adapt to evolving user and policy needs. This calls for regularly revisiting statistical concepts, experimenting with new indicators and harvesting the deluge of data arising from the advance of technology. Considerable work has been undertaken over recent decades to fill data gaps and, perhaps more significantly, update the methodological framework and ensure consistency within and across macroeconomic accounts. But much more work lies ahead despite strained resources.

First, in terms of analytical and measurement needs, a focal point for external statistics is to better **capture the impacts of globalisation, digitalisation and climate change**. This entails a certain number of actions, such as improving the coverage of large multinational enterprises (MNEs) and special purpose entities (SPEs), designing approaches beyond residency-based concepts to map financial flows, innovating measurement techniques for digital and intangible assets, and integrating climate change factors into external statistics.

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In addition, the statistical community aims at **improving the consistency, comparability and relevance of external statistics**, both in terms of methodology and data. The joint revision of the System of National Accounts (SNA) and the Balance of Payments Manual (BPM) in 2025 is a major milestone in this regard. Yet more can be done, especially to achieve consistent implementation, namely in the recording of cross-border flows or transactions between residents and non-residents, to ensure integration of data sources and to streamline coordination within the statistical system, particularly among central banks and national statistical offices.

More broadly, **external statistics need to be “fit for multiple needs” to stay relevant** in response to the rising demand for multidimensional statistical information. In practice, this means that they have to serve and swiftly adapt to the new demands across the wide range of users. A telling case is the key role played by external statistics to navigate the complexities of geopolitics in the wake of recent tensions and document the resilience of global value chains amidst increased fragmentation and reshoring patterns.

A related lesson is the need to **foster experimental external statistics** to face growing, pressing and timely data needs. This includes experimenting with new approaches tailored to analytical requirements, designing innovative methods and testing unexplored data sources. The trade-off is to balance such experimental indicators with reliable, accurate, high-quality and trustworthy statistics.

Harnessing alternative and big data sources for producing official statistics on the external sector is also important. This may not only aid in overcoming sudden stops in the provision of traditional indicators, such as those experienced during the Covid-19 crisis in 2020–22. It can also help enhance and complement conventional sources. Examples such as geospatial data, mobile phone records, credit card transactions, securities, credit and business registers illustrate ways to improve the estimation of balance of payments (BOP) statistics.

Further, **innovation is not an option, rather a necessity**. Keeping abreast of changes, including advancements in artificial intelligence (AI), may yield significant advantages, particularly by enabling producers to tap into the abundance of new data types, enhance data integration and facilitate the communication of external statistics. New techniques to collect data, such as web scraping, also play a growing role in reducing the data reporting burden while improving timeliness overall. Yet, a certain number of challenges and risks cannot be ignored: concerns on “black box” issues, misuse of data, increased costs and ethical and privacy risks may be particularly challenging when it comes to adopting these novel technologies.

Lastly, the growing demand and supply of statistics undoubtedly require **stronger international statistical cooperation to foster data stewardship, sharing and a better centralisation of statistical collections**. Efforts to improve data interoperability, usability and reusability are key ingredients for sound external statistics, particularly because statistical offices and central banks may have shared or strongly connected responsibilities in the compilation process. Regional and global business registers, with the help of global identifiers and harmonised collections, should also be regarded as a priority for identifying or “profiling” MNEs’ attributes.

Taken all together, these recommendations call for a **clear and comprehensive roadmap for enhancing information on the external sector in the years ahead**, based on a shared vision to leverage innovation, promote international cooperation and maintain trust in official statistics.

1. Introduction: charting a new course for external statistics in a complex and multifaceted global landscape

External statistics continue to grapple with the long-standing challenges posed by globalisation. The growing complexity of international financial intermediation chains, including through SPEs, and the proliferation of hidden assets are just a few examples calling for the reassessment of residency-based metrics as well as for the use of more detailed, granular databases. In addition, **the evolving landscape of the global economy in recent years has resulted in tectonic shifts for external statistics.** The restructuring of global value chains, amidst renewed geopolitical tensions and trade barriers, has seen onshoring activities gain prominence, adding complexity to tracking cross-border investments. Moreover, the rapid expansion of digitalisation, reinforced by the evolution of working modes, has further underscored the importance of accurately measuring cross-border digital services. Last but not least, swings in financial conditions have triggered volatility in global financial flows, revealing heterogeneous patterns among investors and countries. This emphasises the need for better and more granular data to identify the causes driving the shifts in global flows, in turn supporting policymakers to make informed decisions.

Taking these developments together, a new course has emerged for external statistics in the post-pandemic "new normal" revolving around four patterns.

First, **mounting uncertainty coupled with remarkable economic shocks have underscored the critical importance of enhancing statistical agility** to support policymaking and analysis during unforeseen and rapidly changing situations. The use of experimental statistics and access to alternative data, such as private and administrative sources, have proven helpful during peaks of high uncertainty and sudden stops in data flows such as during the Covid-19 crisis, not least because traditional data collection exercises faced significant challenges, making it harder to gather timely and accurate information.

Second, **the urgency to address climate change has reached unprecedented levels**, necessitating innovative approaches to compile and measure environment-related concepts within the BOP framework. The imperative to mitigate climate risks, which have by nature a global perspective and may not be adequately tackled by country-based statistical apparatus, has become more pronounced than ever before. This has compelled policymakers to recalibrate existing metrics and methodologies to accurately reflect the environmental impact of economic activities and assess emerging risks to the financial system. This effort is also a key deliverable of the **update to the SNA and BPM.**

Third, **the rapid proliferation of AI has unlocked new frontiers in data analysis and compilation**, not only by offering novel insights into complex economic phenomena but also by enabling more nuanced decision-making processes. The rise of AI has in addition prompted a critical examination of the evolving role of official statistics.

Fourth, **digital services have expanded sharply across the world, reflecting an intensified embrace of technology-driven solutions** and a fundamental shift towards digitalisation in various sectors of the economy. These developments have been accompanied by significant information gaps in official statistics, exacerbating global asymmetries that demand urgent action. Further, the measurement of

digitalisation requires leveraging alternative data sources such as payment records, mobile phone usage data and satellite imagery.

It is against this setting of **major transformations in the post-Covid-19 new normal** that the Irving Fisher Committee on Central Bank Statistics (IFC) of the Bank for International Settlements (BIS) and the European Central Bank (ECB), in collaboration with the Bank of Spain, convened the **second edition of the External Statistics Conference** on “External statistics after the pandemic: addressing novel analytical challenges” in February 2024. This edition followed the inaugural conference held in Lisbon, Portugal, in 2020, shortly before the pandemic’s onset.

Drawing together users and compilers of external statistics across all continents, representing central banks, national statistical offices, international organisations, academia and the private sector, the conference fostered the exchange of ideas and insights not only on the main challenges but also on opportunities in the field of external statistics. The contributions presented are referenced in this overview of the *IFC Bulletin* and grouped into four themes: the multiple roles and facets of external statistics to meet novel analytical needs (Section 2); the methodological updates and measurement challenges (Section 3); the need for a forward-looking perspective to leverage innovation, the ongoing avalanche of data and international cooperation (Section 4); and the proposal for establishing a comprehensive roadmap for external statistics (Section 5).

2. The multiple roles and facets of external statistics to meet novel analytical needs

Fast-changing macroeconomic conditions, exacerbated by major economic shocks and geopolitical fragmentation in an economically interconnected environment, **generate new demands for external statistics**. They also call for making them fit for multiple needs, in particular to provide useful insights across the broad policy spectrum.

Being fit for multiple needs: the roles of external statistics in a growingly uncertain world

The past few years have been characterised by a rapid accumulation of macro-financial vulnerabilities driven by major shifts in the global economy. The first one is the quick and unforeseen swings in global financial conditions, including evolving monetary conditions and changes in global economic linkages. Second, extraordinary shocks have significantly disrupted global value chains. Questions have arisen about the future of globalisation amidst growing geoeconomic fragmentation, as trade and financial openness could create excessive external dependencies. Third, the global expansion of financial intermediation, with the rising share of non-bank actors, has made financial interlinkages more complex, contributing to heightened uncertainty and macro-financial risks.

Against this background, it appears clear that **external statistics need to be fit for multiple needs** and provide insights into the several policy analytical requirements to stay relevant, as noted by the Governor of Bank of Spain, Pablo Hernández de Cos, in his [opening remarks](#).

First, external statistics are crucial to providing insights into the realm of **financial stability**, particularly when it comes to monitoring international macro-financial risks. With the growing interconnectedness among countries, mapping external risks and dependencies in the trade of goods and services and financial flows is key for policymakers to track and limit **external vulnerabilities**, particularly in the context of severe shocks. External statistics also help in grasping the rising role of **cross-border non-bank financial intermediaries** and taking appropriate regulatory actions.

A second area is **climate change**, which is intrinsically linked with external statistics. To say the least, these statistics are essential to **mapping climate-related risks across countries**, leveraging the framework of the BOP and international investment position (IIP). They can in particular help policymakers take appropriate measures to mitigate climate change and its effects on the economy.² All in all, they can also provide insights into the **environmental impact of various cross-border activities**, such as carbon emissions linked to trade, tourism and foreign direct investment (FDI).

Third, statistics on the BOP and IIP are fundamental to assess the **international transmission of monetary conditions**. While such analysis is not new (Lane (2020), Bergant et al (2020)), the increasing **complexity of cross-border financial intermediation chains** requires more granular, detailed and sectoral external statistics, as stressed by Philip Lane in his [keynote speech](#). This is notably the case for the euro area where non-bank financial intermediaries, and particularly investment funds, have been amplifying financial flows considerably during periods of shifting risk sentiment (Beck et al (2024)). Further, research conducted by the [Geneva Graduate Institute](#) highlights that detailed external statistics can play a key role in documenting the drivers of investment flows and heterogeneities across sectors, particularly in the wake of monetary shocks.

Fourth, **external statistics are critical to understanding the fault lines of geopolitics** in an increasingly uncertain landscape. The recent large shocks have unveiled the fragility of global value chains and the related supply bottlenecks, prompting decision-makers to design policies to foster **supply chain resilience**, triggering to some extent new **re-shoring or near-shoring** patterns. In this context, it has become essential to develop new methods to measure which countries own or control the supply chain, by augmenting statistics on international trade with detailed data on ownership, for example from business registers as suggested by [Statistics Netherlands](#). Additionally, the surge in **geopolitical tensions** has revealed changing patterns in global linkages driven by the adoption of **financial sanctions** and **trade barriers**. BOP data can play a useful role in assessing how those tensions are mirrored in trade and investment flows and, more importantly, how these are rerouted through third or “connector” countries (Gopinath et al (2024)).

² See Box A: “Climate change and official statistics: an interview with Galina Hale”, p 10.

Going beyond borders: the geographies of financial flows serving different analytical perspectives

In the quest to make external statistics fit for multiple needs, a diverse array of approaches may be employed to grasp the different **geographies of financial flows** depending on the analytical perspective followed.

One key discussion revolves around the extent to which a **residence-based or nationality-based perspective should be preferred to analyse the geography of financial flows**. The selection of one approach over another typically depends on the pursued analytical goal (McGuire et al (2024a)). Traditionally, the residence view offers an analytical framework to measure where funds are sourced and used, while also being consistent with key macroeconomic indicators and concepts, such as gross domestic product (GDP), BOP, IIP and other macroeconomic statistics. However, it fails to capture the cross-border activity of multinational lenders and borrowers which is based on economic *ownership or control*, rather than *residency* (Sanchez Pacheco (2023)). Here, the nationality view, which consolidates firms' balance sheets to the country where they are headquartered or *controlled*, may be better suited for monitoring **financial stability risks**, especially to quantify countries' credit risk exposure and funding dependencies. As an example, a paper from FGV São Paulo School of Economics indicates that, from the consolidated-by-nationality perspective, international financial integration can be larger relative to those estimates based on conventional, residence-based data. The nationality-based approach also helps to better assess international linkages, for example related to **monetary policy** spillovers.

While the residence-to-nationality remapping is not a new issue in external statistics (Tissot (2016)), the growing international exposure of firms unavoidably calls for additional approaches. One option is the **revenue-based approach**, which gives insights in terms of investors' portfolio allocation. In practice, one will use firm-level geographic revenue records to measure investors' exposure to international firms outside of their country of nationality or residence. As highlighted in a paper from the Board of Governors of the Federal Reserve System and University of California, this approach suggests that US exposure to emerging markets is currently underestimated and that portfolio investments of US residents are much more diversified abroad than revealed by traditional statistics. Moreover, developing **currency-based metrics** can also be a useful approach. In fact, key currencies shape the patterns of global financial flows and offer crucial insights into major international finance dynamics, such as countries' external debt and financial institutions' foreign currency needs (Bénétrix et al (2020), McGuire et al (2024b)). Reflecting this, the BIS has set up a unique global liquidity indicators (GLIs) data set that sheds light on foreign currency credit denominated in three major reserve currencies.³

Finally, the **analysis of onshore-offshore financial centres** can be particularly valuable to grasp the complex geography of financial flows (Pogliani et al (2022)). Offshore financial centres act as hubs for cross-border investment flows and centres of securities issuance by foreign firms, for instance because of their favourable fiscal and regulatory regimes. It is thus important being able to "look through" international groups to correctly analyse global financial integration. For instance, the euro area appears to be less integrated with the rest of the world compared with what is shown

³ Data can be accessed through the BIS Data Portal at data.bis.org/topics/GLI.

by traditional residency-based statistics (Beck et al (2024)). A second relevant example is to look-through third-party holdings of securities to measure “**missing assets**” in global portfolio assets and liabilities. Data on third-party holdings are instrumental to shedding light on the ultimate owner of the securities, which are not well captured by traditional data sources such as the Coordinated Portfolio Investment Survey (CPIS). [Milesi-Ferretti \(2024\)](#) argues that, in practice, this data gap causes a mismatch between global portfolio assets and liabilities, with global assets being typically lower than liabilities. And, indeed, by using granular data on third-party holdings, the [ECB](#) has been able to estimate the missing assets due to unreported foreign custody securities and redraw the geographical allocation of portfolio positions compared with official sources.⁴

Capturing the complex and heterogeneous cross-border operations of multinationals

An important challenge for external statistics is to better capture the **heterogeneous activities of MNEs**. This is critical particularly to reduce distortions in macroeconomic aggregates such as in small open economies, as seen with the 2015 “Irish case” (OECD (2016)). First, the impact of global firms in the area of investment and trade data for intellectual property products (IPPs) is very visible. Joint research from the [Central Bank of Ireland and the ECB](#) shows that MNE activities can blur the real-time assessment and forecasting of key economic indicators in the euro area, such as the business cycle, the current account and capital stock. This is notably explained by the fact that MNEs can operate large and sudden transfers of intangible assets and IPPs. Second, complex MNE activities may also generate distortions in data related to FDI. For instance, developments in euro area FDI over the past decade have been very much driven by financial centres which have a strong MNE presence. As global firms tend to involve numerous legal entities, including SPEs, it is increasingly hard for statisticians to correctly estimate the real impact of FDI on the economy (Pastoris (2024)).

To cope with these challenges, compilers may consider several solutions. First, **new breakdowns** can undoubtedly play an important role. A major step, already implemented for instance by the ECB since April 2024, is to include additional data on **SPEs** in regular statistical releases.⁵ Such data complement other enhancements, particularly on new **sectoral and geographical** breakdowns which allow for better coverage of international financial flows (Emter et al (2023)). Looking forward, more internationally harmonised data and centralised registers on MNE activities, including new statistics on **foreign-controlled corporations** in BOP, would mark another step towards improving the understanding of the dynamics of MNE operations and their impact.

A second, related solution is to refine techniques to better estimate the real impact of FDI by identifying the **ultimate host economy**. This is particularly relevant to assess where the economic benefits and the risks or investment really are. In this context, collecting and integrating **additional information**, especially more granular

⁴ Other data sources, including direct collections from foreign custodians and mirror data, may also be particularly helpful to estimate missing assets.

⁵ See [ECB Guideline \(EU\) 2022/747](#) of 5 May 2022 amending Guideline ECB/211/23 on the statistical reporting requirements of the ECB in the field of external statistics (Guideline ECB/2022/23).

data obtained from business registers, could help. For example, the Banco de Portugal employs the EuroGroups Register and Outward Foreign Affiliates Statistics to analyse Portuguese FDI. The approach also uses three different methods for measuring outward FDI statistics by the ultimate host economy, revealing a significantly different geographic distribution of FDI compared with official data. For example, it shows lower importance attributed to Luxembourg and the Netherlands and increased roles for Brazil and Colombia. The [US Bureau of Economic Analysis](#) conducts similar analyses, using six different ways to reallocate FDI equity positions from the immediate to the ultimate host economy. Applied to the US case, this analysis shows that the two countries with the largest decrease in importance as FDI destinations are the Netherlands and Luxembourg. Other approaches may also involve more complex estimation techniques. For example, the Bank of Italy suggests a new method to estimate FDI distribution by ultimate host economies by joining multiple data sources, including the Coordinated Direct Investment Survey (CDIS) database, and techniques, such as betweenness centrality and a Markov chain (Accoto et al (2023)).

Measuring climate change through the lens of external statistics

Another increasingly important topic in external statistics is **climate change**. To meet rising policy questions, the demand for statistics in this domain has unavoidably become an urgent priority for compilers (NGFS (2022)).

For central banks, measuring climate change is crucial for at least two purposes. One important dimension is **measuring climate-related risks** to ensure monetary and financial stability (IFC (2022)). In this regard, climate change may have effects on both the supply and demand side, which may ultimately impact central bank mandates (Bolton et al (2020)). More importantly, the materialisation of events related to climate change can create physical and transition risks that have to be properly measured (BCBS (2021a)). Another dimension is to **assess the move to a greener financial system** and its impact. Here, green finance can play a key role by supporting “activities that sustain or improve the condition of the environment” (AEG (2022)). Yet, while good quality data on climate finance are instrumental to support the shift towards a lower-carbon economy, they are still largely missing. Several national and international initiatives have been attempting to fill these gaps in recent years. A noteworthy one is Recommendation 4 on green finance within the context of the third phase of the **Data Gaps Initiative** (DGI) endorsed by the G20. The aim is to gather statistics on sustainable, sustainability-linked and green debt securities, and green listed shares, by issuer and holder, based on comparable indicators and self-commitments by economies (IMF et al (2023a)). The [Climate Change Indicators Dashboard](#) of the International Monetary Fund (IMF) is also an important initiative that features statistics on climate finance.

External statistics are instrumental for addressing these issues, not least because of climate change’s impact on cross-border transactions globally. First, from the dimension of risk, mapping climate-related exposures across countries, such as in terms of instruments and sectors, can be facilitated by the framework provided by the BOP and the IIP. In this regard, the Guidance Note B.6 by the Balance of Payments Task Team suggests **integrating measures of climate change risk into external statistics**, including by adding a supplementary “of which” category for green bonds in the BOP and IIP (BOPCOM (2022)). This proposal has been endorsed in the context

of the joint revision of the SNA and BPM⁶ and ensures strong complementarity with the DGI (Barahona et al (2024)). Other useful indicators to capture climate-related risks from the BOP perspective could be the location of borrowers or lenders exposed to physical or transitional risks. Information on financial derivatives can in particular provide valuable insights into how investors manage risks related to climate change and sustainable investments (BCBS (2021b)). Second, and perhaps more importantly, **external statistics are pivotal to assessing cross-border aspects of climate change**. For instance, they may help to track international investment flows to mitigate its impact. Further, BOP data can feed experimental indicators for measuring global carbon emissions balances across countries, for example to show whether countries are net exporters or importers of carbon dioxide (CO₂) emissions (Yamano and Guilhoto (2020)). Another case is the use of specialised and granular data, which can be useful to measure the FDI carbon footprint (Genre et al (2024)) or cross-border trade in CO₂ emission allowances through the derivatives market, as shown by the Narodowy Bank Polski.

Yet **most climate change-related statistics present several challenges**. First, the lack of common definitions prevents achieving full **consistency in terms of data and methodology**. For example, while considerable work has been undertaken to set up homogeneous taxonomies to define green financial instruments, most of them are still voluntary, enforceable only within some jurisdictions, or can be complemented with heterogeneous private standards.⁷ Ensuring consistency also calls for harmonising existing statistical concepts across the main methodological frameworks. In practice, this means ensuring alignment across manuals, notably the SNA, the BPM and the System of Environmental Economic Accounting (UNECE (2021)), but also across international classifications, eg the statistical classification of economic activities in the European Community (NACE) and the International Standard Industrial Classification of All Economic Activities (ISIC) (CMFB (2023)). A second challenge is the lack of **comparability** across indicators and countries, which is largely explained by the poor degree of harmonisation and **the notable disparities in aggregated and granular data collections** (Aurouet et al (2023)). This challenge is often seen as a major obstacle for banks and regulators to use climate scenario analysis and assess resilience to environmental risks (BCBS (2024)). Key recommendations are to use proxy indicators while also making extensive use of metadata to provide a full account of the information sources used, including their caveats.

Another important strand of limitations relates to the **gap between the policy urgency and the relatively slower pace of producing new official statistics on climate change**, which typically have longer horizons. In fact, most of these statistics are released annually, often with a delay of one year or more, which may not fit policymakers' needs (UNECE (2020b)). One way to tackle this issue is to release sets of experimental indicators to serve users' immediate needs, while perhaps not completely fitting statistical standards. The climate change-related statistical indicators disseminated by the ECB are a telling example. Notwithstanding continuous progress to ensure highest statistical standards, this exercise clearly acknowledges the caveats and limitations of these statistics and their status as

⁶ See Joint Forty-Third Meeting of the IMF BOPCOM and Twenty-Fifth Meeting of the Advisory Expert Group on National Accounts (20 February 2024).

⁷ For a review on the adoption of taxonomies among G20 DGI economies, see IMF et al (2023b).

experimental (Statistics Committee Expert Group on Climate Change and Statistics and Working Group on Securities Statistics (2024), Kanutin (2024)).

More fundamentally, **the BOP framework might not be sufficient to incorporate climate change in external statistics**. A typical case is the approach to follow regarding the measurement of international CO₂ emissions. **Residence-based metrics**, aligned with the BOP and IIP, allocate carbon emissions to the country where the economic operator, such as a firm, is resident. Yet, one might also want to allocate them to the country where they take place (territory principle), beyond the residency of the economic operator, or where the firm is headquartered or controlled. This approach, based on **ownership**, can be particularly useful to shed light on carbon emissions by MNEs, monitor whether these circumvent domestic emissions standards or, more broadly, track if FDI can foster the transfer of low-carbon technology across borders (Borga et al (2023)). Finally, another perspective is to measure the carbon footprint of **final domestic demand**. From a policy perspective, this metric might be critical to estimate carbon emissions balances and assess countries' dependencies on foreign carbon-intensive goods (Yamano et al (2023)). Yet, such approaches still face considerable data and methodological gaps, calling for further international cooperation. A pivotal effort in this regard is the DGI, particularly its Recommendation 3 targeting the development of a methodological framework and compilation guidance for estimating FDI carbon footprints.

Box A

Climate change and official statistics: an interview with Galina Hale



Galina Hale is Professor of Economics at the University of California, Santa Cruz. Previously she served as Research Adviser at the Federal Reserve Bank of San Francisco and as Assistant Professor of Economics at Yale University. Her current research interests focus on attracting mainstream finance to climate solutions, the sustainability of the global food system and international financial stability, especially with respect to climate risks. She participated in the panel discussion "Addressing post-pandemic challenges and looking forward, the analysts' perspective" at the second edition of the External Statistics Conference (2024).

1. Your work has been instrumental in highlighting the importance of incorporating climate change considerations into economic statistics. Could you share your motivations and the pivotal moments that led you to pursue this line of research?

I believe one of the biggest financial risks related to climate change stems from the lack of information about financial firms' exposure to them. Given that financial firms' vulnerability to climate risks results from the vulnerabilities of their customers, non-financial firms and households, it is crucial to have reporting of climate change-related variables, including greenhouse gas emissions, plans for transition to zero emissions, as well as exposure to physical risks resulting from climate change and plans for adaptation measures in response to such risks. Without this information, it is very difficult to assess the materiality of climate risks to the financial system and therefore to take measures to mitigate any systemic risks.

2. While the relationship between economic activity and its environmental impact has long been recognised, it is only recently that statistical frameworks, such as balance of payments,

have begun to explicitly account for climate change factors. From your perspective, what were the primary catalysts that prompted this shift, and what challenges did you face in advocating for the inclusion of climate change statistics in official economic statistics?

I think the demand for such statistics comes from government policies, including the Emissions Trading System of the European Union (EU) and climate stress testing that many bank regulators now conduct. In addition, there is an increasing demand from investors which leads to transition from voluntary disclosures, such as the Task Force on Climate-related Financial Disclosures framework, to more reliable, audited, government-required disclosure, such as new rules from the US Securities and Exchange Commission. Aside from politics, I believe the pushback comes from companies that have not chosen to disclose climate variables voluntarily. The main reason for the lack of climate reports is the cost of measuring relevant variables. Additionally, there is a risk of adverse selection, where firms that choose not to publish climate data may do so because they anticipate that investors will not react positively to the information that would be disclosed.

3. One of the key recommendations from the recent External Statistics Conference was the introduction of new categories to identify environmental, social and governance (ESG) investments, green bonds and climate change-related financial flows within balance of payments statistics. Could you elaborate on the significance of these measures and how they can facilitate a better understanding of sustainable finance and its impact on the global economy? And would there be additional climate change-related indicators on your "wish list" in the field of external statistics?

I believe this is a great idea. It will allow us not only to account for the share of green assets in global markets, but also to identify deficits and surpluses in investments in climate solutions. Current climate solution spending is 10 times smaller than needed to achieve the Paris goals, and very little of what is spent comes from institutional investors. Given that national investment needs for climate solutions may not be distributed across countries in proportion with financial flows, understanding global patterns of green investment flows will help official funding sources direct their spending to countries that do not receive enough private flows (relative to their needs for green transition and climate adaptation). My wish list will of course include green loans, green FDI, portfolio investments into firms offering climate solutions, as well as government climate-related transfers and loans. I have a strong opinion that ESG investments should not all be lumped into one category. There are "E" investments (climate- and biodiversity-related) and "S" investments (anything related to other sustainable development goals). I am not sure if "G" even belongs in the group.

4. As we strive to enhance the granularity and accuracy of climate change statistics, what are the key challenges you foresee in terms of data availability, methodological limitations and international coordination? Additionally, how can we foster greater collaboration between official statisticians, policymakers, academia and the private sector to overcome these hurdles and ensure that climate change statistics remain relevant and responsive to evolving policy needs?

I believe international harmonisation of the approaches to climate change statistics methodologies is key. The Task Force on Climate-related Financial Disclosures seems to have set best practices that can be used as a benchmark for required reporting. The EU taxonomy could be refined and adopted by international standards setters. We absolutely need to avoid any opportunities for climate disclosure-related regulatory arbitrage. I believe most challenges are political or technical, not least because statistical standards may not be harmonised across countries. From a technical point of view, given the global nature of the problem, this is an opportunity for extensive collaboration and a unified global methodology and reporting standards. An additional obstacle stems from the fact that climate risks are fundamentally uncertain. Thus, a unified approach to

scenario analysis, based on shared socioeconomic pathways, for example, is also crucial. A further challenge is the complexity of climate metrics, which requires a flexible approach that can be refined over time, making global coordination even more challenging. I believe regular meetings that involve official statisticians, academics, the private sector and policymakers are key to achieving these goals. Statisticians provide the framework, academics can advise on best measurements, the private sector can give feedback on the potential impact on their businesses and use cases, policymakers can contribute to discussions on institutional constraints and the feasibility of various reporting requirements. All these parts are necessary and likely to change over time. I recommend an annual meeting to allow us to adapt to the changing physical, regulatory and political climate.

3. Adapting to change: methodological updates and measurement challenges in external statistics

Reviewing external statistics' standards is essential for keeping pace with new developments, fostering consistency in macroeconomic accounts and reducing international asymmetries. Despite notable progress, significant challenges remain, fuelling the development of experimental indicators, methods and techniques.

Revisiting external statistics' standards to foster consistency and reduce global asymmetries

An important milestone in external statistics is the joint revision of the SNA (SNA 2025) and the BOP and IIP Manual (seventh edition, "BPM7"). Adjustments to the conceptual framework have become a pressing need in recent years to properly respond to the tectonic shifts observed in the global economy, especially since the Great Financial Crisis of 2007–09 and, more recently, the Covid-19 pandemic. In practice, and according to the [IMF](#), updating macroeconomic statistical standards means revising the concepts (ie changing what is measured), the presentation (ie changing how the statistics are presented) and, ultimately, the methodology (ie changing how activities are measured). As regards the new BPM7, the methodological revisions can be grouped into four key thematic areas: globalisation, digitalisation and financial innovation, external sector sustainability, and sustainable finance. Major changes revolve around the proper definition and measurement of fintech and non-bank financial institutions' activity, the identification and recording of cryptoassets, the introduction of a standard definition for net international reserves, the clarification of unlisted equities' valuation and the identification of green investments.

A critical priority in the update process has been to ensure full coordination between the revision of external and national accounts, with the underlying goal of **improving consistency of macroeconomic statistics.** In fact, for the first time, the update of the BPM has been conducted in close coordination with that of the SNA. Moreover, cooperation has been ensured across other domains, notably Government Finance Statistics, Monetary and Financial Statistics and the System of Environmental Economic Accounting, as well as other key initiatives such as classification updates (ISIC, Central Product Classification), FDI and trade statistics, and the DGI (Barahona et al (2024)). Coordination is also critical to **reduce international asymmetries,** which may arise for instance from heterogeneous

sources, recording practices or methodological interpretations. At the EU level, important steps have been initiated by the Committee on Monetary, Financial and Balance of Payments Statistics (CMFB) to further enhance statistical collaboration between the European System of Central Banks and the European Statistical System (ESS). The aim is to develop a common vision for measuring globalisation as well as to improve the consistency and completeness of economic statistics (CMFB (2024)). These actions draw on burgeoning work done over the past few years, particularly to establish coordination activities on MNEs and reduce asymmetries in a certain number of areas, such as FDI, international trade in goods and services statistics and, more broadly, BOP. At the international level, the Task Team on Global Asymmetries in External Sector Statistics, set up by the IMF Committee on Balance of Payments (BOPCOM), aims at identifying the main reasons behind global asymmetries, how they may hamper data quality and propose best practices to address bilateral asymmetries. Ultimately, supporting countries in adopting the new methodological framework will also be critical to achieving these goals.⁸

Notwithstanding recent progress, several challenges lie ahead in the compilation of external statistics

Undoubtedly, there have been significant enhancements in data availability for external statistics over the past few decades. A noteworthy trend is the growing number of countries releasing comprehensive data on IIP. Further, various data sources on cross-border bilateral financial positions are available through international data collections such as the BIS's international banking statistics and the IMF's CPIS and CDIS data sets. These collections not only serve as valuable resources for analysts but also provide supplementary data for compilers to augment national statistics with further breakdowns and enhance the consistency and comparability of the estimates across jurisdictions. For instance, they can be very effective to leverage **mirror data** when compiling external statistics (Pradhan and Silva (2019)). As an example, the Central Bank of Malaysia uses various complementary sources for compiling the BOP. Specifically, bilateral outward CDIS data from counterparty economies are matched with reported inward FDI, while BIS data on deposits in the rest of the world, particularly for non-bank entities, are matched with reported data on deposits abroad.

Yet a certain number of measurement challenges and data gaps persist in several key areas. First, statistics on **portfolio investment** still suffer from incomplete data collections both in terms of geographical and sectoral coverage. A typical consequence is the inaccurate recording of transactions in FDI or portfolio investment. Further, research from the Brookings Institution shows that limited country participation in the CPIS may partly explain why data on global cross-border portfolio securities liabilities are substantially larger than estimates of the corresponding assets. Additionally, traditional data sources fail to capture portfolio assets of resident investors kept in custody abroad, also called third-party holdings. In short, when resident investors hold foreign securities via foreign custody accounts, these foreign assets may be missed by compilers. This is explained by the fact that non-resident custodian entities typically do not report directly to national authorities. To overcome this **blind spot** in portfolio investment statistics, the ECB suggests

⁸ In this regard, the IMF has jointly organised with other regional and international organisations the "BPM7 Outreach Events", notably to raise awareness and explain the envisaged changes in BPM7.

enhancing data collection, dissemination and global sharing of third-party holdings data as well as to integrate them into the existing official data sources, such as the CPIS.

The measurement of **migration and cross-border mobility** is another key area where compilers of external statistics continue to struggle. Several reasons can be advanced, not least the complex data integration involving disparate information sources, ranging from administrative registers to social media (UNECE (2022)). More specifically, measuring personal transfers, which are increasingly relevant due to growing migration movements, is particularly hard. The main reason is that they often relate to small, individual transfers below the reporting thresholds of the BOP compilation framework. Additionally, transfers may be routed through informal and unregulated channels which are difficult to capture by statisticians. Joint research from the [Deutsche Bundesbank](#) and [Bank of Spain](#) relies on multiple alternative sources to estimate personal transfers from Germany, including direct reporting from money transfer operators, household surveys and administrative data.

A further area is **tourism and travel estimates** in the BOP. This item has been particularly complex to grasp in recent years, not least because traditional ways may be inadequate to accurately estimate travel receipts during extraordinary shocks. For example, some methods typically assume that tourism revenue is generated in the same month as when tourists arrive (arrival basis). As shown by the [Bank of Thailand](#), this assumption does not account for travellers with longer stays, for instance in case of unexpected restrictions, as happened during the Covid-19 pandemic. One alternative option is to follow a stock basis approach which records tourists' expenditures throughout the whole period of their stay.

Additionally, the **digital transformation of the economy** continues to challenge compilers. A key reason is that cross-border trade in digital services is difficult to capture in practice despite continuous improvements in the methodological framework.⁹ Here also, a possible solution is to rely on alternative data. For example, the [Reserve Bank of India](#) developed a new approach to measure cross-border digital services trade integrating data based on payment card information to include e-commerce transactions in the BOP. Similarly, [Bank Indonesia](#) harvests alternative data from e-commerce platforms in order to identify entities involved in cross-border digital trade.

More broadly, digital transformation is also propelling a **shift from tangible to intangible activities**, adding even more complexity to the production of official statistics (Haskel and Westlake (2018)). On top of software and databases, intangible assets include research and development and other IPPs. Research conducted by the [Central Bank of Ireland](#) and the [ECB](#) shows that MNE activities are strongly interlinked with intangible assets, not least because they play a role in tax-optimisation and profit-shifting strategies. Although their measurement has improved, their volatile patterns, combined with intra-group relocations of IIPs that are hard to grasp, may have sizeable impacts on macroeconomic indicators such as GDP and the current account balance, blurring the overall business cycle analysis (Tissot and Truong (2019)). This is particularly the case for countries such as Ireland that have a sizeable MNE presence.

⁹ Key methodological advances also include the second edition of the *Handbook on Measuring Digital Trade* (2023), which provides additional clarifications of the concepts related to digital trade.

The path towards experimental statistics for the external sector

More fundamentally, the challenges above, coupled with new users' needs and the availability of novel data sources, have been driving the production of **experimental statistics**.

Experimental indicators are indeed gaining relevance in official statistics, especially in response to the recent pandemic (IFC (2023b)). Experimental data typically use novel sources and offer advantages over traditional statistics in terms of timeliness.¹⁰ In the field of external statistics, one example is the work developed by the Organisation for Economic Co-operation and Development (OECD) to measure global trade using geospatial data on ports and vessels. Although the primary purpose of these data is to ensure the safe navigation of vessels, they can also be used to build experimental indicators for monitoring international sea-borne merchandise trade. Moreover, given the significant share of maritime transport in global trade, this method has also helped to generate experimental real-time indicators to monitor global supply chains. A related case is PortWatch, a collaborative effort between the IMF and the University of Oxford, designed as an open platform for monitoring maritime trade flows using satellite-based vessel data. The project aims at supporting authorities, policymakers and the general public in assessing the impact of realised and potential trade shocks, such as natural disasters or other climate-related events. The platform offers advanced analytical tools to run simulations based on predefined stress-test scenarios, for example to estimate country-level spillovers following a disruption in a specific port. It also provides a tool to identify vulnerabilities within the global transport network in case of climate-related adverse events. Another example, for financial information, is from the Bank of France, which developed experimental indicators to value unlisted equity in FDI based on market capitalisation ratios instead of relying only on own funds at book value, as is conventionally done.

Compilers of external statistics have also been experimenting with new tools, for example to increase the availability, frequency and timeliness of data. Techniques such as **web scraping**, which involves collecting data from various web pages, are increasingly used in official statistics including by central banks (Belchev and Lamboray (2021), IFC (2021a)). More specifically, in the field of external statistics, Bank Indonesia leverages web scraping to capture digital trade from various online sources, notably e-commerce websites. Another area includes using advanced analytical tools borrowed from data science and econometrics. For example, Bangko Sentral ng Pilipinas uses **machine learning (ML)** techniques to better capture the determinants of FDI in emerging Asian economies, unveiling for instance that environmental variables such as total natural resource rents and carbon intensity are significant FDI determinants. Similarly, work by Banco de Portugal shows the usefulness of **network analysis** to better understand foreign investments (Silva et al (2023)). More broadly, research by the Bank of Spain and Deutsche Bundesbank shows the usefulness of advanced **econometric approaches** to improve the accuracy and timeliness of estimates of FDI income. Lastly, a further area of experimental techniques covers **pilot surveys**. For example, the Central Bank of Egypt shows that the Egyptian Customs Authority, in collaboration with other public authorities, is

¹⁰ Although there is no unique definition of experimental statistics, they are usually understood as statistics compiled with new data sources and methods which are sufficiently reliable to be published but whose quality is lower than that of official statistics. For example, see ECB and Eurostat.

contemplating a pilot survey for assessing digital trade. Through sampling methods, it aims to determine the proportion of e-commerce postal parcels to include data on cross-border transactions of digital goods and services by resident households and businesses.

4. Coupling innovation with growing data availability and stronger international statistical cooperation

Frontier technologies such as AI bring several benefits but also challenges for data compilers

In a fast-changing and increasingly competitive data landscape, **innovation is not an option, rather a necessity**. Official statistics in particular have faced heightened pressure to leverage innovation in recent years, not least to increase their timeliness and accuracy.

Embracing frontier technologies, such as ML and generative AI, **presents several opportunities for the compilation of official statistics**. First, these technologies enable **tapping into new information sources**, such as social media texts, speeches and other unstructured data. For instance, large language models (LLMs) are able to achieve human-like proficiency in a wide number of tasks, including analysis, editing, summarisation and, more importantly, generation of texts (Araujo et al (2023)). Second, new data science techniques allow the **harnessing of the wealth of granular data** increasingly available (IFC (2021b)). For example, they can help streamline data editing, especially with large data sets, and improve overall timeliness (UNECE (2024b)). They also **enhance data integration and linkages**, for example by connecting together multiple and disparate data sources. This has become a key challenge in the growingly competitive data ecosystem (UNSD (2024)), particularly in the area of geospatial data (Habchi (2024)). A third opportunity is to **facilitate the communication and understanding of statistics**. In this regard, a key goal of the joint revision of the SNA and BPM is to foster the understanding of macroeconomics accounts, by targeting a broader audience, including non-experts. Here, AI can help, as it already exhibits great promise to communicate more effectively and improve statistical literacy among the public (IFC (2024a)). Practical use cases include using search engines and customised chatbots tailored to users' needs as well as enhancing data access in the context of the SDMX standard (SDMX (2024)).

Yet there are several challenges posed by this innovation wave. First, these new technologies may leverage algorithms which can be hard to understand, raising concerns in terms of transparency, explainability and "black box" issues. These points are particularly challenging when it comes to implementing production pipelines, for example because statistical offices may not be ready to give a full account of the rationale behind the selection of parameters required by the underlying models (UNECE (2024b)). This, in turn, entails **safety, ethical and governance considerations** regarding the use of AI in statistical organisations, notably to counter possible negative impacts due to the misuse of data, propagation and self-reinforcement of biases, as well as harmful consequences for society (UN-ABAI (2023), OECD (2024)). Third, most big data- / AI-based IT infrastructures rely on cloud service providers, which also raises a certain number of issues, such as **data privacy and security, third-party dependency and increased costs in IT services** (UNECE (2023a)). It also

highlights the need for further collaboration, co-investments and mutualisation of costs, such as the EU "one-stop shop" initiative on AI for official statistics by [Eurostat](#).

Harnessing the growing availability of granular and alternative data to enhance external statistics

Along with the spread of innovative technologies, the **compilation of external statistics** can greatly **benefit from the proliferation of new data sources**.

These include granular and large data sets originated from public authorities, including administrative records. These types of data typically enable the compilation of more detailed breakdowns or occasionally offset the inadequacy of conventional data collection methods (UNECE (2023b)). One notable example is the use of granular data from the Immigration Bureau by the Bank of Thailand for better estimating cross-border travel income and expenses, especially during the Covid-19 period. Similarly, the [Bank of Italy](#) combines customs data on trade in goods with granular surveys on trade in services to measure the complementarity of goods and services trade. Further, research from the [Central Bank of Chile](#) and [Bank of Spain](#) shows that firm-level data obtained from fiscal and customs authorities have been instrumental in capturing how Chilean firms adjusted their international trade activities during and after the pandemic shock. Another notable example is the use of instrument-by-instrument databases to compile external statistics, such as security-by-security holdings and issuance data for compiling portfolio investment (Dilip and Tissot (2024)). Similarly, the [Central Bank of the Republic of Austria](#) uses granular and big data on financial derivatives reported under the European Market Infrastructure Regulation to improve the compilation of the BOP. Yet this work has also underlined the complexity of using granular data, as they are often not directly intended for statistical purposes and may require greater effort than traditional sources, most notably in terms of processing, integration and quality management (IFC (2024b)).

Additionally, external statistics can leverage alternative information sources and new data formats. These typically include unstructured data, such as text. For instance, innovative techniques such as LLMs allow central banks to explore new possibilities in data production, such as extracting information from articles, generating textual descriptions of tables and series, and improving statistical classifications or taxonomies (Araujo et al (2024)). One possible use case in external statistics could be to refine the analysis of corporate events, such as mergers and acquisitions, to better record FDI. Another notable example is the work undertaken by [Bank Indonesia](#) to identify cross-border digital trade actors through the collection of qualitative information, such as **textual data**, from online websites. **Geospatial and positioning data** have also been gaining traction, not least for climate change-related statistics, although their integration with official statistics raises several challenges (UNECE (2024d)). Moreover, **mobile phone records** have proven useful in providing better estimates, particularly for tourism-related activities.¹¹ For example, a joint study from the [Bank of Spain](#) and the [Spanish national statistical institute \(INE\)](#) uses these data, along with **card transactions**, as a complement to traditional surveys to improve the geographical breakdown of tourism expenditure. Finally, another strand of unstructured data is **satellite imagery**, whose development in official

¹¹ For methodological guidance, see UN Global Working Group on Big Data for Official Statistics (2019).

statistics has been catalysed by the work of the Task Team on Earth Observation Data under the Committee of Experts on Big Data and Data Science for Official Statistics of the United Nations (UN) (UNSD (2015)). And, indeed, satellite data appear to be particularly useful for proxying trade disruptions and economic activity (d'Aspremont et al (2024)).

While alternative data present several opportunities, their use also raises several challenges. These typically feature imperfect quality (IFC (2023b)), concerns about the protection of privacy (Nichols et al (2023)), limited historical depth (Woloszko (2023)) or inadequate methodological requirements, calling for further preprocessing. For example, a key issue in the use of credit card transactions for BOP compilation is that they are at times recorded on a *net* basis, while *gross* transaction values are required. To address this challenge, the Reserve Bank of India took advantage of its regulatory power to instruct card networks to report the data on a gross basis. More broadly, a key issue raised by the IMF BOPCOM is the limited availability of alternative data – particularly due to scarce online data collection systems, administrative sources and surveys – that may exacerbate current account asymmetries (BOPCOM (2023)).

The need for stronger international cooperation...

The growing demand for and supply of data necessitate robust international data governance. The ongoing deluge of information, combined with recent advances in technologies such as AI and computational power, emphasises the need for strong data stewardship (UN-CEB (2023)).¹² In fact, despite the existence of vast data pools, mostly accumulated through electronic devices and networks, their access remains limited by strong market competition, privacy regulations and associated expenses. This may prevent compilers, especially in low-income countries, from harnessing alternative sources for the compilation of external statistics. Facilitating data access through sound governance is therefore crucial (Krizman and Tissot (2021)). A prominent example is the UN Global Platform,¹³ a cloud-based, open and inclusive data ecosystem which supports international collaboration, particularly in the area of new data sources and innovative methods. This initiative supports several projects, including the IMF PortWatch to monitor trade disruptions from space.

A second aspect is to make data findable, accessible, interoperable and reusable, including through the promotion of common standards.¹⁴ These are particularly important to facilitate the integration, interoperability and linking of multiple information sources (Gregory (2024)). For example, in the domain of macroeconomic statistics, the Statistical Data and Metadata eXchange (SDMX) standard is widely used by central banks, both as providers and users of aggregated

¹² Data stewardship can be defined as “ensuring the ethical and responsible creation, collection, management, use and reuse of data so that they are used for public good and benefit the full community of data users” (UNECE (2024a)).

¹³ The UN Global Platform has been established under the aegis of the UN Committee of Experts on Big Data and Data Science for Official Statistics.

¹⁴ The FAIR principles outline a set of guiding principles to foster the discovery and reuse of data by multiple stakeholders (Wilkinson et al (2016)). More specifically, they require data to be findable (eg with rich, clear and searchable (meta)data), accessible (eg open and standardised), interoperable (eg with common vocabularies) and reusable (eg with accessible data usage licences, detailed provenance and relevant attributes).

statistics. It provides an informational model and brings three major advantages. To start with, it allows **data and metadata to be harmonised *within and across statistical domains***. For instance, macro statistics on the BOP and IIP are typically modelled through the “BOP” Data Structure Definition (DSD).¹⁵ This BOP DSD includes not only concepts specific to the BOP area (eg “international account item”) but also those belonging to other statistical domains, such as national accounts (eg “valuation”). In addition, SDMX ensures **proper governance of statistical concepts**. A notable example is the fact that any changes, for example those triggered by conceptual updates, are properly introduced after extensive consultations with subject matter experts and upon the agreement of the owners of the related concepts (SDMX (2014)). Finally, **standards such as SDMX enable and foster interoperability** (UNECE (2024c)). This entails several benefits across statistical processes, from collection – with lower reporting burden – to dissemination – through the implementation of open data platforms (Laaboudi et al (2024)).

...especially to promote data-sharing

A key aspect to meet the growing need for granular and alternative data for external statistics is data-sharing, both *within* and *outside* the official statistical community in each jurisdiction as well as across countries.

Sharing data resources *within* the national statistics ecosystem is a first, crucial priority, as national statistical offices and national central banks typically have shared responsibilities in the compilation of external statistics (UNECE (2020a)). For example, most national central banks in the EU are responsible for the compilation of BOP/IIP.¹⁶ They jointly cooperate and share data with Eurostat and national statistical offices, particularly to reconcile BOP and national accounts (ESS-ESCB (2024)). Moreover, from an organisational perspective, the setup of so-called “Large Cases Units” (LCUs) can be useful to exchange information on MNE activities among all the stakeholders involved.

Sharing of data should also occur *outside* the official statistical community, particularly with academia and the private sector. On the one hand, sharing data with academic institutions has become an established practice in several countries over the past few years. The creation of **research data centres** enables researchers to access confidential data from central banks while also safeguarding anonymisation, secure access and confidentiality (IFC (2023a)). Another noteworthy example includes the **International Network of Exchanging Experience on Statistical Handling of Granular Data** (INEXDA), which promotes knowledge-sharing on micro data issues across academia, central banks and international organisations (IFC (2018)). In the area of external statistics, the cooperation between central banks and researchers has been instrumental in advancing the understanding of several topics, including hidden securities (ECB, University of Osnabrück and World Bank), assessing euro area financial integration (Columbia Business School, ECB and Stanford University) and analysing the dynamics of international financial integration and households (Central

¹⁵ The DSD belongs to the SDMX Information Model and comprises a set of concepts to describe and identify data (SDMX (2016)). The DSDs for the BOP (SDMX-BOP) and FDI (SDMX-FDI) are available at sdmx.org.

¹⁶ For examples see the [Memorandum of Understanding](#) signed by Eurostat and the ECB on the quality assurance of statistics underlying the Macroeconomic Imbalance Procedure.

Bank of Ireland and Trinity College Dublin). On the other hand, **data sharing between private and public statistical agencies** has also become more relevant in official statistics, not least to supplement traditional statistical methods as well as to address timely policy needs (Jahangir-Abdoelrahman and Tissot (2023)). For example, the Bank of Italy and Bank of Thailand relied on mobile phone data, originated from wireless carriers, to refine their estimates of tourism flows during the Covid-19 pandemic (Carboni et al (2023)). Additionally, efforts are under way to establish digital platforms for data-sharing and knowledge dissemination, exemplified by initiatives like data catalogues, such as the Ministry of Statistics and Programme Implementation National Data Archive in India, or data spaces, such as the Common European Data Spaces (OECD (2022), European Commission (2024)). But, despite these advancements, the landscape of **data-sharing with the private sector lacks standardised taxonomies** to facilitate agreements and ensure a level playing field.

Hence, the above initiatives are being complemented by renewed efforts to streamline **data-sharing frameworks and practices at the global level**, especially under the third phase of the DGI. In particular, its Recommendation 13 has produced a new taxonomy for accessing private data, delineating the types of data to be shared, the roles of various stakeholders (such as data users, producers or holders) and the channels through which data are exchanged. Turning to Recommendation 14, it aims at establishing the definition of a set of principles for data-sharing, including for micro data. In addition, there has been limited but important progress in the actual sharing of statistical information at the international level, especially in specific regions such as the EU or in the context of BIS global statistical activities (Tissot (2017)).

Innovation can also play a decisive role in promoting data-sharing to support the compilation of external statistics, thereby alleviating the reporting burden while also facilitating a more comprehensive profiling of MNEs. First, **centralised collections** can help bridge the gaps between business and trade registers (UNSD (2024)). Lane (2024) advocates for centralised data collections on an international scale to consolidate data concerning the top 500 MNEs within the European Union, akin to the existing framework for supervising banks. A priori, this approach may mitigate information disparities and improve consistency in recording MNE activities. More broadly, work is also ongoing in the community of official statisticians to identify best practices for collecting data related to globalisation and digitalisation, such as e-commerce.¹⁷ Second, the **adoption of unified reporting and common identifiers** is also crucial in this regard. Typical examples are the global Legal Entity Identifier (LEI) covering legal entities across markets and jurisdictions taking part in financial transactions with information on their ownership structure, or the Permanent Identifiers (PermID) made available by the London Stock Exchange Group (UNECE (2024e)). The streamlining of data reporting and linkages can also be facilitated by the national and regional initiatives, including the Register of Institutions and Affiliates Database (RIAD)¹⁸ within the European System of Central Banks and the EuroGroups Register (EGR) serving as a coordination platform within the ESS for survey frames pertaining to global business activities. Third, **multi-source and multi-mode data collections** can be developed to pool together data from different sources, such as online questionnaires, monitoring offices, private providers and

¹⁷ For instance, see the workplan of the task team on globalisation and digitalisation of the Committee of Experts on Business and Trade Statistics (E/CN.3/2024/18).

¹⁸ See Perrella and Catz (2020).

traditional surveys. Key examples are the Smart Data for Multinational Enterprises project (Papailias et al (2021)) and the OECD-UNSD Multinational Enterprise Information Platform, which sources national, regional and private business registers to gather information on the world's 500 largest MNEs and includes a monitoring tool for large corporate events, such as mergers and acquisitions (Pilgrim and Ang (2024)).

5. Developing a roadmap for external statistics

Six building blocks...

Given the unprecedented speed at which the world is changing, anticipating emerging trends in external statistics is critical in at least two ways. First, from the user perspective, **anticipatory thinking** plays a critical role in meeting emerging analytical needs and addressing the measurement challenges posed by globalisation, digitalisation and climate change. Second, from the producer perspective, the growing availability of data and new techniques requires **proactively adapting statistical processes** to increase the quality, timeliness and relevance of, and trust in, external statistics. This calls, in turn, for sound strategies to use frontier technologies in a responsible, accountable and ethical way. Ultimately, the two perspectives combined call for setting up a **comprehensive roadmap to develop external statistics** in the years ahead, articulated in six blocks:

i. Capturing the impact of globalisation in an increasingly borderless world.

Globalisation will continue to put pressure on residency-based concepts, challenged by transnational activities which permeate geographical borders. Presenting data based on economic *ownership* or *control* will be critical to better capture economic linkages and exposures. Accurately measuring the intricate activities of MNEs and global financial intermediaries will also be key. In practice, several proposals can be suggested:

- Producing additional breakdowns on SPEs, for example to better track the advantages offered by the host country such as a lower tax burden.
- Compiling supplementary data on foreign-controlled corporations to analyse the extent of domestic *versus* foreign control in globalised economies.
- Enhancing data on global value chains to track the complex cross-border production networks that characterise modern trade.
- Identifying the economic ownership of securities' holdings through indirect data collections (eg custodian data) and international data sharing (eg third-party holdings in the CPIS).
- Compiling data on the currency composition of trade in goods and services and investment flows to better inform on currency exposures and risk management.

ii. Adapting external statistics to a digital and intangible reality. The fast digital transformation of today's society, shaped by the ubiquity of technology, the tokenisation of finance and vast cross-border flows of data, will keep challenging users and producers of external statistics. Key actions may include:

- Refining guidance and measurement techniques on digital trade, e-commerce transactions and intangible assets, such as software and data.
- Developing a framework for classifying and measuring innovative financial products, such as cryptoassets.
- Further refining the statistical treatment of financial derivatives in view of market practices, reflecting the increasing complexity and importance of these instruments.¹⁹

iii. Incorporating environmental aspects into external statistics. In particular, the threat of climate change unavoidably prompts adapting and embedding environmental-related metrics in external statistics. Key steps may include:

- Producing indicators on climate change and introducing new categories to identify environmental, social and governance (ESG) investments and green equity, loans and debt securities within the BOP and IIP.
- Combining data on the location and economic activity of direct investment enterprises with information on physical and transition risks from climate change.
- Going beyond residency-based metrics to measure international carbon emissions, for instance considering alternative approaches based on territory, ownership or final consumption and production.

iv. Achieving consistency, reducing asymmetries and improving reconciliation. Attaining consistency in recording practices, improving stock-flow reconciliation and ensuring comparability and completeness of external statistics will remain primary concerns for compilers. They call for various initiatives, including:

- Improving the coordination and the exchange of information among and within the international and national statistical systems, particularly between central banks and national statistical offices.
- Enabling a close dialogue with all the stakeholders involved in the chain supporting the production of external statistics, not least to make a better use of business registers and improve the linking of data across multiple sources.
- Enhancing MNE data collections, to make them more effective for both reporters and compilers.

v. Harnessing alternative data sources and types. Alternative data have become essential for supplementing or addressing the limitations of traditional sources mobilised for external statistics, especially to enhance accuracy and relevance. Proposals include:

- Tapping into new information sources and data types, such as geospatial and positioning, mobile phone and credit card data, to further improved monitoring of cross-border activities, such as tourism.

¹⁹ In line with the ongoing steps taken by the BIS to refine the provision of comprehensive measures for the size and structure of global derivatives markets.

- Leveraging payment statistics to gain additional insights into cross-border flows.
- Making better use of regulatory data to compile external statistics, for instance in the context of the European Market Infrastructure Regulation for financial derivatives.

vi. Promoting the agility and timeliness of external statistics in a fast-changing global landscape. To cope with growing uncertainty, regularly revisiting methodological and statistical processes, including through more timely releases, will play a pivotal role to better inform policymakers and the broader public. Several concrete actions that will be crucial in this regard include:

- Promoting access to micro data to perform ad hoc aggregations tailored to users' needs, especially to support evidence-based policymaking.
- Enhancing the production of experimental statistics as well as the compilation of supplementary items or breakdowns (based on their relevance, priorities and urgency).
- Investigating the feasibility of compiling higher-frequency BOP data.

...putting a premium on innovation, cooperation and securing public trust

To be successful, the implementation of the above roadmap requires a clear and shared vision of the future of external statistics. **Leveraging innovation, promoting international cooperation and maintaining trust in official statistics will be essential** in bringing such a vision to fruition.

First, there is no doubt that **innovation will continue to be high on the agenda** of external and official statistics as the facilitator for improved data acquisition, integration, management and analytics. It will empower statisticians with the required tools and techniques to complement traditional sources and fill gaps with alternative data, including in close collaboration with the private sector. In parallel, reaping the benefits of innovation and addressing its challenges will continue to require adequately trained staff, investment in IT as well as prioritisation of costs.

Second, in the light of the intricate interdependence of economies and the threat of climate change, **international cooperation is a fundamental requirement to preserve and promote further**. It can play a pivotal role in fostering global data governance and, more practically, in accessing, exchanging and sharing information. It will also help broaden the corpus of available information for producers and users to better understand pressing global issues.

Finally, and more fundamentally, **securing trust in external statistics will be essential to serving the public good**. In an increasingly competitive information ecosystem, the imperative to maintain accurate, credible and relevant external statistics cannot be overstated. More efforts will be needed to employ tailored communication to better engage with users as well as foster data-informed policymaking. Enhancing the accessibility and interpretability of data through enriched and transparent metadata will also be essential. Ultimately, central banks and statistical offices will need to promote sound stewardship to preserve the relevance of, and trust in, external statistics.

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