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Measuring what matters - broadening official statistics:
Session 2: How to react swiftly

Measuring what matters: Remaining relevant in the changing United States economy

Note by United States Bureau of Economic Analysis

Summary

The document provides an overview of how the US Bureau of Economic Analysis (BEA) is confronting the challenge of providing timely, relevant and comprehensive data in the conditions of changing economy. BEA uses five innovative mechanisms for this purpose: expanding the use of satellite accounts, leveraging flexible revision periods, strengthening partnerships with source data agencies, better harnessing big data, and developing a multi-disciplinary staff. Successful deployment of these strategies will allow to position agencies to readily anticipate and respond to rapidly changing economic tides in ways that meet the growing expectations of customers.

The document is presented to the Conference of European Statisticians' seminar on "Measuring what matters – broadening official statistics", Session 2 "How to react swiftly" for discussion.

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I. Introduction

1. Perhaps one of the most daunting challenges facing statistical agencies around the globe is keeping their statistics up-to-date in the sea of change that is the modern economy. Emerging technologies, the growing importance of global supply chains, and the expanding complexity of financial relationships continue to introduce significant measurement challenges into the field of economic accounting. As the producer of some of the United States' most closely watched and influential economic indicators, the United States Bureau of Economic Analysis (BEA) must confront this issue head-on.

2. BEA has identified five key areas that statistical agencies can focus on to help them stay relevant: (1) expand the use of alternative mechanisms, such as "satellite accounts"; (2) leverage flexible revision periods; (3) strengthen partnerships with source data agencies; (4) better harness "big data" and other non-traditional data sources; and (5) develop a dynamic, multi-disciplinary staff.

II. Expand the use of satellite accounts

3. To give statistical agencies the edge in responding to current global trends, they should consider low-cost ways to offer new datasets without changing official economic measures. BEA has a long, successful history of using "satellite accounts" to introduce supplemental data products. Over the years, BEA has constructed satellite accounts highlighting key sectors, such as arts and culture, travel and tourism, research and development, and health care. Satellite accounts serve two main purposes: (1) they provide alternative economic perspectives that are of keen interest to the user community by re-packaging existing data to evaluate a specific aspect or sector of the economy, and (2) they fuel the expansion and development of economic accounts by providing a framework for testing experimental measures without the risk of disrupting the core statistics.

A. Evaluate a specific aspect or sector of the economy

4. BEA typically constructs satellite accounts using rich detail from BEA's input-output (I-O) accounts, which provide an in-depth look at the relationships among industries, including each industry's contribution to GDP. Under this approach, satellite accounts essentially rearrange I-O detail and complement it with other data sources to highlight a certain sector or type of activity. BEA's Travel and Tourism Satellite Accounts (TTSAs) provide an excellent example of the content, construction, and use of satellite accounts.

- Content: TTSAs present a detailed picture of travel and tourism activity and its role in the U.S. economy. The accounts feature estimates of spending by tourists on 24 types of goods and services, including data on food services and drinking places, domestic and international air passenger transportation services, and automotive rentals. The accounts also present estimates of the income, output, and employment generated by travel and tourism-related industries;
- Construction: TTSAs are created using detail from the I-O accounts, augmented with data from other BEA accounts, from other government agencies, and from a private vendor of tourism statistics. The accounts comply with the standards set forth by the United Nations World Tourism Organization and its *International Recommendations for Tourism Statistics;*
- Use: TTSA data are regularly used by industry analysts, academic researchers, and U.S. government agencies (including Congressional offices) to analyze the

effects of tourism on the U.S. economy. Specifically, the TTSAs can be used to determine the expenditures of tourists and compare travel and tourism industries to other industries.

B. Test experimental measures

5. Satellite accounts also serve as a laboratory for experimenting and developing concepts that are not ready for implementation as official measures. At BEA, this approach has facilitated the introduction of new statistics much more quickly than relying on changes to the core set of accounts. For example, in the case of BEA's Health Care Satellite Account, health care spending is presented by disease rather than by type of product. This provides policymakers with a new view of spending that highlights the diseases that drive spending growth, and whether that growth is the result of an increase in the number of cases or the result of an increase in cost. Essentially, this satellite account provides a different perspective on health care spending that can help policymakers, but at the same time, does not disrupt the official GDP statistics.

6. Looking to the future, BEA will continue to expand its use of satellite accounts as a means of introducing statistics outside of its core datasets. BEA currently has three new satellite accounts—highlighting outdoor recreation, the digital economy, and ocean-related activity—in various stages of development.

- Outdoor recreation: In early 2018, BEA released prototype statistics measuring the economic effects of outdoor recreation—activities like boating, RVing, and snowboarding—across the U.S. economy. BEA will continue to gather feedback from businesses, industry groups, and other interested members of the public to help finalize definitions, data sources, and methods. A full set of detailed national statistics is expected to be released in the fall of 2018;
- Digital economy: In the spring of 2018, BEA released, for the first time, preliminary statistics on the size and growth of the digital economy. This marked a crucial step in a larger project aimed at better capturing the effects of fast-changing technologies on the U.S. economy and on global supply chains. BEA will build on these efforts to advance research on digital goods and services, the sharing economy, and free digital content;
- Ocean-related activity: BEA is in the initial stages of developing a satellite account for ocean-related economic activity. First steps include establishing a preliminary definition of ocean-related goods and services and exploring data sources and methods. From there, BEA will prepare national-level prototype statistics and gather public feedback by the fall of 2018.

7. Satellite accounts allow statistical agencies to spotlight specific sectors of the economy and test experimental measures without altering official economic statistics. This is an effective mechanism for statistical agencies looking to balance the competing demands of relevance, timeliness, and data integrity.

III. Leverage flexible revision periods

8. Statistical agencies' rigid revision processes have been a barrier for keeping up with continuous changes in the economy. Until recently, BEA regularly updated data and methods for recent years only; much more rarely would BEA revise longer time spans to introduce major changes in definitions, classifications, and methods. In 2010, BEA adopted a new, flexible approach to managing revisions that accelerated improvements to BEA's

accounts by expanding the periods subject to revision. “Flexible” annual revisions have benefited BEA and its customers in several ways—data users have a more accurate and up-to-date set of accounts with fewer changes reserved for infrequent, major revisions, and BEA is able to manage changes to its accounts better and allocate its resources more efficiently.

9. Historically, there have been two tracks for yearly revisions to BEA’s accounts—comprehensive updates and annual updates. Comprehensive updates are usually conducted at 5-year intervals that correspond with the release of information from the quinquennial U.S. economic census. BEA has often introduced major changes to the accounts in comprehensive updates because these improvements tend to require revisions to many years or to multiple components within the accounts.

10. In contrast, BEA’s annual updates were designed to revise the accounts with source data for recent periods, for example, incorporating information on domestic production, sales, and inventories from U.S. Census Bureau surveys and information from foreign trade reports. BEA has also used annual updates to introduce improvements to methods that primarily affected these recent periods. By convention, annual updates were limited to the 3 most recent years. As a result, some improvements that would have also significantly affected earlier periods were reserved for comprehensive updates to preserve time-series consistency.

11. About a decade ago, BEA recognized that its revision cycles had become out-of-sync with the realities of the modern economy. Instead, a more flexible approach to introducing major changes was taken. Flexible annual updates allow some of the complex and cross-cutting improvements, once introduced only every 5 years, to be incorporated into the accounts on a flow basis, benefiting customers and BEA alike.

A. Customer benefits

12. Flexible annual updates provide users of BEA’s statistics with better information earlier. In addition, users benefit from having fewer cross-cutting improvements to absorb when trying to understand how and why the long-term picture of the economy has changed during comprehensive updates.

B. Agency benefits

13. Flexible revisions also strengthen BEA’s review of many account improvements by removing them from peak production periods leading up to comprehensive updates when the demands on staff are greatest. In addition, flexible annual updates increase the frequency and scope of staff interactions across BEA’s program areas. Interactions among staff from different work areas yield insights that lead to improvements to the accounts. With flexible annual revisions, this contact is more continuous than periodic, increasing the efficiency with which BEA produces and improves its economic measures—an especially important characteristic in a tight budget climate.

14. Statistical agencies’ revision cycles should mirror the speed of change in today’s economy. By being more flexible and allowing for more changes, more regularly, agencies can ensure that their data products paint an accurate, fully nuanced picture of the global economy.

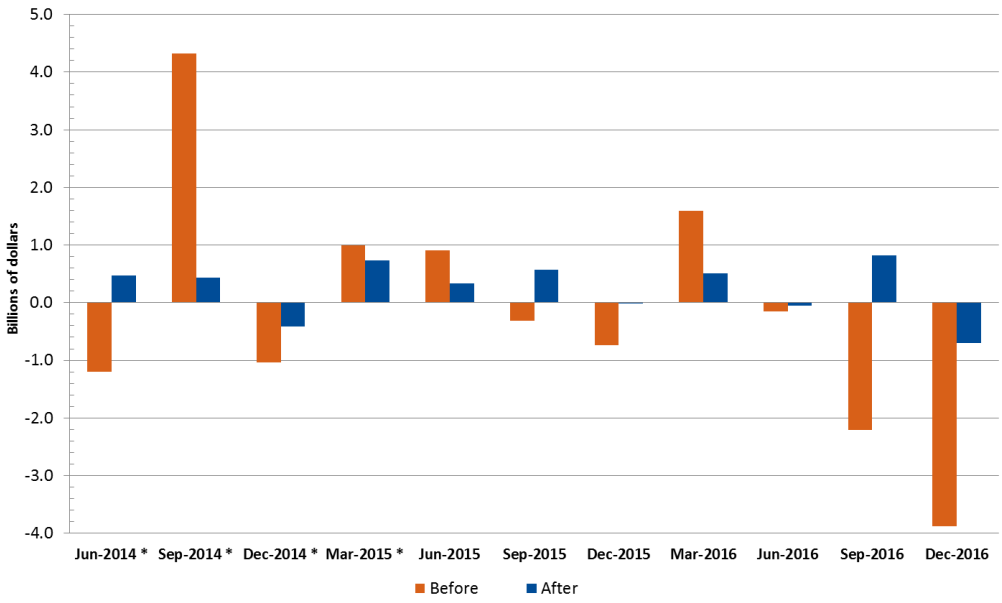
IV. Strengthen partnerships with source data agencies

15. As pressures for timelier, more detailed statistics mount, statistical agencies should pool resources to improve and expand their data products. This is especially true in decentralized statistical systems, as in the United States. BEA has a rich history of coordinating with other agencies to enhance data quality and achieve the earlier incorporation of vital information into principal economic indicators. BEA's recent work with the U.S. Census Bureau to accelerate the publication of source data for the initial GDP estimates highlights the importance of collaboration between statistical agencies.

16. Over the last several years, BEA and the Census Bureau have joined forces to release several key GDP inputs sooner, including data on business inventories, international trade in goods, and services spending. Previously, these data were not available in time for the preliminary GDP readings, and BEA made assumptions for the missing information. As a result of these efforts, BEA and the Census Bureau have been able to refine some of their most influential measures and reduce revisions to the early GDP statistics.

Chart 1

Exports of goods: Comparison of revisions before and after the incorporation of the U.S. Census Bureau Advance Report on U.S. Trade in Goods



*Simulated results; incorporation of the Census Bureau Advance Report on U.S. Trade in Goods began with

17. The introduction of the Census Bureau Advance Report on U.S. Trade in Goods provides a window into the effects of recent data improvement actions. In 2015, BEA collaborated with the Census Bureau to release international trade in goods data in time for BEA's first reads on quarterly GDP. BEA is now able to incorporate 3 months of Census Bureau data at the time of the initial estimates rather than using 2 months of source data and an assumption for the third month. Chart 1 compares revisions to BEA's estimates of exports of goods before and after the incorporation of data from the advance report. The timelier publication of Census Bureau data has led to notable improvements in BEA's export and import statistics and has reduced revisions to quarterly GDP by about $6 billion, on average, or 0.1 to 0.2 percentage point in growth-rate terms.

18. Moving forward, BEA will continue to partner with other U.S. statistical agencies to enrich the source data underpinning its economic accounts. For instance, as the next step in their data acceleration program, BEA and the Census Bureau are working to publish construction spending statistics earlier, improving BEA's estimates of investment in structures. Joint initiatives such as this allow agencies to share resources, best practices, and technical knowledge and pave the way for important advancements in the field of economic statistics.

V. Harness alternative data sources—including "big data"

19. Despite the falling response rates on government surveys and continued constraints on government resources, business executives, government officials, academic researchers, and consumers are demanding larger amounts of timely data to guide their economic decisions. To meet these demands, statistical agencies should explore ways to leverage alternative data sources, including "big data", keeping a close eye on the challenges associated with the use of these datasets.

20. Big data already feature prominently among BEA's sources and methods—the agency uses auto registrations to calculate motor vehicle output, retail store point-of-sale scanner data to estimate select components of consumer spending, and tax records to compute corporate profits. BEA's current efforts with big data fall into three main categories: (1) fill data gaps, (2) expand detail, and (3) employ "passive" data collection.

A. Fill data gaps

21. BEA is investigating ways to apply big data to improve the early GDP estimates. For example, BEA has begun researching how to better measure spending on products and services for which timely source data are lacking—for example, using commercial insurance claims data to estimate consumer spending on health care services that accounts for about 18 percent of gross domestic product. BEA is also expanding its use of retail scanner data to track consumer spending in the very dynamic area of digital goods and services—products like smartphones, video games, contract ride services (for example, Uber), and video and audio streaming services (for example, Hulu and Pandora).

B. Expand detail

22. BEA is also exploring how big data can provide more comprehensive information, finer geographic detail, and higher frequency statistics. For instance, BEA and the U.S. Census Bureau have initiated a project using zip code information from credit and debit card transactions to produce estimates of consumer spending by county and metropolitan area—geographic levels of detail that customers demand but that are not currently available or achievable through traditional survey methods. In addition, BEA is evaluating housing transactions and characteristics data from Zillow to improve housing measures within BEA's national and regional statistics.

C. Employ passive data collection

23. BEA and its statistical agency partners are examining applications for passive data collection—that is, automatically extracting data from a company's system and transmitting those data for compilation and analysis. For BEA's surveys of international trade, this would reduce respondent burden and increase response rates, improving the timeliness and

accuracy of BEA's statistics. The U.S. Census Bureau has also begun work in this area, collaborating with big data providers to gather information that would otherwise be collected through surveys. In an initial pilot project, the Census Bureau is testing the use of retail scanner data to fill in missing survey data, with the goal of enhancing monthly and annual retail trade surveys and the economic census.

24. While the overall benefits of using big data appear to outweigh the costs, significant obstacles associated with these data remain. Two of these obstacles are achieving sustainability and overcoming resource constraints.

D. Sustainability

25. The effectiveness of any statistical agency is inexorably tied to its ability to provide timely, meaningful information to customers in as transparent a way as possible. It is not enough to harness big data for one-time studies, no matter how groundbreaking they may be. Instead, these alternative data sources must be sustainable in a way that supports the ongoing production of statistics. There are several considerations under the umbrella of sustainability. First, to prepare reliable time series, statistical agencies must have access to high-quality data for long time spans that are based on consistent classifications and methods and that can be calibrated to fit into existing statistical frameworks. In addition, the data must be cost-effective, and any costs must be predictable over time. Finally, there must be incentives for both the data providers and the statistical agencies, hinging on considerations like cost structures, knowledge sharing, and publicity.

E. Resource constraints

26. Statistical agencies must make significant financial and human capital investments to understand, manipulate, and use big data sources. For example, the insurance claims data that underlie the disease-based price indexes of BEA's Health Care Satellite Account took about 10 years to develop. While it is not possible or practical to repeat this practice with every big data project, some level of investment will always be required. Purchasing data from third-party providers can help reduce some of the costs associated with big data. These vendors can help tremendously with processing big data into manageable chunks (for example, data scrubbing, editing, and aggregation) and can greatly diminish the amount of in-house investment required to handle these enormous datasets.

27. While there are hurdles to overcome, alternative data sources, like big data, hold much promise for revolutionizing the way statistical agencies collect, compile, review, and publish information. If government statisticians can forge long-term relationships with data providers and statistical agencies can invest the right level of resources in these efforts, big data may well be the key to ensuring the continuing quality, integrity, and relevance of some of the world's most vital economic statistics.

VI. Develop a dynamic, multidisciplinary staff

28. To tackle the unique challenges of measuring today's economy, statistical agencies should cultivate a staff with strong data science skills, in addition to more traditional skills in economics and statistics. This means recruiting the specific talent and abilities needed to address emerging data issues, training staff in a diverse range of topics—from foundational economic theories and statistical approaches to pioneering data management and analytics techniques, and bolstering employee engagement to retain agencies' internal knowledge bases.

A. Attract talent

29. Statistical agencies should cast a wide net to recruit employees with the right mix of skills, building cadres of agile, innovative analysts eager not only to maintain but also to improve the agencies' data products. At BEA, the days of hiring pure economists or pure statisticians, especially for research positions, are largely gone. BEA has found that employees with varied backgrounds naturally approach problems from multiple angles, resulting in novel solutions to some of the most pressing issues confronting economic measurement today.

B. Develop staff

30. Statistical agencies should strive to provide a plethora of opportunities for staff to encounter and interact with data science techniques as well as more traditional theories and methods. This means more cross-training of employees and more on-the-job exploration of data science, alongside conventional methods. BEA recently hired a Chief Innovation Officer not only to employ cutting-edge tools but also to teach them to staff. As BEA builds a community of practice around data science, these skills will begin to guide agency-wide innovation, ultimately transforming the development of new and enhanced statistical products.

C. Engage employees

31. Many of BEA's new hires enter the agency with training and experience in data science and visualization; however, it is often difficult to keep these staff engaged. The challenge is to find better ways to take advantage of these skill sets—there needs to be more flexibility about traditional divisions within statistical agencies (for example, an economist may assist communications staff with data visualization). As agencies tear down these organizational silos, they will be better equipped to fully make use of the knowledge, skills, and abilities of their employees.

32. Statistical agencies should consider how to build their human capital capacities by attracting, developing, and engaging staff from diverse backgrounds. Agencies should empower employees with skills in both data science and more traditional statistical methods and economic analysis to nimbly blaze the trail in modernizing the world's economic accounts.

VII. Conclusion

33. The international statistical community is charged with the arduous task of providing timely, relevant, and comprehensive economic data. BEA recognizes five innovative mechanisms for confronting this challenge: expanding the use of satellite accounts, leveraging flexible revision periods, strengthening partnerships with source data agencies, better harnessing big data, and developing a multi-disciplinary staff. Successful deployment of these strategies will go a long way in positioning agencies to readily anticipate and respond to rapidly changing economic tides in ways that meet the growing expectations of their customers.