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The Status of GDP Compilation Practices in 189 Economies and the Relevance for Policy Analysis

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Abstract

This paper examines the status of GDP compilation in 189 economies against six key criteria that describe national accounts compilation practices: whether the benchmark year is up to date, the availability and timeliness of annual and quarterly GDP, whether GDP by production and expenditure approaches are compiled independently to allow for comparisons, whether estimates by the income approach are available, and the vintage of the *System of National Accounts (SNA)* applied. We used publicly available information including from the IMF's [Dissemination Standards Bulletin Board (DSBB)](), and, for 108 developing economies, information provided by the IMF's real sector advisors stationed in the Fund's 10 Regional Technical Assistance Centers (RTACs). The data were compared with the UNSD and World Bank databases. We find that 50 percent of economies have acceptable benchmark years, 72 percent report timely annual GDP data, while 55 percent of economies report timely data for quarterly GDP. The study presents some conclusions for priorities of capacity development.

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I. INTRODUCTION[1]

Reliable GDP data are critical for macroeconomic and financial policy analysis including IMF surveillance. Data users rely on national accounts compilers to provide consistent, timely, and relevant GDP statistics in line with internationally acceptable standards laid out in the *System of National Accounts (SNA).* The IMF Statistics Department provides technical assistance to well over 100 economies to improve GDP compilation.[2] It also advises Fund economists when questions arise on the quality of GDP data for surveillance purposes. Based on the experiences gained with these activities over the past decades, this paper identifies six key criteria that are routinely applied to assess whether GDP data are fit for purpose.[3] In this paper, we highlight the results for the Fund's 189-member economies mainly in terms of the World Economic Outlook (WEO) regional groups.

We assess the status of GDP by examining six key features of the national accounts. These features are (1) years elapsed since the most recent benchmark year to indicate whether the current structure of the economy is appropriately represented, (2) the availability of annual and quarterly data, for forward looking policy analyses and forecasting, (3) the timely dissemination of annual and quarterly data, (4) the availability of GDP by production, expenditure, and income approaches, (5) the availability of independently estimated GDP approaches, and (6) the vintage of the SNA applied**.** The paper is based on publicly available information including the IMF's Dissemination Standards Bulletin Board (DSBB), and for 108 developing economies, information provided by the IMF's real sector advisors located in the Fund's 10 Regional Technical Assistance Centers (RTACs). The data were also compared with the UNSD's National Accounts Official Country Data database and the World Bank's database on Statistical Capacity Indicators. The dataset used in this paper is available in the technical appendix published separately.

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[2] The term "economy," as used in this paper, does not in all cases refer to a territorial entity that is a state as understood by international law and practice. The term also covers some non-sovereign territorial economies, for which statistical data are maintained and provided internationally on a separate and independent basis.

[3] To help users identify quality-related features of their macroeconomic statistical systems, the IMF developed the *Data Quality Assessment Framework* (DQAF). The DQAF is rooted in the UN Fundamental Principles of Official Statistics and is organized around a set of prerequisites and five dimensions of data quality—assurances of integrity, methodological soundness, accuracy and reliability, serviceability, and accessibility. This paper is focused on a subset of the DQAF.

Table 1. Status of GDP Compilation in 189 Economies: Six Criteria

1.	Most recent benchmark year	4.	Availability of GDP by different approaches
2.	The availability of annual and quarterly GDP	5.	Independent compilation of GDP by the production and expenditure approach
3.	Timeliness of dissemination	6.	The vintage of the SNA applied

II. YEARS ELAPSED SINCE THE BENCHMARK YEAR

The years elapsed since the update of the benchmark year is a key indicator of data quality of national accounts. The benchmark year refers to the year in which an economy`s transactions such as production—including input costs—, consumption, capital formation, international trade, and taxes are comprehensively measured and accurately reflect the structure of the economy (in current price GDP). The base year refers to the year of the weights that are used to measure constant price GDP. Benchmark and base years do not necessarily coincide. When a country adopts the chain-linking approach, the base year is updated annually.[4] As the structure of an economy evolves and as more or better data become available, revisions are needed to realign the national accounts with economic reality. Likely the most significant element of national accounts revisions is the updating of the benchmark year although other reasons for major revisions exist, for example changes in statistical methods and changes in concepts, definitions, and classifications.[5]

A good practice is to benchmark GDP estimates every 10 years or less. Updating the benchmark year generally improves the quality of national accounts estimates because of the incorporation of newly available and revised data sources, enhanced coverage as well as improved estimation methods. GDP is compiled based on the information and data sources available at a given period and thus benchmark revisions would require, for example, comprehensive household budget surveys, recent population censuses, business structural surveys or censuses, and up to date business registers. Compiling these statistics (including data collection and processing) is costly and may take several months. Often, the compiling agency will require additional funding for those activities.

About 50 percent of the economies updated their benchmark year within the last 10 years. For 65 economies (34 percent) the benchmark year is between 11 to 15 years old,

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[4] Dippelsman, Robert, Venkat Josyula, and Eric Métreau. 2016. "Fixed Base Year vs. Chain Linking in National Accounts: Experience of Sub-Saharan African Countries." IMF Working Paper No. 16/133.

[5] See *System of National Accounts, 2008*, the *Guidelines on Revisions Policy and Analysis* (Organization for Economic Co-operation and Development and Eurostat, 2008) and Carson, Carol S, Sarmad Khawaja, and Thomas K Morrison. 2003. "Revisions Policy for Official Statistics: A Matter of Governance." IMF Working Paper No. 04/87.

and older than 15 years in 30 economies (16 percent), as shown in Figure 1. From a regional perspective, Table 2 shows that almost all Advanced Economies and over 80 percent of Emerging and Developing Europe have updated base years. In the Commonwealth of Independent States, Sub-Saharan Africa, Emerging and Developing Asia, Middle East, North Africa, Afghanistan and Pakistan, updated base years exist in about 36 to 64 percent of the economies. In Latin America and the Caribbean, the percent of economies with updated benchmark years falls to 16 percent, mainly reflecting the status quo in the Caribbean and Central American countries.

Figure 1. Annual GDP - Age of Benchmark Year in 189 Economies
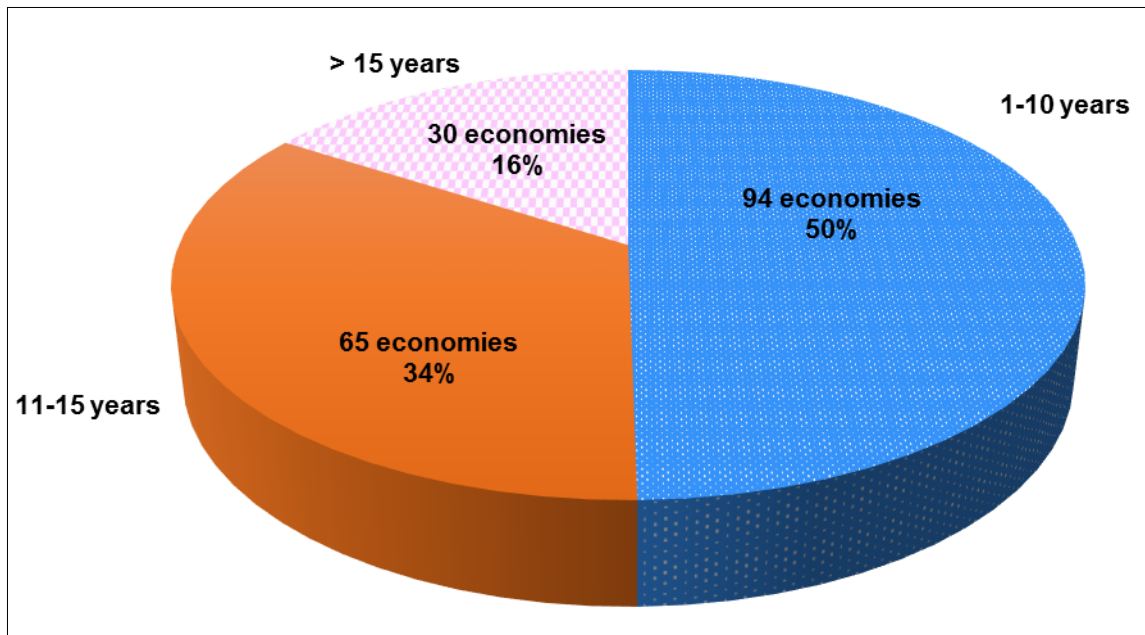
Source: Fund staff estimates as of October 2017.

Table 2. Annual GDP - Age of Benchmark Year in 189 Economies

Region	1-10 years		11 -15 years		Older than 15 years		Total Economies
	Number	Percent	Number	Percent	Number	Percent	
Advanced Economies	35	95	2	5	0	0	37
Commonwealth of Independent States	7	64	1	9	3	27	11
Emerging and Developing Asia	12	40	11	37	7	23	30
Emerging and Developing Europe	10	83	1	8	1	8	12
Latin America and the Caribbean	5	16	19	59	8	25	32
MENA, Afghanistan, and Pakistan	8	36	9	41	5	23	22
Sub-Saharan Africa	17	38	22	49	6	13	45
Memo: G-20 Economies	*18*	*90*	*2*	*10*			*20*
Total Economies	**94**	**50***	**65**	**34**	**30**	**16**	**189**

Source: Fund staff estimates as of October 2017; Economies are grouped according to IMF WEO regional classification.
* This represents 90.5 percent of the world GDP (current values of 2016)

The effects of updating outdated benchmark years vary widely across economies and can present significant difficulties for policy makers. Updating the benchmark year can have a large impact on both the level and growth rate of GDP, particularly if prices and volumes have changed significantly. The update may show an increase or decrease depending on the developments in the economy since the previous benchmarking exercise, the robustness of the compilation method, and the quality of the source data.

Some examples illustrate this point: In Africa, after benchmarking, the level of GDP in current prices was 89 percent higher in Nigeria, 60 percent higher in Ghana, 25 percent in Zambia, but 10 percent lower in Botswana. After benchmarking, national accounts typically provide more accurate estimates of the size of the economies (as measured by GDP) but also of their production and consumption structures (because, for instance, the benchmark update incorporates new or existing activities or products, which were previously not captured or ill-measured). In Latin America, it has generally resulted in increases in nominal GDP levels (for the base year assessed under the old and new methodology) with a median increase of 8.8 percent.[6]

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[6] Olinto Ramos Roberto, Gonzalo Pastor, and Lisbeth Rivas. 2008. "Latin America: Highlights from the Implementation of the *System of National Accounts 1993 (1993 SNA)*." IMF Working Paper No. 08/239.

III.   AVAILABILITY OF ANNUAL AND QUARTERLY GDP

Annual GDP data are needed for a longer, more in-depth view of trends and cycles in the economy while quarterly GDP data are key for short-term surveillance, forecasting, and policy analysis. Annual GDP is produced by 188 of the 189 economies in this study (Figure 2). During the past 15 years, many economies launched efforts to compile quarterly national accounts. Capacity development activities by the IMF, World Bank, and others have focused on higher frequency data, particularly quarterly national accounts.

Figure 2. Annual and Quarterly GDP Compilation by Region
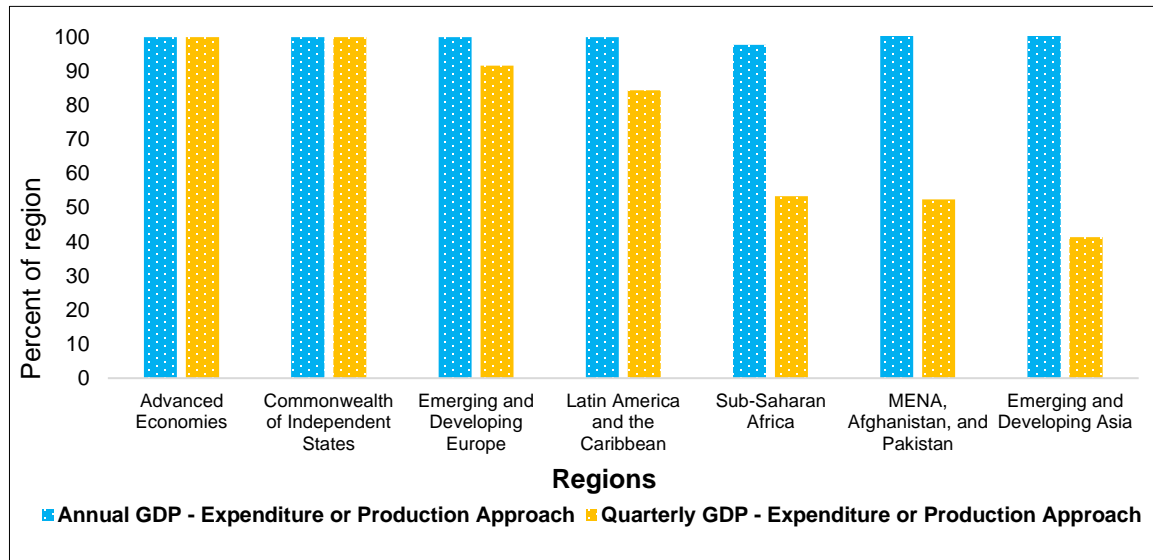
Source: Fund staff estimates as of October 2017; Economies are grouped according to IMF WEO regional classification.

While annual and quarterly national accounts use the same principles and definitions, data sources and statistical techniques differ. Quarterly national accounts require source data that are more frequent but possibly less complete and less comprehensive and are typically supplemented with extrapolation and other statistical techniques. An additional process is required to transform, and integrate quarterly source data within the SNA framework and to make quarterly estimates consistent with available annual estimates.[7]

Currently, 133 economies (70 percent of the total) disseminate quarterly GDP (Table 3). The share of economies that compile quarterly GDP is about 53 percent for Sub-Saharan Africa, 50 percent in the Middle East, North Africa, Afghanistan and Pakistan, and 40 percent in Emerging and Developing Asia. It is between 80 and 100 percent in the rest of the world. Overall, the economies that compile quarterly GDP represent approximately 97 percent of world GDP (current values of 2016).

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[7] IMF, 2017, "Quarterly National Accounts Manual - Concepts, Data Sources, and Compilation."

Table 3. Annual and Quarterly GDP by Production, Expenditure, and Income and Vintage of SNA
(Number of Economies and Percent of Region)

	Advanced Economies		Memo[1]: Emerging G20 and Emerging EU Economies		Common-wealth of Independent States		Emerging and Developing Asia		Emerging and Developing Europe		Latin America and the Caribbean		MENA, Afghanistan and Pakistan		Sub-Saharan Africa		Total	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent of Total Economies
Annual GDP																		
Production - current prices	37	100	15	100	11	100	30	100	12	100	32	100	22	100	43	96	187	99
Production - constant prices	37	100	15	100	11	100	29	97	12	100	32	100	22	100	43	96	186	98
Expenditure - current prices	37	100	15	100	10	91	20	67	12	100	31	97	21	95	43	96	174	92
Expenditure - constant prices	37	100	13	87	10	91	18	60	12	100	22	69	15	68	43	96	157	83
Memo: annual GDP by production **or** expenditure	37	100	15	100	11	100	30	100	12	100	32	100	22	100	44	98	188	99
Memo: annual GDP by production **and** expenditure	37	100	15	100	10	91	20	67	12	100	31	97	21	95	42	93	173	92
Memo: GDP - Income Approach[2]	37	100	12	80	10	91	12	40	9	75	16	50	11	50	24	53	119	63
Quarterly GDP																		
Production - current prices	34	92	15	100	11	100	12	40	10	83	25	78	11	50	15	33	118	62
Production - constant prices	35	95	15	100	10	91	12	40	10	83	27	84	10	45	23	51	127	67
Expenditure - current prices	37	100	14	93	8	73	9	30	11	92	17	53	5	23	11	24	98	52
Expenditure - constant prices	37	100	13	87	7	64	9	30	11	92	17	53	3	14	10	22	94	50
Memo: quarterly accounts: production or expenditure	37	100	15	100	11	100	12	40	11	92	27	84	11	50	24	53	133	70
Vintage of SNA																		
SNA 1968							1	3					1	5			2	1
SNA 1993	1	3	1	7	8	73	18	60	2	17	15	47	16	73	29	64	89	47
SNA 2008 / ESA 2010	36	97	14	93	3	27	11	37	10	83	17	53	5	23	16	36	98	52
Total number of Economies and percent of World GDP	**37**	**61**	**15**	**29**	**11**	**2**	**30**	**21**	**12**	**3**	**32**	**7**	**22**	**4**	**45**	**2**	**189**	**100**

Sources: Fund staff estimates as of October 2017, UN National Accounts Statistics: Main Aggregates and Detailed Tables, 2016 and World Bank Statistical Capacity Indicator Database; Economies are grouped according to IMF WEO regional classification.

1/ The economies covered are Argentina, Brazil, Bulgaria, People's Republic of China, Republic of Croatia, Hungary, India, Indonesia, Mexico, Republic of Poland, Romania, Russian Federation, Saudi Arabia, South Africa, and Turkey.

2/ GDP-Income Approach also includes economies that compile Gross Operating Surplus.

IV.   TIMELINESS OF ANNUAL AND QUARTERLY GDP

Timeliness of annual and quarterly GDP data is a key requirement for policy decisions.
Timeliness is defined in the *IMF Special Data Dissemination Standard Guide* as the lapse of
time between the end of a reference period (or a reference date) and the date on which the
data are disseminated. The IMF's Data Standards Initiatives (SDDS and SDDS Plus) require
economies to disseminate annual data within nine months of the reference period and
quarterly GDP within one quarter. Using these criteria, Table 4 shows that timely annual data
are disseminated by 73 percent of economies while timely quarterly data are disseminated by
55 percent (this is 77 percent of economies compiling quarterly data). In 32 economies
(17 percent of the total), annual data are disseminated with a lag of more than 15 months and
25 economies (13 percent) disseminate quarterly estimates with a lag of more than six
months.

**To promote timeliness and transparency, the IMF's Data Standards Initiatives
recommend that economies disseminate Advanced Release Calendars (ARCs)**. An ARC
should show the release dates of data for the current month and the following three months.[8]
A publicly available ARC provides users with information on when data will be released, it
signals good management and transparency of statistical compilation, and helps compilers
take an active and organized approach to acquiring the inputs for their work. It also promotes
communication with users including the media. Currently 57 percent of economies have
ARCs (Figures 3 and 4), of which 7 percent correspond to SDDS Plus economies, 32 percent
to SDDS economies and 17 percent to e-GDDS economies.

Table 4. Annual and Quarterly GDP - Timeliness of Data Release in 189 Economies

(Number of Economies and Percent)						
Release of Annual GDP						
9 months or less		**10 - 15 Months**		**Later than 15 Months**		**Total Economies**
Number	Percent	Number	Percent	Number	Percent	
137	73	20	11	32	17	189
Release of Quarterly GDP						
3 months or less		**4 - 6 Months**		**Later than 6 Months**		**Total Economies**
Number	Percent	Number	Percent	Number	Percent	
104	55	4	2	25	13	133 / 189

Source: Fund staff estimates as of October 2017.

[8] The availability of an ARCs is a requirement for subscribing to the IMF's SDDS and SDDS Plus. ARCs are
required for all SDDS and SDDS Plus data categories, except for the encouraged categories, and for those data
categories disseminated daily: interest rates, stock market (share price index), and exchange rates. e-GDDS
participants are encouraged to disseminate an ARC taking into considering each country's own circumstances.

Figure 3. Availability of Advance Release Calendars in 189 Economies
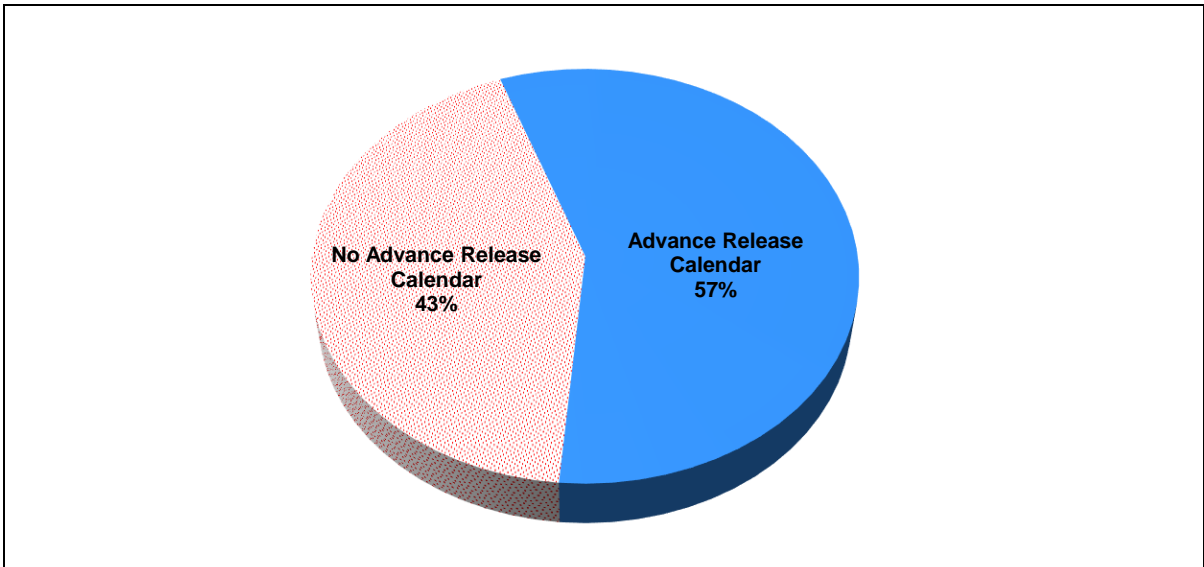
No Advance Release Calendar 43%

Advance Release Calendar 57%

Sources: Fund staff estimates as of October 2017 and World Bank Statistical Capacity Indicator Database.

Figure 4. Availability of Advance Release Calendars Across Regions
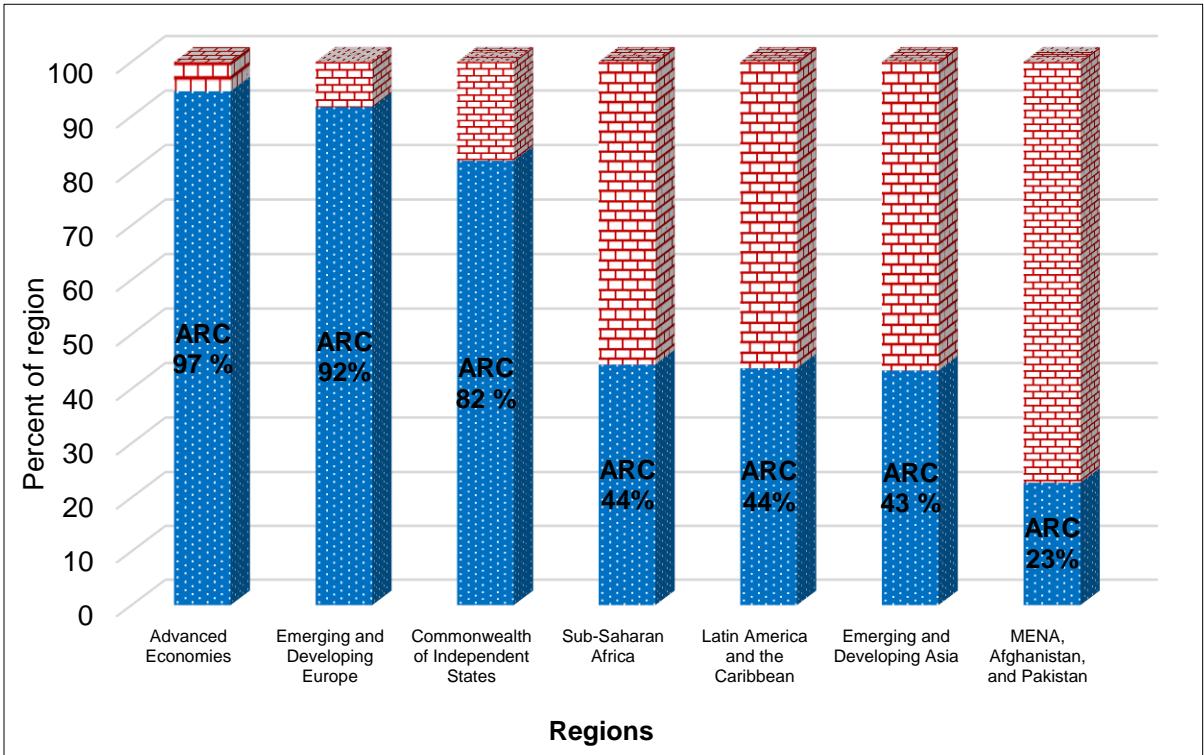
Sources: Fund staff estimates as of October 2017 and World Bank Statistical Capacity Indicator Database.

V. GDP BY PRODUCTION, EXPENDITURE, AND INCOME

Ideally, GDP is estimated according to three approaches; production, expenditure (both in current and constant prices), and income (only current prices). Table 3 depicts economies' compilation scopes by production, expenditure, and income, and current versus constant prices GDP. Virtually all economies compile annual GDP in current and constant prices from the production approach. Current and constant price GDP from the expenditure side are compiled by 174 and 157 economies respectively. Economies not reporting current GDP by expenditure are mainly in Emerging and Developing Asia while several Latin America and Caribbean economies and Middle East and North Africa economies only release current expenditure GDP.

Often the first stage of developing a national accounts system is to compile GDP by type of economic activity or industry (production approach). The availability of source data drives the development of national accounts statistics. Industry and business statistics are commonly more readily available on a continuous basis in most economies since they may already be part of other statistical systems. On the other hand, key data sources for the expenditure and income side require more advanced statistical systems covering household and corporate income data on a continuous basis. For example, household final consumption expenditure is generally derived from household surveys which are costly and thus not always conducted on a regular, timely, and continuous basis.

Compiling constant price GDP requires a series of price statistics. Good practices on deflation requires detailed price statistics for all GDP components by product groups.[9] Detailed deflation is commonly carried out on annual estimates and the most relevant prices required for deflation are Producer Prices (including agriculture, construction, and services), Consumer Prices, and Export and Import Prices. These deflators are not available in some economies. On the other hand, some countries rely on volume indicators to derive constant prices GDP estimates directly (for instance, quarterly GDP).

About 64 percent of economies compile at least some components of annual GDP by the income approach.[10] The availability of GDP by income component supports the analysis of profitability and distribution of income between capital and labor. However, with reliable data on the compensation of employees, taxes less subsidies on products and production, the other key component gross operating surplus/mixed income can be calculated as a residual. GDP from the income approach is reported by 119 economies (Table 3) and the availability is particularly limited in Sub-Saharan Africa (53 percent of economies), Middle East, North

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[9] Alexander, Thomas, Claudia Dziobek, Marco Marini, Eric Metreau, and Michael Stanger. 2017. "Measure up: A Better Way to Calculate GDP." IMF Staff Discussion Notes No. 17/02.

[10] The availability of GDP by the income approach in this paper includes countries compiling some of the main income components.

Africa, Afghanistan and Pakistan (52 percent), Latin American and the Caribbean (50 percent), and Emerging and Developing Asia (41 percent).

The development of annual GDP data in the ten G-20 Emerging Economies and the five European Union Emerging Economies is broadly in line with that of Advanced Economies. The most important exceptions are constant GDP from the expenditure approach (available in 13 economies) and GDP from the income approach (available in 12 economies) as shown in the second column of Table 3. These economies represent about 29 percent of the world GDP while G-20 economies account for 86 percent of the world GDP.

Quarterly GDP from the production approach in constant prices (127 economies) is more common than GDP from the expenditure approach (94 economies) as shown in Table 3. The income approach is not as widely used as the two other approaches for estimating quarterly GDP, partly because the required data might not be available at an intra-annual frequency, and partly because the income approach may only be estimated at current prices.[11] The availability of quarterly GDP from the expenditure approach at constant prices is particularly limited in the Middle East, North Africa, Afghanistan and Pakistan (14 percent), and Sub-Saharan Africa (22 percent) (Figure 5).

Figure 5. Quarterly GDP Compilation by Region and Method
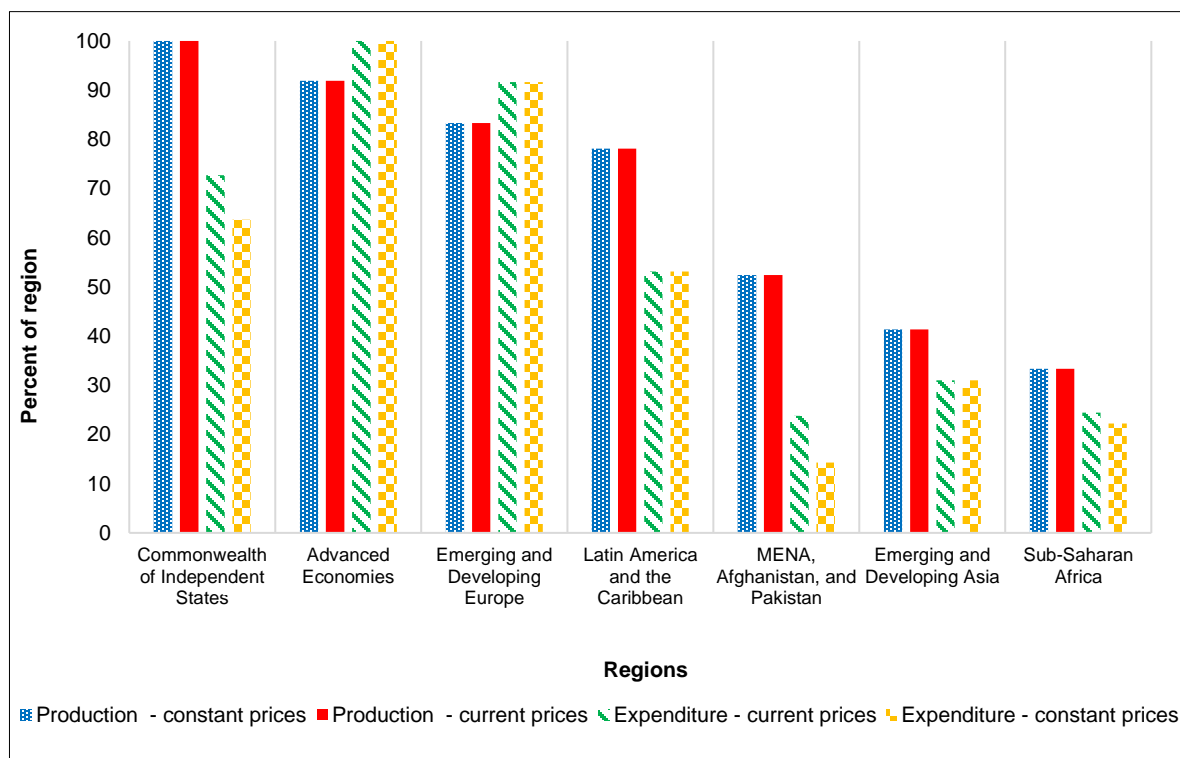
Source: Fund staff estimates as of October 2017; Economies are grouped according to IMF WEO regional classification.

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[11] See footnote 7.

VI.   DATA ON GDP BY PRODUCTION AND EXPENDITURE DERIVED INDEPENDENTLY

When the production and expenditure approaches are derived independently, GDP estimates benefit from cross validation of each of these estimates. Different source data and methods are used to estimate different components of GDP. Validation procedures are carried out so that discrepancies between approaches are managed in favor of more reliable data sources increasing the GDP robustness when consistency is achieved. Countries may not be able to assign all discrepancies and thus report a statistical discrepancy in the GDP estimates. Supply and use tables are the appropriate tool to perform a detailed reconciliation, as recommended by the SNA.

In many economies, GDP from either the production or the expenditure approach is estimated first and is considered the official measure. Thereafter, the sum of expenditure aggregates or the sum of industry GDP are assumed to be equal to official GDP. For instance, in most Sub-Saharan economies expenditure based GDP is not independently estimated and frequently, private final consumption expenditure is calculated as a residual. Figure 6 shows that production and expenditure GDP are derived independently by 48 percent of the economies. The number of economies that derive independent estimates of GDP by production and expenditure is proxied by those that produce supply and use tables or report statistical discrepancies in GDP.

Figure 6. Are Production and Expenditure GDP Derived Independently?[1]
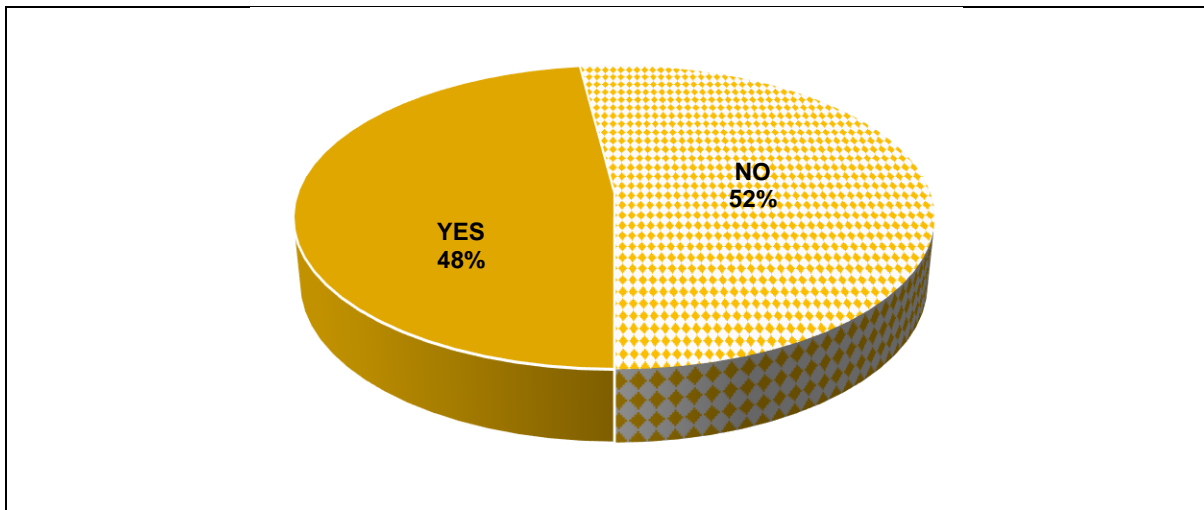
Sources: Fund staff estimates as of October 2017 and UNSD National Accounts Official Country Data.

1/ Of the 189 economies in this sample, 173 economies compile both Production and Expenditure GDP (See Table 3). The number of economies that derive independent estimates of Production and Expenditure GDP is proxied by those that produce supply and use tables or report statistical discrepancies in GDP.

VII.   VINTAGE OF THE SNA APPLIED

The most recent vintage of the SNA is the *2008 SNA*. Of the 189 economies, 98 (52 percent of economies representing 94 percent of world GDP) have adopted the *2008 SNA* methodology, 89 (47 percent) use the *1993 SNA*, and two still apply the *1968 SNA*.[12] Implementation of the *2008 SNA* varies across regions. Almost all Advanced Economies and Emerging and Developing Europe economies, and 53 percent of Latin American and Caribbean economies have adopted the *2008 SNA*. In the other regions, most of the economies produce their data according to the *1993 SNA*, particularly in the Middle East, North Africa, Afghanistan and Pakistan regions, where only five economies have adopted the *2008 SNA*.

What does this mean for data users? How different is GDP when it is compiled according to *2008 SNA* versus *1993 SNA*? The *2008 SNA* retains the basic theoretical framework of its predecessor the *1993 SNA*. The *2008 SNA* mainly introduces treatments for new aspects of the economy, elaborates on aspects of analytical interest, and clarifies guidance on a range of issues. The most important changes which impact GDP concern the capitalization of expenditure on Research and Development (R&D) and Military Weapons Systems.

In most OECD economies, the methodological changes resulting from *2008 SNA* implementation resulted in a significant upward shift of the *level* of GDP while the impact on growth *rates* was small.[13] The overall impact on GDP-levels was 3.1 percent (weighted average of all OECD economies in 2010), ranging from 1.2 to 5.1 percent. The average increase of GDP due to capitalizing expenditure on R&D and Military Weapons Systems was, respectively, 2.2 percent and 0.3 percent. Concerning GDP growth, over the period 1992 to 2012 the difference in GDP growth for the OECD average was generally within the boundaries of +/- 0.1 percentage points.

The impact for the member countries of the European Union was below the overall OECD area. The methodological changes introduced by *ESA 2010*[14] increased the GDP of the European Union by 2.3 percent.[15]The impact on the GDP level in the five biggest

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[12] The information on the vintage includes data as reported by economies.

[13] Peter van de Ven, "New standards for compiling national accounts: what's the impact on GDP and other macro-economic indicators" OECD Statistics Brief, February 2015, No. 20.

[14] The European System of National and Regional Accounts (ESA) sets out the harmonized methodology that must be used for the compilation of national accounts data in the European Union (EU). The latest version is *ESA 2010* that was implemented in September 2014 (from that date onwards the data transmission from Member States to Eurostat is following *ESA 2010* rules). *ESA 2010* is the counterpart of, and is consistent with, the *2008 SNA*.

[15] Marianthi Dunn, Leonidas Akritidis and Luis Biedma, "The impact of *ESA 2010* on key indicators of the national accounts in Europe," EURONA, 2/2014.

European countries was less than 4 percent, while it was 4.4 percent in Sweden, 4.2 percent in Finland. In the United States the level of the GDP increased by 4 percent.

How will the introduction of *2008 SNA* impact developing economies? The impact on GDP of the capitalization of R&D and Military Weapons Systems depends on the relative size of these expenditures to GDP. In many emerging market economies and middle-income economies, the impact could be of a magnitude similar to those of OECD/EU economies. In many low-income economies, the component of R&D is likely to be small.

Beyond GDP, the implementation of the *2008 SNA* affects other national accounts aggregates such as gross fixed capital formation and saving. For instance, in the European Union, the revision in gross fixed capital formation in 2010 was 12.9 percent for the European Union as a whole, with the largest overall revisions in Ireland (35.4 percent) and Sweden (30.2 percent).[16] Although these refer to the combined impact of the implementation of *ESA 2010* and the associated statistical improvements, they are informative about the order of magnitude of the revision due to the adoption of the *2008 SNA*.

VIII. CONCLUSIONS AND FURTHER RESEARCH

A key finding of this study is that about 50 percent of the 189 economies estimate GDP using benchmark data not older than 10 years. These countries represent 91 percent of world GDP. The impact of updating the benchmark year depends on a variety of circumstances such as the extent to which the structure of the economy has evolved since the last benchmark year. GDP may be higher or lower, revisions may be large or small. Outdated GDP benchmarks may result in misleading interpretations of GDP evolution. Updates in very long intervals can produce large revisions and make the interpretation of the data more difficult. Outdated benchmark years raise concerns about the usefulness of GDP estimates for policy analysis.

Virtually, all economies compile annual GDP data while the compilation of quarterly GDP data (71 percent of economies, representing about 97 percent of GDP), is less developed. Timeliness of dissemination also varies across economies and many do not publish Advance Release Calendars which makes it difficult to predict data release. Annual data are disseminated with very long delays of 15 months or more in 17 percent of economies and in 13 percent of economies, quarterly data are released with delays of six months or more. Long delays in dissemination reduce the relevance of these data for policy analysis and sometimes result in parallel data compilation efforts by other private or government agencies. Such parallel systems typically use other data sources or nonstandard methodologies and produce different results which may cause confusion. The adoption of an Advance Release Calendar can be an effective first step in this respect.

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[16] See Dunn et al., "The impact of ESA 2010" (see footnote 2).

The compilation of GDP based on the production approach is more developed than the expenditure approach in many developing economies. The income approach is less developed than the other two approaches except for Advanced Economies and the Commonwealth of Independent States. Independent estimates of production and expenditure approaches, which allow data comparisons are compiled by 48 percent of economies. The lack of independently derived data in 52 percent of the economies reduces users' ability to judge the quality of the data.

On the vintage of the SNA, about 52 percent of the economies compile GDP data according to the current vintage, the *2008 SNA,* **and most others apply the** *1993 SNA***.** In advanced economies, the adoption of the *2008 SNA* has resulted in relatively small changes to GDP growth, but larger changes, mostly upward, to the *level* of GDP with impacts on ratios used for policy purposes such as debt-to-GDP. In low-income economies, the effect is likely to be small especially as compared to changes that may result from updated benchmark years or improved data sources. Improved data sources to capture the informal sector, for example, are likely to lead to more significant revisions.

From a capacity development point of view, priority should be given to updating the benchmark year, developing quarterly GDP data, deriving production and expenditure GDP data independently, and improving the timeliness of dissemination. In cases where updating of the benchmark year and improved source data lead to significant revisions, backcasting the data to address breaks in the series and effective communication with data users are needed. The use of an Advance Release Calendar provides data users with predictability and it signals sound management and transparency of statistical compilation. It also helps compilers take an organized approach to data compilation.

Future studies may extend to other features of national accounts or more in-depth analyses of the size of revisions due to improved methods and data sources. For example, a further study could consider whether GDP captures the informal economy (where relevant) or estimates of the size of household production or whether consistent time series are available for an adequate period of time. The appropriate use of deflators to derive GDP in constant prices could also be considered. Other research topics could include the coverage of the other components of the national accounts for example the government sector ("G" in the familiar formula Y= C+I+G+X-M). The System of National Accounts requires comprehensive coverage of the general government sector but many economies compile data only for the central government.[17] The authors also recommend repeating this study in 3–5 years to monitor how the GDP data and compilation practices improve over time.

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[17] Dippelsman, Robert, Claudia Dziobek, and Carlos A. Gutiérrez Mangas. 2012. "What Lies Beneath: The Statistical Definition of Public Sector Debt." IMF Staff Discussion Note No. 12/09.

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