Differences in IMF Data: Incidence and Implications

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Data published in IMF country reports and International Financial Statistics (IFS) *may differ for seemingly identical variables, and at times users may be unaware of the reasons underlying such differences and may lack the information needed to permit reconciliation. This paper presents a study of the consistency of annual data on core statistical indicators presented in the* IFS *and a sample of country reports. The paper finds a significant incidence of apparent discrepancies for similarly defined variables. It discusses the reasons for differences and examines the implications for research using an example from the debt sustainability literature.* [JEL C10, C82]

The publication of country reports beginning in the mid-1990s has significantly expanded the statistical information published by the IMF. Previously, the IMF disseminated economic and financial statistics primarily through its traditional statistical publications and databases, led by *International Financial Statistics (IFS)* and the *World Economic Outlook (WEO).*[1] This paper assesses the use of generally more timely data contained in IMF country reports to supplement the standard IMF publications and databases, and illustrates certain pitfalls.[2] We study differences between key time series published in the *IFS* and country reports, determine their

size and frequency, and attempt to explain how and why such differences arise. In the process, we provide researchers with practical advice on how to make good use of country reports in empirical research.

Data reported to the IMF by member countries and published in country reports and the *IFS* may differ for seemingly identical statistical concepts or variables. Such discrepancies stem principally from differences in the objectives of these publications. In some cases, differences can be attributed to the incorporation of more recent data revisions in country reports. Other differences reflect adaptations to suit country-specific analytical purposes, with country reports focusing on recent economic developments, whereas the *IFS* emphasizes cross-country comparability and definitional consistency over time. Nonetheless, external and internal users may not be fully aware of the reasons behind differences in data contained in various IMF publications or may have difficulties reconciling these differences.[3]

This paper presents the results of a study on the consistency of data published in Article IV consultation reports and the *IFS*. It examines the frequency and nature of differences using only publicly available data and metadata in these IMF publications, and attempts to identify discrepancies that may raise legitimate concerns. Specifically, it presents the results of a survey to discern differences between data for key variables presented in country reports for 66 countries and the same data published in the *IFS*.

To illustrate practical implications, the paper concludes with an example drawn from the debt sustainability literature illustrating how answers to certain questions are affected by small measurement errors of a similar magnitude to the data differences found in this study. The illustration serves to indicate the utility of supplementing standard IMF statistical publications and databases with data from country reports. A strategy for sequencing the use of IMF data is suggested. Specifically, researchers in need of the most recent estimates available from IMF sources, particularly those researchers conducting cross-country studies, should rely first on *IFS* data to ensure cross-country comparability and definitional consistency; if *IFS* data are not available for the required time frame, they should rely on data in country reports, after ensuring consistency with the *IFS* for historical observations.

I. Design of the Study

Sample

A sample of 66 Article IV consultation country reports was selected from the total of about 150 published between September 2002 and June 2004 (Table 1). Sample selection methodology was designed to yield a representative sample to facilitate analysis that would be valid for the total population. The sample reflects key attributes thought to be relevant for the analysis—specifically, geographic region, stage of development (advanced, transition, or developing), and IMF program status.

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[3]In any event, data differences presented in this study should not be interpreted as reflecting deficiencies in data practices of IMF staff or deficiencies of member countries in their provision of data to the IMF.

Table 1. IMF Country Reports and Reference Year			
Advanced Economies		**Developing Economies**	
Australia	2002	Algeria	2001
Belgium	2002	Argentina	2001
Canada	2002	Bangladesh	FY2000/01
Cyprus	2001	Bhutan	FY2000/01
France	2002	Brazil	2001
Germany	2002	Burkina Faso	2001
Hong Kong SAR	2002	Chile	2002
Israel	2002	Colombia	2001
Italy	2002	Congo, Rep. of	2002
Japan	2002	Costa Rica	2001
Korea, Republic of	2002	Ecuador	2001
Singapore	2001	Egypt	FY2002/03
Sweden	2002	Ghana	2001
Switzerland	2002	Honduras	2001
United Kingdom	2002	India	FY2000/01
United States	2002	Iran, I.R. of	FY2001/02
Countries in Transition		Kenya	FY2001/02
		Lebanon	2002
Azerbaijan	2001	Malaysia	2001
Czech Republic	2001	Malta	2001
Hungary	2002	Mauritania	2001
Kazakhstan	2001	Mauritius	FY2000/01
Latvia	2002	Morocco	2001
Lithuania	2002	Myanmar	FY2000/01
Macedonia, FYR	2001	Namibia	2001
Mongolia	2000	Nicaragua	2000
Poland	2001	Papua New Guinea	2002
Romania	2001	Peru	2002
Russian Federation	2001	Saudi Arabia	2001
		Senegal	2001
		South Africa	2001
		St. Lucia	2002
		Tanzania	2000
		Thailand	2001
		Tunisia	2001
		Uganda	FY2000/01
		Uruguay	2002
		Vanuatu	2000
		Vietnam	2001

Sources: IMF country reports.

Variables Selected for Comparison

Annual data, including period averages for flow variables and end-of-period values for stocks, provided in country reports were compared with annual data published in the June 2004 edition of the *IFS* for the following 11 key macroeconomic variables: nominal GDP; real GDP growth; the rate of inflation; international reserves;

external current account balance; merchandise exports; merchandise imports; general government balance; total public debt stock; bank credit to government; and broad money stock.

Most of these variables were covered by the core statistical indicators required during the sample period for Article IV surveillance. They form a common set of data to be provided to the IMF by all member countries on a timely basis. These data provide an overview of macroeconomic developments and enable the IMF Executive Board to form views on the appropriateness of economic policies. Many of these variables, or transformations, also figure in early-warning-system models of currency crisis.[4]

Comparison Year

Comparisons were made for the latest year for which complete historical data were provided in both the country report and the *IFS*. Generally, the comparison year was determined by the country report, with the latest year of complete historical data being generally one year before issuance of the report, and at times two. Consequently, for the period from which the sample of country reports was drawn, the comparison year was usually 2001 or 2002. In some instances, the *IFS* provided data for certain variables with longer reporting lags, usually in the national accounts or government finance areas. In these instances, the comparison year for these variables was shifted to the last year of actual data available in the *IFS*.

Classification of Comparison Outcomes

The examination of data published in country reports and the *IFS* frequently involves more than a straightforward determination of whether two statistics matched. Even variables compiled using widely accepted methodologies, like nominal GDP and consumer price inflation, at times could not be directly compared because the reference periods differed. For example, country reports sometimes presented data based on the country's fiscal year rather than on calendar years as in the *IFS*.

In cases where data were not reported in a directly comparable format, it is frequently possible to put them on a comparable basis—that is, in the same units for the same definition or institutional coverage and time period—by means of a straightforward calculation. For example, when a country report did not present GDP directly, GDP was calculated from a variable reported both in nominal value terms and as a percentage of GDP.[5]

Based on whether data published in both sources for the same variable were directly comparable or had to be put on a comparable basis, the outcomes of

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[4]For a recent survey, see Berg, Borensztein, and Pattillo (2004).

[5]Another example is the comparison of broad money frequently presented in staff reports with the sum of money and quasi-money reported in the *IFS*. If only the percentage change in broad money is presented in the country report, broad money is compared by adding money and quasi-money reported in the *IFS* in the comparison year and the previous year and computing the percentage change.

comparisons were classified as: direct match, consistent when put on a comparable basis, direct discrepancy, inconsistent when put on a comparable basis, or not comparable.

The outcomes—"direct match" and "consistent when put on a comparable basis"—are achieved when the data reported for the same variable are within 2 percent of each other.[6] When they are not, the outcomes—"direct discrepancy" and "inconsistent when put on a comparable basis"—are obtained, depending on whether the data could be compared directly, or indirectly after being put on a comparable basis.[7] The outcome "not comparable" is recorded when data provided in the country report could not be compared to similar *IFS* variables.

II. Results

The comparison of data presented in country reports and the *IFS* for the 11 key variables for the sample countries indicates a significant number of differences and apparent discrepancies. The frequency and nature of differences are analyzed below, by variable for the entire sample (Figure 1), then by variable for three country groupings (Tables 2–4).

For the entire sample of countries, 64 percent of the data for the 11 variables were either direct matches or consistent when put on a comparable basis, whereas 19 percent showed inconsistencies or discrepancies and 17 percent were not comparable. Advanced countries showed the lowest proportion of matching and consistent data (61 percent), owing mainly to their having the highest proportion of noncomparable data (20 percent). This followed from the absence of reporting of a monetary survey in country reports for advanced countries, leaving no data on bank credit to government to be compared with data in the *IFS*. Both transition and developing countries had a proportion of inconsistencies and discrepancies of 19 percent. Transition countries had a slightly higher proportion of matching and consistent data (66 percent) than developing countries (64 percent).

For the entire sample and for the country groups separately, there were higher rates of direct matching or broad consistency (for data put on a comparable basis) for nominal and real GDP, consumer price inflation, international reserves, and balance of payments statistics than for government finance statistics and bank credit to government. The results for the last variable reflect to some extent the effect of different definitions of government between the country report and the

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[6]The selection of 2 percent as the divergence criterion, rather than a tighter level, is related to the rounding of source data, principally in country reports. This can be illustrated in the case of Cyprus, where the 2003 Article IV country report presents nominal GDP for 2002 of US$9.1 billion. The *IFS* reports nominal GDP in billions of local currency, which, when converted to billions of U.S. dollars, yields an estimate of US$9.144. The 0.5 percentage point difference between these two estimates is purely the result of conversion and rounding. While the size of such differences is a function of the scale of the variable under consideration, a 2 percent divergence criterion was considered sufficiently tight to ignore spurious rounding differences, while signaling data divergences.

[7]Valid reasons for "direct discrepancy" and "inconsistent when put on a comparable basis" outcomes could frequently be provided by area department's country desks. However, because external users cannot easily ascertain these reasons from information provided in the country report and the *IFS,* the outcome was not changed.

Figure 1. Comparison of IMF Country Reports and
International Finance Statistics (IFS), by Variable
(In percent)

All Variables

Nominal GDP

Real GDP Growth Rate

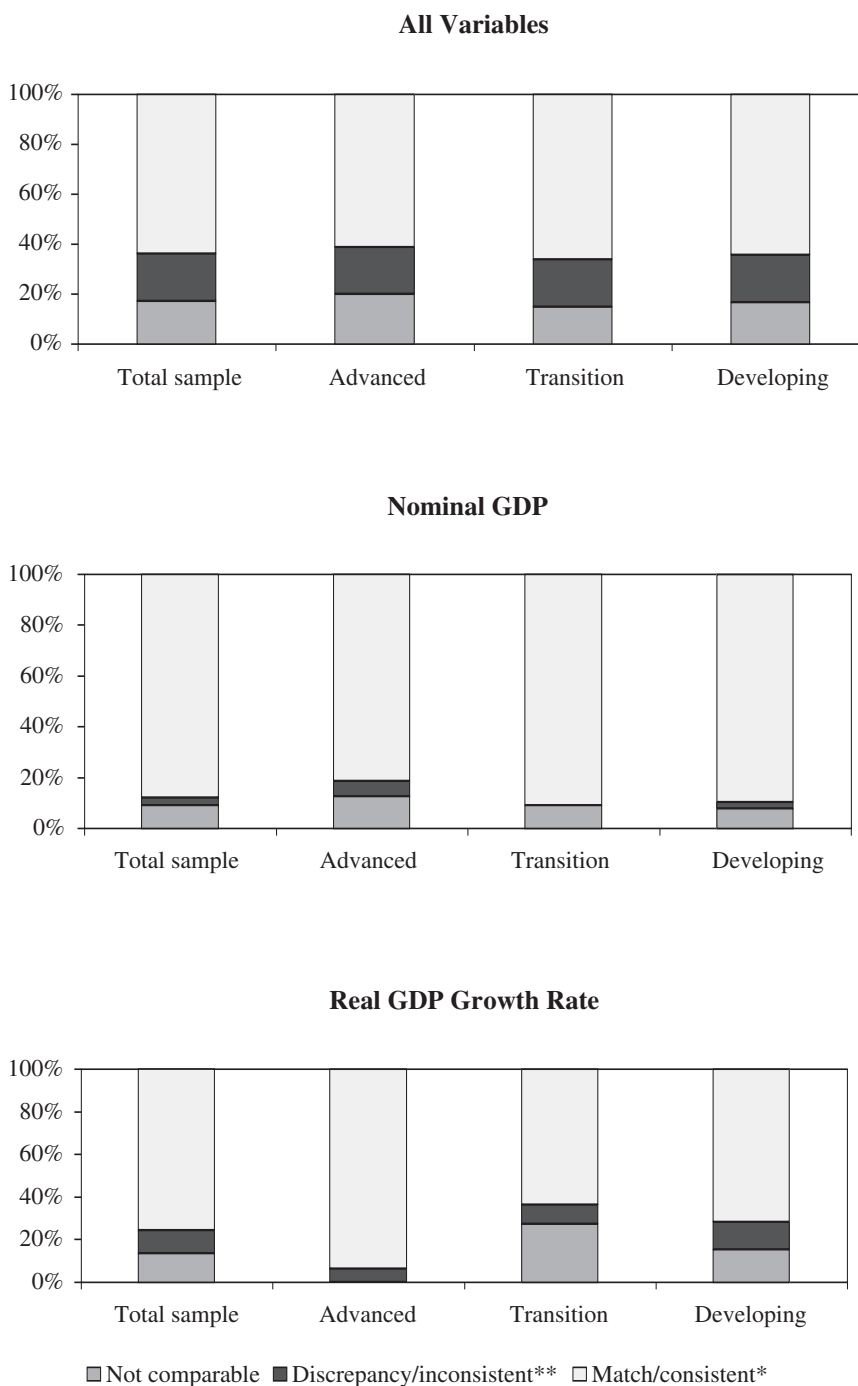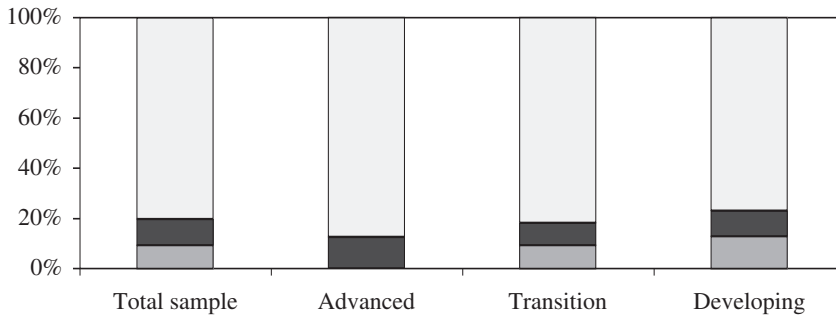☐ Not comparable ■ Discrepancy/inconsistent** ☐ Match/consistent*

Figure 1 (*continued*)

Inflation Rate

International Reserves
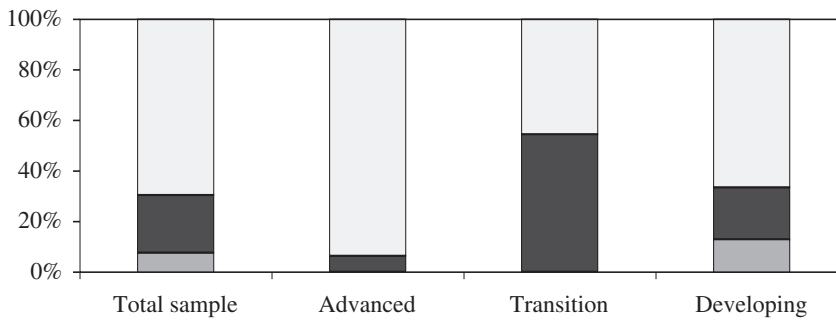
Current Account Balance
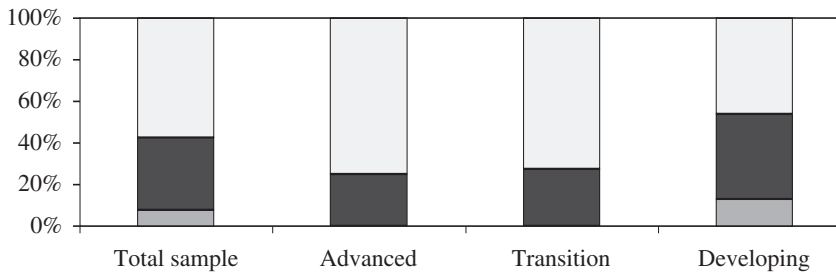
☐ Not comparable ■ Discrepancy/inconsistent** ☐ Match/consistent*

Figure 1 (*continued*)

Merchandise Exports

Merchandise Imports

General Government Balance
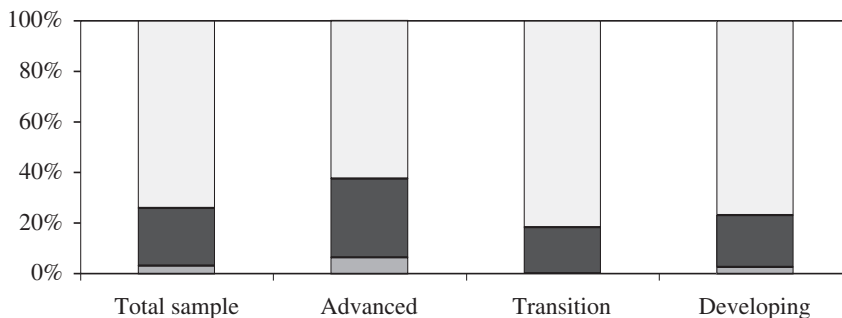
☐ Not comparable ■ Discrepancy/inconsistent** ☐ Match/consistent*
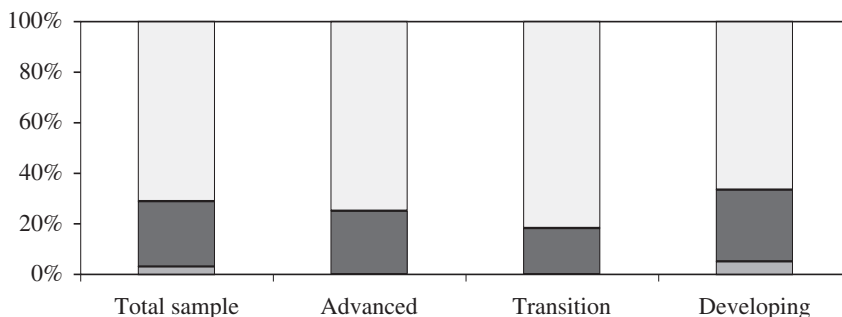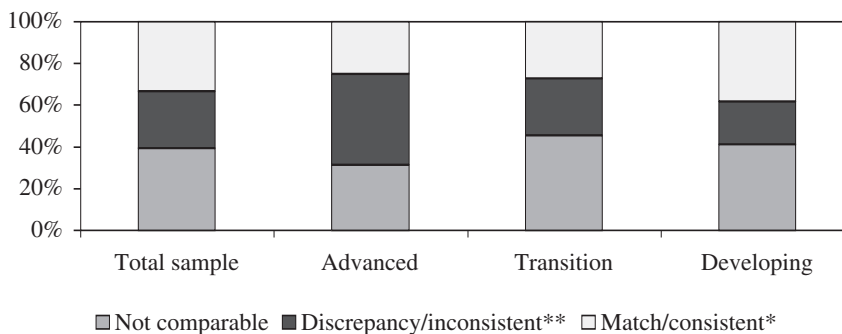
Figure 1 (*concluded*)

Total Public Debt

Bank Credit to Government

Money Stock

☐ Not comparable ■ Discrepancy/inconsistent** ☐ Match/consistent*

Sources: IMF country reports and *IFS*.

**Discrepancy/inconsistent indicates differences of more than 2 percent.
*Match/consistent indicates differences of less than 2 percent.

IFS, and the absence of monetary survey data in the sample of advanced countries, rather than broad problems with monetary statistics. For the entire sample, the rate of direct matching or consistency was 42 percent for bank credit to government data and 73 percent for broad money.
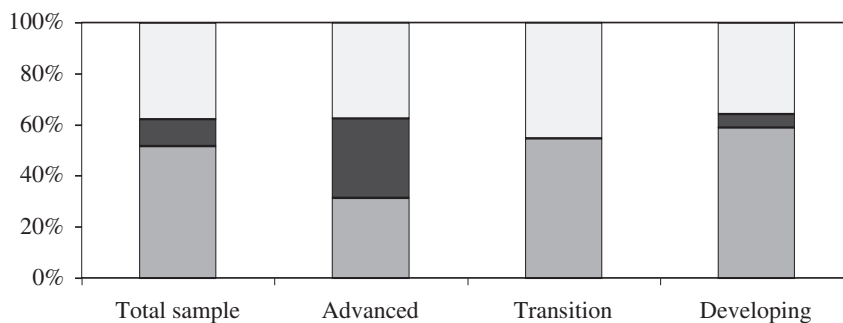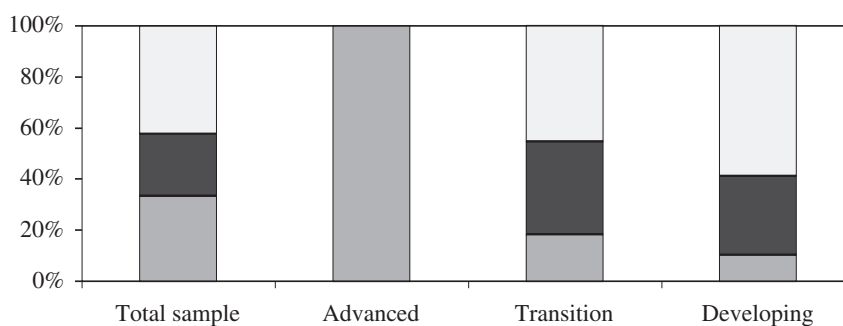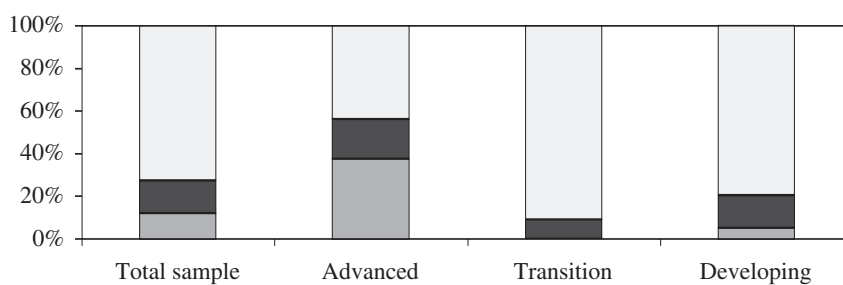
Data for nominal GDP and real GDP growth matched or were consistent for 88 percent of the sample. Nominal GDP data showed significant differences for two countries, Korea and Vietnam. Advanced countries had the highest percentage of noncomparable cases for nominal GDP, 12.5 percent, because the level of nominal GDP was not usually reported in the country reports. Transition countries showed a high matching rate for nominal GDP (91 percent) while having the highest proportion of noncomparable cases for real GDP growth (27 percent), owing mainly to the nonreporting of real GDP for some countries for publication in the *IFS.* The matching rate for nominal GDP data reported in country reports and the *IFS* was 90 percent for developing countries. Nominal GDP and real GDP growth data could not be compared for Kenya because they are reported on a fiscal year basis in the country report and on a calendar year basis in the *IFS.* These data also could not be compared for Lebanon because national accounts data are not reported for publication in the *IFS.*

The inflation rate presented in country reports and the *IFS* matched for about 80 percent of the sample. Inflation data were not comparable for a few transition and developing countries because country reports presented inflation only on an end-period or fiscal year basis, while the *IFS* presented an annual average on a calendar year basis. The *IFS* did not report price data for Lebanon. Inflation in Saudi Arabia for 2001 was reported at different rates in the country report (−0.8 percent) and the *IFS* (−1.1 percent).

Among the 16 advanced countries included the sample, there were discrepancies in the inflation rates for Israel and Sweden between the country reports and the *IFS.* In the case of Israel, the *IFS* flags breaks in the analytic comparability of the consumer price index in 2000 and 2002, which precluded comparison of the inflation rate for the test year with the inflation rate presented in the country report used in this study.[8] For Sweden, the 2003 country report indicates the rate of inflation for 2002 as calculated using the harmonized index of consumer prices (HICP). In 2002, the compilation of the HICP was subject to a methodological change, and the discrepancy between the country report and the *IFS* stems from the different versions of the HICP.[9]

Data on international reserves, a critical variable for vulnerability analysis reported by the IMF, could be compared for most countries, with only developing countries showing some noncomparable cases, specifically 5 out of 39. Costa Rica

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[8]Generally, rebasings of official price indices are linked in a month following the reference year of the revised weights.

[9]The HICP is compiled for European Union (EU) member countries according to methodological and sampling standards set by the European Commission. The HICP excludes expenditures on certain goods and services, such as medical care and services of owner-occupied housing. Country reports for EU countries could usefully indicate when the HICP is being reported. The change from reporting standard Swedish price indices (up to 2002) to the HICP was not flagged in the 2003 country report. The *IFS* reports both the HICP (obtained from EUROSTAT) and national consumer price indices for most EU countries.

Table 2. Advanced Economies: Comparability and Consistency of IMF
Country Reports and the *IFS*, by Selected Indicators

	Australia	Belgium	Canada	Cyprus	France	Germany	Hong Kong SAR	Israel	Italy
Nominal GDP	M	M	m	m	M	m	m	m	N
Real GDP growth rate	M	M	M	m	M	M	M	M	M
Inflation rate	M	M	M	M	M	M	M	D	M
International reserves	m	M	M	M	M	M	M	M	M
Current account balance	m	m	m	M	m	m	M	D	d
Merchandise exports	m	D	m	M	D	D	M	M	M
Merchandise imports	m	D	m	M	D	M	M	M	D
General government balance	N	d	m	d	D	M	N	d	D
Total public debt	d	M	m	d	m	M	N	d	M
Bank credit to government	N	N	N	N	N	N	N	N	N
Money stock	M	N	N	m	N	N	N	d	N
Percent not directly or broadly comparable	18.2	18.2	18.2	9.1	18.2	18.2	36.4	9.1	27.3
Percent directly or broadly comparable but inconsistent	9.1	27.3	0.0	18.2	27.3	9.1	0.0	45.5	27.3
Percent directly or broadly comparable and consistent	72.7	54.5	81.8	72.7	54.5	72.7	63.6	45.5	45.5

Sources: IMF country reports and *IFS*.
Notes: Entries indicate outcomes of comparisons of data in country reports with the *IFS* based on the following classifications: M denotes direct match; m denotes consistent when put on a comparable basis, with consistency considered a difference of less than 2 percent; D denotes direct discrepancy; d denotes inconsistent when put on a comparable basis, with consistency considered a difference of more than 2 percent; N denotes not comparable.

was considered a comparable case even though international reserves were reported to be 20 percent higher in the *IFS* than in the country report, which noted that bilateral claims under negotiation with neighboring countries were excluded. Among comparable cases, there was a high incidence of differences in the samples of transition (about half) and developing (about one-fifth) countries. The reasons for differences could not be fully resolved based on data descriptions in the country reports or the *IFS*. For example, the country report for Argentina noted that international reserves include liquidity requirements held abroad, which may account for levels higher than those published in the *IFS*.[10] The country report for Ghana presented international reserves data for 1997–2001 that differed significantly—higher in some years, lower in others—from the data in the *IFS*.

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[10]The arrangement between Argentina and the IMF following the sample period of this study excluded liquidity requirements held abroad from international reserves.

Table 2 (*concluded*)

Japan	Korea	Singapore	Sweden	Switzerland	United Kingdom	United States	Percent Not Comparable	Percent Inconsistent	Percent Comparable and Consistent
M	D	N	M	M	M	m	12.5	6.3	81.3
D	M	M	M	M	M	M	0.0	6.3	93.8
M	M	M	D	M	M	M	0.0	12.5	87.5
M	M	M	D	M	M	M	0.0	6.3	93.8
M	D	M	D	m	m	M	0.0	25.0	75.0
M	M	N	M	D	D	M	6.3	31.3	62.5
M	M	M	M	D	M	M	0.0	25.0	75.0
N	N	N	d	m	d	m	31.3	43.8	25.0
N	N	N	m	d	N	D	31.3	31.3	37.5
N	N	N	N	N	N	N	100.0	0.0	0.0
M	M	M	M	D	M	D	37.5	18.8	43.8
27.3	27.3	45.5	9.1	9.1	18.2	9.1			
9.1	18.2	0.0	36.4	36.4	18.2	18.2			
63.6	54.5	54.5	54.5	54.5	63.6	72.7			

Among advanced countries, only Sweden had discrepancies in reported international reserves. This discrepancy stems from the use of different sources by the area department and the Statistics Department (STA). The country report presents international reserves data taken from the website of the Swedish central bank (Riksbank), rather than the data reported to the IMF by the authorities. The *IFS* reports international reserves data submitted directly to STA by the central bank, modified with the value of special drawing rights (SDRs) and the reserve position in the IMF from the IMF's own financial records, as provided by the IMF's Finance Department.[11] In addition, the Riksbank indicates that

[11]Countries reporting international reserves in the *Data Template on International Reserves and Foreign Currency Liquidity* under the Special Data Dissemination Standard may show minor discrepancies with the Finance Department for the reserve position in the IMF and value of SDR holdings, owing to use of a different exchange rate.

reserves data reported to STA are valued at market value, while the data contained on its website are revalued only once a year, and that this can lead to large differences.

The incidence of comparable data for the external current account balance was broadly similar to the incidence of comparable data for international reserves, with five noncomparable cases in the developing country sample. For Algeria, data on the current account balance were not reported for publication in the *IFS;* only export and import data were reported, with a five-year lag relative to the country report. For Bhutan, current account data have not been reported to the *IFS;* however, data on exports and imports were reported on a fiscal year basis in the *IFS* as well as the country report although the country report provided U.S. dollar values and the *IFS* provided domestic currency values. Nonetheless, exports and imports were broadly consistent when put on a comparable basis.

The incidence of differences between country reports and the *IFS* in reporting external current account balance data was 35 percent in the entire sample, ranging from 25 percent for advanced countries to 41 percent for developing countries. For Chile and Colombia, current account balances reported in the country report and the *IFS* differed by 20–30 percent, while exports and imports closely matched, indicating differences in other, more difficult to measure components of the current account—in particular, transfers in the case of Colombia. For Ecuador, the reporting of the current account balance, exports, and imports showed significant differences between the country report and the *IFS* over several years. Data for Honduras' external current account balance differed, with export data showing substantial differences and import data matching.[12] External current account balances reported for Ghana differed significantly during 1997–2001, with differences coming mainly from import data.[13]

For the entire sample, a high proportion of government balance data presented in the country reports and the *IFS* was not comparable, ranging from 31 percent for advanced countries to 41 percent for transition countries. This resulted from unclear definitions of government in country reports and the *IFS* or from lack of reporting of government finance data for publication in the *IFS.* For example, in Brazil's case, the government balance could not be compared because it was not possible to determine whether the definition of the consolidated central government used in the *IFS* matched the country report's coverage of the federal government, central bank, and social security system. The *IFS* reported a small consolidated central government surplus of 0.2 percent of GDP for 2003, while the country report presented a substantial deficit of more than 4 percent of GDP for its definition of central government. In some cases, even when data on the government deficit were put on a comparable basis, they differed. For example, the country report for Costa Rica

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[12]Consultation with area department staff revealed that *maquila* exports were included in total exports in the *IFS,* but were not indicated in published documentation.

[13]Although exports closely match for 1998–2001, there is a large difference for 1997 between the Statistical Appendix of the country report (US$1,810.2 million) and the *IFS* (US$1,489.9 million), with the *IFS* appearing in error according to comparison with the trend in figures.

Table 3. Transition Countries: Comparability and Consistency of IMF Country Reports and the *IFS*, by Selected Indicators[1]

	Azerbaijan	Czech Republic	Hungary	Kazakhstan	Latvia	Lithuania	Macedonia	Mongolia	Poland	Romania	Russia	Percent Not Comparable	Percent Inconsistent	Percent Comparable and Consistent
Nominal GDP	N	m	M	M	m	M	M	M	m	M	M	9.1	0.0	90.9
Real GDP growth rate	N	M	M	M	M	M	N	M	M	D	N	27.3	9.1	63.6
Inflation rate	m	M	M	M	M	M	D	M	M	M	N	9.1	9.1	81.8
International reserves	D	M	M	D	D	M	M	D	D	D	M	0.0	54.5	45.5
Current account balance	M	M	M	D	M	M	M	M	D	D	M	0.0	27.3	72.7
Merchandise exports	M	M	M	D	M	M	M	M	D	M	M	0.0	18.2	81.8
Merchandise imports	M	M	M	M	M	M	M	D	D	M	M	0.0	18.2	81.8
General government balance	D	N	m	D	N	m	N	D	N	N	M	45.5	27.3	27.3
Total public debt	N	N	m	N	N	M	N	m	m	N	m	54.5	0.0	45.5
Bank credit to government	D	N	m	d	m	m	D	m	N	M	D	18.2	36.4	45.5
Money stock	M	m	M	M	M	M	D	M	M	M	M	0.0	9.1	90.9
Percent not directly or broadly comparable	27.3	27.3	0.0	9.1	18.2	0.0	27.3	0.0	18.2	18.2	18.2			
Percent directly or broadly comparable but inconsistent	27.3	0.0	0.0	45.5	9.1	0.0	27.3	27.3	36.4	27.3	9.1			
Percent directly or broadly comparable and consistent	45.5	72.7	100.0	45.5	72.7	100.0	45.5	72.7	45.5	54.5	72.7			

Sources: IMF country reports and *IFS*.

Notes: Entries indicate outcomes of comparisons of data in country reports with the *IFS* based on the following classifications: M denotes direct match; m denotes consistent when put on a comparable basis, with consistency considered a difference of less than 2 percent; D denotes direct discrepancy; d denotes direct discrepancy when put on a comparable basis, with consistency considered a difference of more than 2 percent; N denotes not comparable.

presented the central government deficit in percent of GDP, but when multiplied by GDP, this figure did not match the *IFS*.[14]

For comparable government finance data, differences were found for 27 percent of the entire sample, ranging from 20.5 percent for developing countries to 44 percent for advanced countries. Developing countries had the highest proportion of matching and consistent government balance data, mainly because government finance data were generally available only for central governments, except in the Western Hemisphere Department. Consequently, differences in the coverage of government for developing countries between country reports and the *IFS* were not as prevalent as they were for transition and advanced countries.

Public debt data had the highest incidence of noncomparable reporting between country reports and the *IFS*—52 percent for the entire sample, 31 percent for advanced countries, 55 percent for transition countries, and 59 percent for developing countries. This was mainly due to the nonreporting of public debt data for publication in the *IFS* although for Singapore the *IFS* provided public debt data while the 2002 country report did not (subsequent country reports have begun to report public debt data). This absence of reporting accounted for all noncomparable cases in the developing country sample. This was also the reason in the transition country sample although in two cases, Azerbaijan and Kazakhstan, public debt data were not presented in the country report as well.

Differences in public debt data reported in the country reports and the *IFS* were found mainly in the advanced country sample, specifically 31 percent. Reasons for these differences could be related to differences in the timing of measurement or definition in gross and net terms, but this could not be concluded from *IFS* metadata or the descriptions contained in the country reports. The rate of matching or consistency of public sector debt data fell in a narrow range across the three country groups—specifically, 36 percent for developing countries, 37.5 percent for advanced countries, and 45 percent for transition countries.

As mentioned earlier, data on bank credit to the government could not be compared in the entire advanced country sample owing to the general absence of reporting of a standard monetary survey in these country reports. The samples of transition and developing countries showed a more modest incidence of noncomparable data, at 18 percent and 10 percent, respectively. Developing countries showed the highest rate of matching data, 59 percent, owing to their generally low level of financial sector development and consequent reliance on domestic bank financing by the government, in addition to official external support.

The lack of reporting of monetary survey data in the country reports for the advanced country sample resulted in the noncomparability of broad money data for 37.5 percent of the sample. For 44 percent of the sample, broad money data matched or were consistent based on tables of indicators for financial soundness or vulnerability presented in country reports. Such reporting showed differences and inconsistencies with the *IFS* for 19 percent of the sample. The rates of match-

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[14]Area department staff included "capitalized interests" on the expenditure side to account for accrued interest on zero-coupon debt, but this was not apparent in published reports.

ing or consistency for broad money data were high for transition and developing countries—91 percent and 80 percent, respectively—whose country reports included a monetary survey.[15] However, the country report for Uruguay noted that the monetary survey followed *IFS* definitions but reported significantly lower broad money than the *IFS* for 2002 and previous years.

III. Reasons for Differences

Many of the reasons for noncomparable and divergent data between country reports and the *IFS* have been known for a long time. As noted above, some differences and noncomparabilities are related to the use of different classification systems, that is, use of country-specific definitions or data adjustments by IMF staff in country reports, whereas standardized international methodologies are followed for data presented in the *IFS*. Other differences and noncomparabilities may arise in some cases from reliance by area departments and STA on different sources of information—different databases and different contact persons—in the government bureaucracy of member countries. As mentioned at the beginning of this paper, data practices of member countries or their provision of data to the IMF is not the source of divergences presented in this study. Beyond these broad explanations, some prominent reasons emerge.

Revisions Captured at Different Times

In some cases, country reports may have contained updated information that had not yet been transmitted to STA for publication in the *IFS,* as illustrated by the case of the Swedish HICP. On the other hand, the *IFS* may incorporate revisions of data that are not reflected in country reports. For example, Uruguay's current account balance data differed between the country report and the *IFS* for 2002 but exactly matched looking back to 2000. This suggests that it may take a couple of years before revisions are completed, indicating the importance of allowing time for the compilation and reporting of revisions to the *IFS* before concluding that data are different or inconsistent. Advanced countries may have the highest percentage of differences and inconsistencies for nominal GDP because it is revised more frequently as a consequence of more frequent reporting requirements and diverse source data than in developing or transition countries. The revision policy of a country may account for some apparent discrepancies owing to different versions of the same data (Carson, Khawaja, and Morrison, 2004).

Differences in Coverage or Classification

Differences between coverage of the public sector in the country report and the *IFS* are an important reason for the lack of comparability or apparent data discrepancies. For example, for Ecuador, these differences do not allow comparison of data for the government balance, public debt, and bank credit to government.

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[15]The discrepancy for Macedonia in 2001, the comparison year, was due to a coding error in the *IFS*. A comparison of the data for broad money in 2002 matched.

Table 4. Developing Countries: Comparability and Consistency of IMF Country Reports and the *IFS,* by Selected Indicators

	Algeria	Argentina	Bangladesh	Bhutan	Brazil	Burkina Faso	Chile	Colombia	Republic of Congo	Costa Rica
Nominal GDP	M	m	M	m	M	M	m	m	M	M
Real GDP growth rate	N	M	M	m	M	M	M	M	M	M
Inflation rate	M	M	m	m	M	M	M	M	D	M
International reserves	M	d	m	m	M	m	M	M	m	N
Current account balance	N	D	m	N	M	d	D	D	m	M
Merchandise exports	m	M	m	m	M	m	M	M	m	M
Merchandise imports	m	D	m	m	M	m	M	M	m	M
General government balance	N	N	N	M	N	D	M	M	M	d
Total public debt	N	N	N	N	N	N	m	N	m	d
Bank credit to government	m	m	m	N	M	D	N	m	M	D
Money stock	D	m	M	m	M	D	m	m	M	M
Percent not directly or broadly comparable	36.4	18.2	18.2	27.3	18.2	9.1	9.1	9.1	0.0	9.1
Percent directly or broadly comparable but inconsistent	9.1	27.3	0.0	0.0	0.0	36.4	9.1	9.1	9.1	27.3
Percent directly or broadly comparable and consistent	54.5	54.5	81.8	72.7	81.8	54.5	81.8	81.8	90.9	63.6

	Myanmar	Namibia	Nicaragua	Papua New Guinea	Peru	St. Lucia	Saudi Arabia	Senegal	South Africa
Nominal GDP	M	m	M	M	M	M	M	M	M
Real GDP growth rate	M	M	M	D	M	d	M	M	M
Inflation rate	N	D	m	M	M	D	D	M	M
International reserves	d	M	M	M	d	M	N	m	D
Current account balance	N	D	M	D	M	D	M	N	D
Merchandise exports	m	M	M	D	M	D	M	N	D
Merchandise imports	m	M	M	N	M	D	M	N	D
General government balance	M	N	N	D	d	N	N	N	m
Total public debt	N	N	N	m	N	N	N	N	m
Bank credit to government	M	M	D	M	d	D	M	M	M
Money stock	M	M	m	d	N	D	M	M	M
Percent not directly or broadly comparable	27.3	18.2	18.2	9.1	18.2	18.2	27.3	45.5	0.0
Percent directly or broadly comparable but inconsistent	9.1	18.2	9.1	45.5	27.3	63.6	9.1	0.0	36.4
Percent directly or broadly comparable and consistent	63.6	63.6	72.7	45.5	54.5	18.2	63.6	54.5	63.6

Sources: IMF country reports and *IFS*.

Notes: Entries indicate outcomes of comparisons of data in country reports with the *IFS* based on the following classifications: M denotes direct match; m denotes consistent when put on a comparable basis, with consistency considered a difference of less than 2 percent; D denotes direct discrepancy; d denotes inconsistent when put on a comparable basis, with consistency considered a difference of more than 2 percent; N denotes not comparable.

Table 4 (*concluded*)

	Ecuador	Egypt	Ghana	Honduras	India	I.R. of Iran	Kenya	Lebanon	Malaysia	Malta	Mauritania	Mauritius	Morocco
	M	M	M	M	M	M	N	N	M	M	M	m	M
	M	M	M	D	M	M	N	N	M	M	N	m	M
	M	N	M	M	M	M	N	N	M	M	M	m	M
	N	N	D	D	m	N	M	D	M	M	M	m	m
	D	m	D	D	m	M	D	N	M	D	d	m	M
	D	m	M	D	m	M	D	M	M	D	d	m	M
	D	d	D	M	m	M	D	M	M	D	d	m	M
	N	N	D	m	M	N	M	M	M	D	N	N	m
	N	N	N	m	M	N	M	M	m	d	N	m	M
	N	d	M	d	m	N	M	D	M	M	M	m	m
	m	N	M	m	m	M	D	M	m	M	M	m	M
	36.4	45.5	9.1	0.0	0.0	36.4	27.3	36.4	0.0	0.0	27.3	9.1	0.0
	27.3	18.2	36.4	45.5	0.0	0.0	36.4	18.2	0.0	45.5	27.3	0.0	0.0
	36.4	36.4	54.5	54.5	100.0	63.6	36.4	45.5	100.0	54.5	45.5	90.9	100.0

	Tanzania	Thailand	Tunisia	Uganda	Uruguay	Vietnam	Vanuatu	Percent Not Comparable	Percent Inconsistent	Percent Comparable and Consistent
	M	m	M	m	M	D	N	7.7	2.6	89.7
	D	M	M	N	M	D	N	15.4	12.8	71.8
	M	M	M	N	M	M	M	12.8	10.3	76.9
	M	M	M	m	M	D	M	12.8	20.5	66.7
	D	M	M	d	M	M	M	12.8	41.0	46.2
	M	M	M	m	M	M	M	2.6	20.5	76.9
	D	D	M	m	M	M	M	5.1	28.2	66.7
	D	m	N	D	M	M	N	41.0	20.5	38.5
	N	m	M	m	N	N	N	59.0	5.1	35.9
	D	d	D	m	M	M	D	10.3	30.8	59.0
	M	M	M	m	D	M	M	5.1	15.4	79.5
	9.1	0.0	9.1	18.2	9.1	9.1	36.4			
	45.5	18.2	9.1	18.2	9.1	27.3	9.1			
	45.5	81.8	81.8	63.6	81.8	63.6	54.5			

Specifically, the country report provides fiscal data for the nonfinancial public sector but no information on the central or general government, whereas the *IFS* provides data for only the budgetary central government. In the case of the Islamic Republic of Iran, the coverage of government financial operations is not described fully enough in either the country report or the *IFS* to ensure that the data definitions are comparable. Exclusions cited in *Country Notes 2003* for the *IFS* may account for the reporting of a smaller deficit in the *IFS* than in the country report. This is supported by the fact that bank credit to government shown in the *IFS* is about half of that in the country report. The country report for Romania presents government finance data for general government and the *IFS* for central government, and yet both report the same domestic credit to government in the monetary survey. Finally, in the case of Thailand, the discrepancy in net bank credit to government is due to the country report's lack of documentation of the government's inclusion of coin issuance in the monetary accounts. The difference in the money stock also is due to the inclusion of coin issuance but is small enough (0.2 percent) that data could be considered as matching.

A common reason for noncomparable fiscal data is the use of different reporting periods, usually fiscal years in country reports and calendar years in the *IFS*. With regard to balance of payments data, the current account balance and merchandise export data reported for Thailand in the country report and the *IFS* match, but merchandise import data differ significantly. This difference is mainly offset by a discrepancy in the services balance, indicating a potential difference in the classification of the current account between the country report and the *IFS*.

Different Methodologies or Use of Staff Adjustments of Official Data or Staff Estimates

The *IFS* data are reported to STA by central banks, ministries of finance, and national statistical agencies, and are based on internationally consistent definitions, such as the fifth edition of the *Balance of Payments Manual (BPM5)* and the *System of National Accounts 1993.* STA's data collection practices are extensive and reflect an effort to compile data into long time series that are consistent across time and countries. For certain countries, however, gaps exist for some data, such as for GDP and for current account transactions for recent years.

Country reports should preferably present data consistent with international methodology, but this is not required. For example, the definition of balance of payments variables will not necessarily conform to *BPM5* until national compilers have revised the country's balance of payments accounts, or country reports adopt the new definitions. Because of space constraints, country reports cannot be expected to include all documentation necessary for transparent understanding of definitions used and, more broadly, of the quality of data.

In contrast to the rigorous application of international methodologies in the IMF's statistical publications, area department data management practices maintain the flexibility to meet specific analytic requirements in a particular country. These practices often reflect information acquired through frequent, in-depth contact with country authorities. This may include monthly and quarterly data

that are not, for instance, in the *BPM5* format, which provide indicators of current developments—for example, oil exports or public enterprise borrowing. This can result in staff adjustments of official data or use of staff estimates in place of officially reported statistics.

Discrepancies in broad money are not unexpected because the *Monetary and Financial Statistics Manual (MFSM)* does not prescribe a specific definition. Instead, the *MFSM* defers to country authorities to apply their own national definitions of broad money with a view to using data that are useful for policy purposes. This flexibility carries over to the definition of variables presented in country reports. For example, the country report for Algeria presents data on bank credit to government that show the impact of bank restructuring packages, which convert bank claims on public enterprises into bank claims on the government. As a result, net bank credit to the government shown in the country report can be larger than net bank claims on central government reported in the *IFS*.

Owing to the short time frame, generally five years, of data presented in country reports, these data are of limited value for econometric analysis that could inform operational and program work, as well as cross-country analysis, especially when time series data over several years are needed.

Differences in Data Sources That Give Rise to Inconsistencies in Underlying Data

As discussed above, the sources for reporting Sweden's international reserves differed between the country report and the *IFS*. Specifically, the country report presented data available on the Swedish central bank's website, while the *IFS* reports data provided by the authorities and the IMF's Finance Department directly to STA.[16] This type of discrepancy can be avoided because all IMF staff can adjust data reported by the central bank, as STA does, using data for IMF financial variables from the Finance Department.

The divergence in reporting GDP for Korea may stem from the use of different agencies as sources, with the central bank cited as the source in the country report, and the economic planning board in the *IFS*. Some data differences may point to uneven cooperation between the IMF's area departments and STA. Furthermore, statistical agencies in many countries do not always reconcile data on national accounts and balance of payments.

IV. Importance of Data Differences for Research and Markets: Assessing Public Debt Sustainability

This section illustrates the potential impact of data differences of the magnitude found in this study on empirical research. The assessment of public debt sustainability has long been an important subject of investigation for academic researchers

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[16]It should be noted that Sweden's central bank follows the IMF's reporting and valuation requirements when reporting *IFS* data to the IMF.

and financial market analysts with an interest in measuring the risks in the value of sovereign debt instruments (for example, Edwards, 1984; Frenkel and Razin, 1987; Wyplosz, 1991; and Crosbie and Bohn, 2003). It is also central to the IMF's work with member countries, in the context of both surveillance and IMF-supported programs. This assessment focuses on two critical variables in the calculation of sustainable debt and the implications for empirical research of differences in the values of these variables between country reports and the *IFS* found in this study. Specifically, a country's debt is sustainable if future primary balances are sufficient to meet the service obligations on existing and future debt. The dynamics of future primary balances and debt service are given by the public sector budget constraint, which can be solved for the maximum level of the public debt ratio, *b,* that can be sustained by the steady-state primary surplus ($\tau - e$) in the future:

$$b = (\tau - e)/(r - g),$$

where τ and *e* are the ratios of revenue and primary expenditure to GDP, respectively; *r* is the interest rate on public debt; and *g* is the GDP growth rate.[17] This formula presents the maximum sustainable debt ratio as the present value of a consol yielding the steady-state primary surplus discounted at the interest rate on public debt net of the rate of economic growth.

Abiad and Ostry (2005) present calculations of sustainable debt levels for a sample of emerging market countries using alternative measures of surplus-generating capacity based on historical performance and predicted values from their econometric model of the primary surplus. Given this paper's focus on the consistency of published historical data, we build on their calculations using historical data. The objective here is to illustrate how these calculations vary with discrepancies of the magnitude found for real GDP growth and the primary balance in the study presented in this paper.[18] Although the real GDP growth rate had a higher rate of matching between country reports and the *IFS* than most variables examined here, differences ranged from a few tenths of a percentage point to, in some cases, almost 2 percent. Large discrepancies indicate substantial shortcomings in data quality that are not typical, but smaller discrepancies are fairly common. Consequently, a discrepancy of two-tenths of a percentage point in the growth is examined.

The differences in the overall balance for general government found in this study were taken as representative of potential differences in the primary balance between country reports and the *IFS*. As discussed above, there were a high proportion of differences in government balance data, with many cases showing differences greater than a percentage point of GDP. With the average difference having an upward bias owing to severe data quality and comparability problems, half of a percentage point of GDP was taken as indicative of the magnitude of differences that can be found between country reports and the *IFS*.

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[17]This formula has been derived and applied in recent empirical studies of debt sustainability by Kufa, Pellechio, and Rizavi (2003) and by Abiad and Ostry (2005).

[18]This study and Abiad and Ostry (2005) used different data sets.

For purposes of illustration, we calculated the combined effects of variations of two-tenths of a percentage point in the growth rate and one-half of a percentage point of GDP in the primary balance. These calculations show the magnitude of the impact of these variations on the calculation of sustainable debt levels based on historical performance in Abiad and Ostry (2005) (Figure 2).[19] Although the overall results of their study broadly hold up, the impact of these variations is significant for some countries.

Actual debt for most countries in Figure 2 (except LA6) remains above sustainable debt using average historical values even with the combined effect of discrepancies in economic growth rate and primary balance. This is consistent with Abiad and Ostry's result showing that for many cases actual debt is much larger than sustainable debt, with the consequence that even a positive variation for a higher growth rate and primary balance owing to potential discrepancies in the reported values does not close the gap. However, this positive variation does push the sustainable debt calculated using average historical values above actual debt in one case (EMEA9) and close to actual debt in another (LA1), and, in the latter case, above actual debt when using the best five-year performance. In a few cases (LA5 and EMEA2 and EMEA8), this favorable allowance using the best five-year performance brings sustainable debt within striking distance of actual debt. Thus, when errors in variables of the magnitude found in this study are allowed for, conclusions concerning debt sustainability can change and, in some cases, be reversed. On the other hand, using negative variation for the growth rate and primary balance would reinforce Abiad and Ostry's calculations that show that sustainable debt falls short of actual debt.

V. Conclusions

The conclusions of this study can be summarized as follows:
- The incidence of noncomparable data and data differences between country reports and the *IFS* is significant for the common indicators reported to the IMF by all member countries for surveillance purposes. This incidence would very likely not be as high nor have been as persistent had there been better documentation of the content of country reports and the *IFS*.
- The content, coverage, and timeliness of the IMF's publicly available databases have not fully benefited from the knowledge accruing to area departments from their frequent contacts with country authorities.
- Country reports can be useful sources of data for updating IMF databases. Data differences, where they exist, need to be taken into consideration in empirical research and financial market analysis, as illustrated for the calculation of public debt sustainability.

Data differences among IMF databases have been a long-standing concern of the IMF because of the practical significance for its financial operations, as well as for calculating member quotas and voting rights. The strategy adopted by the IMF

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[19]Figure 2 reproduces Figure 1 from Abiad and Ostry (2005), with the additional results obtained from calculating sustainable debt levels for positive and negative variations in growth and primary surpluses.

Figure 2. Data Differences: Impact on Estimates of Sustainable Debt Levels
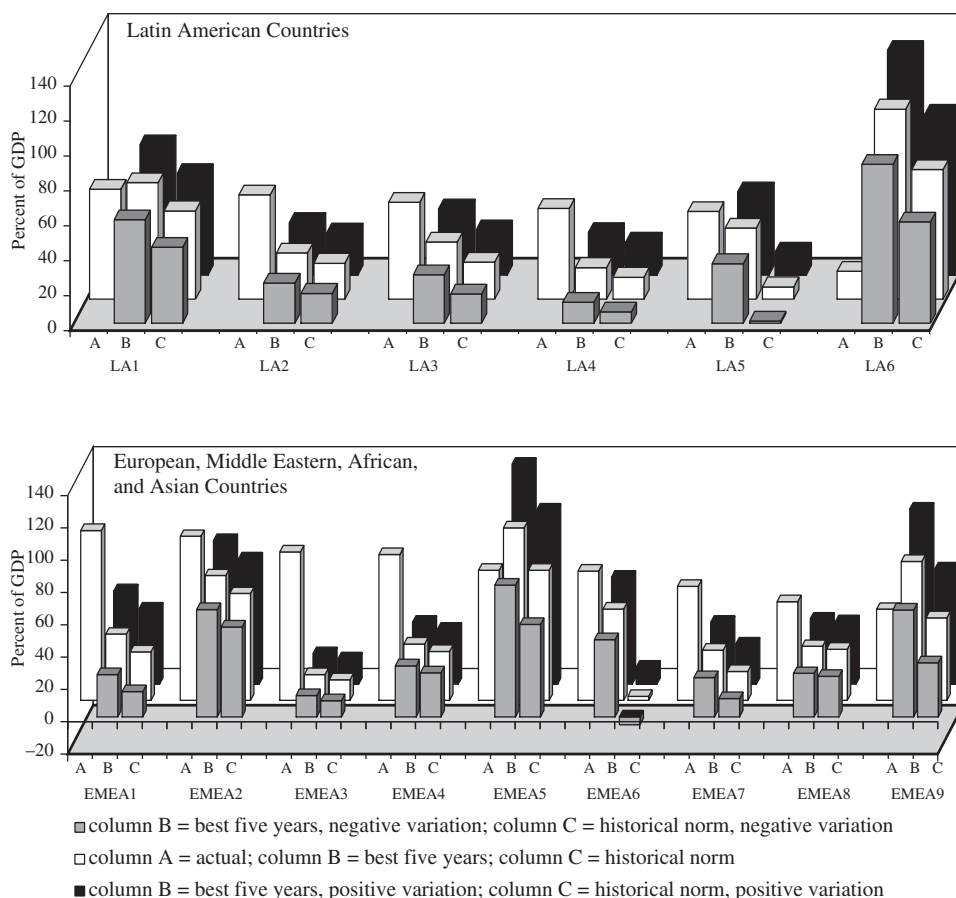
Sources: Authors' calculations based on Abiad and Ostry, 2005.

Notes: Country labels enumerate a sample of countries from Latin America (LA1, LA2, LA3, LA4, LA5, LA6) and countries from Europe, Middle East, Africa, and Asia (EMEA1, EMEA2, EMEA3, EMEA4, EMEA5, EMEA6, EMEA7, EMEA8, EMEA9) taken from Abiad and Ostry (2005).

to handle this issue provides useful guidance. Specifically, when members report balance of payments statistics for publication in the *IFS* database, these statistics are used after they have met quality standards and their comparability with data from other countries has been confirmed, without consideration of data published in country reports. When data are not available for some members for the time frame required for quota calculations, estimates are made on the basis of the *WEO*. For members for whom neither *IFS* nor *WEO* data are available, data from Article IV country reports and country desk data are used. In keeping with this strategy, researchers and analysts should rely on *IFS* data for cross-country comparability and definitional consistency and, if more timely data are needed, on country report data, after ensuring consistency with the *IFS* for historical observations.

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