



IMF Working Paper

Economic Data Dissemination: What Influences Country Performance On Frequency and Timeliness?

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Middle Eastern Department

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On Frequency and Timeliness?**

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Abstract

The views expressed in this Working Paper are those of the authors and do not necessarily represent those of the IMF or IMF policy. Working Papers describe research in progress by the author(s) and are published to elicit comments and to further debate.

Despite initial improvements in macroeconomic data dissemination following the emerging markets crises of the late-1990s, large differences among countries remain. To identify the factors behind such differences, this paper develops measures of the frequency and timeliness of macroeconomic data dissemination for 180 countries. After discussing potential factors influencing data dissemination, the paper confirms the importance of a range of economic, social, and demographic factors. The relative importance of these factors in different regions is discussed, as well as the broader policy implications for strengthening macroeconomic data dissemination.

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I. INTRODUCTION

Following the emerging markets crises of the mid- to late-1990s, countries seeking access to capital markets have been encouraged to provide high quality economic and financial data.² By permitting an early identification of policy inconsistencies, such data can provide a stabilizing influence, as investor reactions encourage early and orderly policy correction. Reflecting this growing focus on data availability, financial market analysts have begun to monitor data provision by emerging markets (IIF, 1997 and 1999). However, less attention has been focused on data provision by countries with limited access to global capital markets. Moreover, there has been no systematic effort to explain differences in countries' data provision.

This paper reviews differences in data dissemination practices for 180 countries, focusing on two important aspects—the *frequency* of data compilation and *timeliness* of data availability. These indicators of quality are gauged for 12 key economic variables, the results for which are combined to produce aggregate indices of data frequency and timeliness. This process and the resulting scores are discussed in Section II. Section III considers possible factors influencing countries' data dissemination, while Section IV reports on econometric procedures and results. Section V elaborates on the implications of the analytical exercise and provides some concluding remarks.

II. ASSESSING ECONOMIC DATA PROVISION

The production and dissemination of economic data is a complex activity, and it is difficult to conceive of a country ranking that would capture all aspects of statistical performance. In particular, considerable problems would arise in precisely measuring the *quality* of data.³ While this, at the end of the day, is the key issue for data users, it is possible to assess certain aspects of the statistical process. This paper focuses on country practices in regard to economic data dissemination—measured in terms of the coverage, periodicity, and timeliness of the official data.⁴

² For brevity, the remainder of the paper refers to economic data, rather than economic and financial data.

³ Carson (2001) discusses a framework for assessing data quality.

⁴ These data attributes fall under the first of four dimensions of data dissemination covered by the IMF's Special Data Dissemination Standards (SDDS), established in April 1996. The other dimensions are: access by the public, data integrity, and data quality. See IMF (1996), and IMF website.

Our analysis draws on the results of IMF surveys conducted in 1996, 1997, and 2000 on the data compilation practices of 180 countries in regard to 12 economic series (IMF, 2000).⁵ The surveys indicate, for each country, which of the 12 data series are regularly compiled, the frequency of compilation (daily, weekly, monthly, etc), and the timeliness of the data (measured by the lag between the conclusion of the reporting period in question and the date of the survey). Dissemination, in this context, was defined as provision of the data to the IMF for surveillance purposes; this typically occurs after the data becomes available to the domestic government, but sometimes before it becomes available to the general public.⁶

To establish numerical indices, we have scored the survey responses for frequency and timeliness on a scale of 0 to 10, with the upper limit assigned to practices broadly consistent with the IMF's Special Data Dissemination Standards (SDDS) (see Appendix I). The resulting scores for the 12 data series were then averaged to form composite indices of data frequency and timeliness for each country.⁷ We also calculated a second set of composite scores for the 2000 survey results, using a weighted averaging process, to test the sensitivity of the averaging process.⁸

The results of this exercise are summarized in Table 1. In general terms, scores tend to be higher—i.e., countries are closer to the SDDS standards—for data frequency than for data timeliness. This difference apart, the two aspects of data compilation tend to be related: countries that score highly for data frequency also tend to score highly for data timeliness.⁹ As might be expected, scores for data frequency and timeliness are higher for advanced economies than for developing countries, with the seven major industrial countries scoring higher, on average, than the other advanced economies.

⁵ The data series covered the real sector (GDP and consumer prices); the fiscal sector (the government balance); the monetary sector (reserve and broad money, the central bank balance sheet, and interest rates); and the external sector (exchange rates, net international reserves, merchandise trade, the current account balance, and external debt).

⁶ No attempt was made in these surveys to rate the other dimensions of data dissemination, particularly data quality. Some countries with high ratings for data timeliness may have achieved this at the expense of data quality.

⁷ Where a country does not compile one of the 12 data series, a zero score is given for frequency and timeliness for that series.

⁸ In this case, scores for frequency and timeliness were first averaged for the real sector, fiscal sector, monetary sector, and external sector. Composite scores were then calculated as simple averages across these four sectors. This approach reduces the weight given to monetary and financial sector data, a number of which are closely related (e.g., the central bank balance sheet, reserve money, and net international reserves), while increasing the weight given to the limited data for the fiscal and real sectors included in the survey.

⁹ For 2000, the correlation coefficient between the 180 unweighted country scores for data frequency and timeliness is 0.46.

Of the developing economies, those in the Western Hemisphere score highest for both data frequency and timeliness: indeed, when the low-scoring Caribbean economies are excluded, the Western Hemisphere countries score higher than the advanced economies. For African and Asian economies, data scores are close to, or slightly below the developing country average. Middle Eastern and European economies score lowest of the major regions, particularly for data timeliness.¹⁰ The transition economies score strongly, exceeding the ratings for the major industrial countries.

While data timeliness and frequency were little changed between 1996 and 1997, frequency improved between 1997 and 2000 for all country groupings (Table 1). While the 2000 survey found a broad-based deterioration in data timeliness, this was largely related to the timing of the survey, which fell in February rather than June, leading to longer estimated lags for data compiled on an annual basis.¹¹ For data compiled on a more frequent basis (daily, weekly, or monthly), timeliness improved between 1997 and 2000 (Table 2).¹²

Our findings are broadly in line with cross-country assessments of data frequency and timeliness compiled by the Institute for International Finance in 1997 and 1999.¹³ While the IIF assessments are based less closely on the SDDS standards and cover significantly fewer countries, they show higher ratings for data frequency than timeliness, and broad-based improvements in combined performance on these two standards between 1997 and 1999 (Table 3).¹⁴ Moreover, the regional rankings are broadly comparable to those in the current study. The transition economies scored highest, followed by the advanced, and then the developing economies. Within the developing economies, Western Hemisphere economies score highest, and the Middle Eastern and European economies lowest.

One of the largest differences relative to the current paper is in regard to the score given to Middle Eastern countries for data timeliness, where the shortcomings are much more marked

¹⁰ This region comprises the Middle Eastern economies, Turkey, Cyprus, and Malta.

¹¹ Where data was compiled on a calendar year basis, the previous year's data were commonly available by the time of the June surveys in 1996 and 1997, implying an estimated 6-month time lag in data availability. However, at the time of the February 2000 survey, the previous year's data were generally not available, implying a 14-month time lag from the last available data (for two years earlier).

¹² The notable exception was the consumer price index, where data timeliness deteriorated. Possibly governments accorded such data a lower priority as inflation fell globally.

¹³ The IIF assessments covered a larger number of variables (18 in 1997 and 25 in 1999, compared to 12 in the IMF survey), but the country sample was much smaller (28 in 1997, and 27 in 1999, compared to 180 in the IMF surveys). See IIF (1997 and 1999).

¹⁴ Combined scores for frequency and timeliness do not increase for the advanced and African economies in the IIF assessments, but the number of countries in these groups is small.

in the IIF assessment. This may reflect long publication lags for some economic data in Middle Eastern countries, so that the IIF survey, which relies on public data, shows less timely data than the IMF surveys, where staff may have access to unpublished data.

III. INFLUENCES ON DATA PROVISION

The variation in data dissemination practices described above is likely to reflect a range of factors such as baseline statistical capacity, the role of the private sector in economic activity, the demand for economic data, and the costs of providing them. This section proposes a range of potential influences, including the factors that are recognized to have contributed to the growth of economic data usage in today's industrialized economies. We examine the relative importance of these influences in Section IV.

Economic management. Societies need economic data for diverse purposes. While, historically, the earliest data collection efforts were typically for documentary purposes—related to systems of jurisprudence, the massive expansion in economic data compilation during the last century has been geared to government economic management. Data on economic conditions help governments decide whether existing economic policies are working, what alternative policies might be appropriate, and whether policy changes are having the desired impact. The importance of such data is directly related to the pace of change in institutions, technology, and markets. When the pace of change was slow, decisions were commonly based on tradition and custom. But as countries have developed and become more integrated into the global economy, more accurate and timely economic data have become essential.

The growing importance of such data can be illustrated in historical terms for today's advanced economies. The process of industrialization, which contributed to rapid social change, caused governments to look for more accurate demographic data, resulting in the introduction of periodic population censuses for a growing number of countries from the early nineteenth century. Subsequently, the importance of economic data increased enormously as governments took on an expanded role during the twentieth century, including through the provision of social insurance.¹⁵

¹⁵ Recurring censuses were initiated in the United States from 1790, and in France and the United Kingdom from 1801. Centralized national statistical offices were in place in many European countries during the following century (in France by 1801, Belgium 1831, Germany 1872). Compulsory unemployment insurance schemes were adopted in the UK in 1911, Austria 1920, and Germany 1927 (Morton (1969)). The resulting expansion of the social role of the government led to the first official cost-of-living index for the UK in 1914. Further expansion of the role of the government during the Second World War led to the preparation of the first national income and expenditure estimates for the UK in 1941 (Mitchell (1988)).

Economic management also relies on information gathered from direct contacts between policy makers and the private sector (visits to factories, meetings with political constituents, etc). While information collected in this manner is used even in the most complex economies, it is perhaps most effective as a substitute for formal economic data in the least populous economies and those with economic structures that are relatively simple. Conversely, economic data compilation is likely to be most vital for the largest economies, with diverse economic structures.

Policy consultation. While governments have been the leading users of economic data, the latter are also commonly provided to the public to inform policy debates. This may spur further demands for economic data, leading to a richer statistical base in countries featuring strong public participation in policy-making.

Policy implementation. In some cases, the compilation and distribution of economic data contributes not only to policy development but also to the efficacy of implementation. Anti-inflation policies, to take one example, are more difficult to design in the absence of data on the nature and extent of inflationary pressures. Moreover, given the critical importance of inflation expectations to price- and wage-setting behavior, anti-inflation policies are likely to be more effective when the public has access to timely inflation data.

Private sector decision-making. The private sector also relies on economic data to guide a range of household and business decisions. In the business sector, economic data are likely to be particularly important when production processes are complex, involving risky long-term investments, and when market conditions are subject to rapid change. These factors seem likely to increase in importance as economies develop. Similarly, improvements in literacy and numeracy are likely to boost private sector demand for economic information. Quality economic data are particularly important to financial market participants, and countries seeking access to global market financing may experience specific demands for improved economic data.

Cost and capacity considerations. While the above factors influence the *demand* for economic data, cost and capacity considerations are also likely to be important. High quality economic data depend on an adequate resource commitment, which may prove costly for small and low-income countries. A country's ability to produce adequate economic data will also depend upon recruiting qualified statisticians, which may be difficult for the smallest countries and for poorer countries with low education levels.

The "transition effect". The high scores for economic data provision achieved by the transition economies in Table 1 suggest that special political and institutional factors have played a role in these countries. Even prior to transition, the state planning systems in these countries placed a high priority on economic data. While much of this statistical effort was redundant after the collapse of state planning, the institutional reforms implemented during transition extended to the statistical agencies, many of which, as a matter of national pride, sought to bring their practices into line with those in market economies.

Fund programs. Many developing countries and most transition economies have implemented IMF-supported adjustment programs. Design and implementation of these programs has required, in many cases, improved economic data. Efforts to develop such data were commonly supported by extensive external technical assistance.

Explanatory variables

Based on the above considerations, we view the following as potential influences on economic data dissemination:

- *Country size.* Data compilation is likely to be particularly important for large economies, because (a) they tend to be more complex, reflecting regional and societal differences, and (b) informal consultations between government officials and the private sector are a less effective substitute for data compilation than in small economies. There may also be economies of scale in data compilation for large countries. Size is measured by geographic area or population;
- *Economic and social development.* More developed economies tend to be more complex, increasing the government's demand for economic data. Higher income levels and associated developments in literacy and political participation also increase the private sector's desire for economic data. In addition, developed countries may find it easier to meet the resource costs of statistical collection.
- *Government size.* A more pervasive government sector may be associated with greater use of economic data for policy analysis.
- *Economic structure.* More open economies may be subject to more frequent shocks, requiring more data for policy management purposes. Similarly, where one sector dominates, the use of broader macroeconomic data may be less important.
- *Capital market participation.* Countries seeking access to global capital markets may have needed to strengthen economic data dissemination.
- *Transition.* Factors relating to the transition process appear to have contributed to the availability of timely, high frequency economic data.
- *Fund programs.* Implementation of IMF-supported adjustment programs may be associated with efforts to strengthen economic data dissemination.

IV. ECONOMETRIC RESULTS

To assess the relative influence of these factors on data compilation, we have estimated the following model:

$$\text{INDEX} = a + b \ln \text{SIZE} + c \text{DEV} + d \text{GOV} + e \text{STRUCT} + f \text{CAPMKT} + g \text{TRANS} + h \text{PROG} + \text{error}$$

where: INDEX is the country score for data frequency or timeliness; SIZE is country geographic area or population; DEV are measures of economic and social development; GOV measures the size of the government sector; STRUCT measures different dimensions of the country's economic structure; CAPMKT is a measure of capital market participation; TRANS is a dummy for the transition economies; and PROG is a dummy for implementation of IMF-supported adjustment programs.¹⁶

In the case of data frequency, the data scores show a "humped" distribution ranging from about 6 to 9.9, with a larger "spike" of scores of exactly 10. The latter reflects the large number of advanced as well as some developing countries whose data dissemination practices more than meet the maximum standards established under the scoring system. If these data standards were extended, some of these countries would score more than 10. To this extent, the dependent variable can be viewed as censored at an upper limit of 10 (and less importantly, at a lower limit of zero).¹⁷ Accordingly, for estimation purposes, the dependent variable is assumed distributed according to the censored normal distribution, and parameter estimates are derived using tobit estimation procedures.¹⁸ (Although the same approach is used for modelling data timeliness, the data distribution is less obviously censored, and tobit procedures produce regression results very similar to those under OLS.)

Regression results

Of the explanatory variables considered above, country size was found to have a major influence on economic data dissemination, with larger countries having stronger dissemination records. In a range of model specifications, *country population* proved more influential than *geographic size* (Table 4),¹⁹ with the data preferring a logarithmic specification (implying marked economies of scale). The results suggest that a country at the 90th population percentile (population of 60 million) tends to score about 1.5 points higher on

¹⁶ Appendix 2 summarizes the data series included in the econometric work.

¹⁷ That is, countries with data compilation efforts that should, ideally, score a value of above 10 are not observable, but receive instead a score of exactly 10.

¹⁸ See Maddala (1983) for a discussion of the tobit (censored regression) model. With censored dependent variables, ordinary least squares estimation procedures tend to underestimate model parameters.

¹⁹ After taking account of absolute population levels, no significant role was found for population density.

the data frequency index and 2.3 points higher on the data timeliness index (on a 0-10 scale) than a country at the 10th population percentile (population of 230 thousand) (Table 5).²⁰

The data also suggest that *economic and social development* has a strong influence on economic data dissemination. Several income-based measures of economic development proved significant, including GDP per capita (at current or PPP-based exchange rates) and a dummy variable distinguishing between advanced and developing economies.²¹ The best fit was obtained, however, using indicators of adult literacy and political participation (Table 4). While these factors potentially have a direct role in influencing the demand for economic data, they may also proxy for a range of social and cultural factors that influence data dissemination. Countries in at the 90th percentile for these variables tend to score about 1.2 points more on the data frequency index, and 2.0 points higher on the data timeliness index than countries at the 10th percentile (Table 5).

There are some suggestions that *economic structure* may have an influence on data dissemination practices. *Relatively open countries*—measured by trade flows relative to GDP—were found to have somewhat stronger data dissemination records than more closed economies (Table 4). Countries at the 90th percentile in terms of trade openness tend to score 0.2 points higher on the data frequency index, and 0.7 points higher on the data timeliness index than countries at the 10th percentile (Table 5).²² In addition, countries linked to *raw materials extraction* tended to have weaker data dissemination records than countries with more complex economies. Specifically, data dissemination scores for *fuel exporting economies* were between 0.6 and 1.2 points lower than for other economies, while those for *primary product exporters* were up to 0.4 points lower (though the latter effect was not significant across all equations) (Table 4).

By contrast, the *relative importance of the government sector*, measured by the ratio of government spending to GDP, was not found to have a significant role in influencing economic data dissemination. To some extent, this may be because the role of the government tends to rise with economic development, with this effect captured by the proxies for development discussed above.

²⁰ Based on the simple average measures of data frequency and timeliness. Sensitivity tests found that the parameter estimates were unaffected by exclusion of the most populous countries (China and India).

²¹ Preliminary estimation results using a range of alternative measures of economic development found the parameter estimates to be highly sensitive to the addition or exclusion of development-related variables, suggesting problems of multicollinearity. To avoid these problems, regressions were limited to one, or at most two (non-collinear) proxies for economic development.

²² The role of trade openness in influencing data frequency is not unequivocal: the significance of the influence depends on how the frequency index is compiled (Table 4).

For developing countries, we found that data dissemination records tend to be stronger, other things equal, for *countries active in international capital markets*.²³ These countries scored about 0.4 to 0.5 points higher for both data frequency and data timeliness. (Parameter estimates were more significant in the former case.)

As foreshadowed in Section II, the data compilation scores of *transition economies* were significantly higher than for their non-transition counterparts. After adjusting for other influences, transition economies achieved data scores some 0.5-0.9 points higher than comparable non-transition countries. Separate dummy variables distinguishing between the Baltics, Russia, and other countries of the former Soviet Union (BRO economies) and the other transition economies found no significant difference between the two in the size of the “transition” effect.

A separate influence was also found for *countries currently or recently implementing IMF-supported adjustment programs* (Table 4). Data dissemination scores for these countries were 0.3 to 0.8 points higher than for other countries, other things equal.

Explaining country differences in data dissemination

To assess the impact of the above factors on global data dissemination, we have used the fitted equations from Table 4 to calculate, for each country, the estimated impact of these factors as well as the “unexplained” component of data frequency and timeliness.²⁴ These estimates were then averaged, to produce data on the same regional breakdown as in Table 1. To highlight cross-country differences, we present the data in terms of differences from the average for advanced economies (Tables 6 and 7). This analysis suggests that regions vary considerably in terms of the factors influencing data dissemination.

Pacific and Caribbean economies. Among developing countries, data dissemination scores are lowest for the Pacific and Caribbean economies. For these two regions, the largest single contribution to weak data dissemination is found to be small country size. Taking data frequency and timeliness together, this accounts for 63 percent of the shortfall in data scores (relative to advanced economies) for the Pacific economies and 83 percent for the Caribbean economies. In addition, these countries have been relatively inactive in international capital markets and have had relatively few IMF-supported programs, factors which are estimated to have improved data dissemination in other regions. One positive factor for data dissemination in these countries, however, is their relatively high developmental indicators, with literacy rates and political participation scores above other developing countries.

²³ This relationship was explored using a dummy variable to identify countries borrowing at least a cumulative US\$200 per capita on international capital markets during 1994-99 (see Appendix I).

²⁴ This analysis should be regarded as indicative, as the explanatory variables are not entirely independent of one another.

Sub-Saharan Africa and Middle Eastern economies. After the Caribbean and Pacific economies, data dissemination scores are weakest in sub-Saharan Africa and the Middle East.²⁵ For these regions, small country size is a negative factor, but accounts for only a minor part of the shortfall relative to advanced economies (i.e., 28 percent of the shortfall in sub-Saharan Africa, and 16 percent for the Middle East and North African (MENA)). The largest adverse factor is found to be the relatively low developmental indicators for these regions, with low scores for literacy and political participation accounting for 76 percent of the shortfall in data dissemination scores for sub-Saharan Africa and 69 percent of the shortfall for MENA countries. For some MENA economies, low data scores also reflect an orientation toward fuel-exporting. Against these negative influences, data dissemination in the MENA region has benefitted from involvement in international capital markets, while data dissemination in sub-Saharan Africa has benefitted from the region's high number of Fund-supported programs.

The transition economies and Latin America. The strongest data dissemination record in the developing world is found in the transition economies, South America, and, to a somewhat lesser extent, Mexico and Central America. This reflects a number of favorable factors. In all three regions, data dissemination is positively linked to countries' active involvement in international capital markets (notably for South America) as well as with implementation of Fund-supported programs. Developmental indicators (literacy and political participation) are also typically higher than the developing country average (though below advanced economy levels). In addition, country size is a positive factor, being higher than the developing country average in all three regions, and higher than advanced economies in South America. At the same time, data dissemination in all three regions exceeds what would be expected based purely on country size and other economic and social factors. This is reflected in the identification of a significant "transition effect" for the transition economies and the existence of a large positive unexplained residual in the estimates of data timeliness scores for the Latin American economies. This possibly suggests that government policy played an especially active role in boosting data dissemination in these countries.

South Asia and East Asia. Data dissemination scores for East and South Asian economies have been slightly stronger, on average, than for developing countries as a whole, though below levels achieved in the transition and Latin American economies. For both regions, large average country size is found to be the key factor promoting data dissemination. Other factors are broadly in line with developing country averages.²⁶

²⁵ Either grouped with the limited number of developing European countries, or with North African countries.

²⁶ Development indicators (literacy rates and political participation) are marginally below developing country averages for both regions. Contributions from capital market activity and IMF-supported programs are higher than the developing country average for East Asian economies, but lower than this benchmark for South Asian economies.

V. CONCLUDING REMARKS

Our empirical results suggest that while it may be difficult to measure overall economic data quality, aspects of countries' data dissemination practices can be explained in terms of plausible economic, social, and demographic factors.

A key finding is that countries with small populations disseminate data on a less frequent and timely basis than larger countries. Arguably, for these countries, the effectiveness of direct consultations between the government and private sector permit a more "relaxed" approach to data compilation and dissemination. In addition, the policy-related demand for data is reduced for many such countries by policies that permit limited discretion, such as currency board exchange regimes.

While this may be a partial explanation, cost and capacity considerations are also likely to be important. To this extent, improved data compilation could permit more effective government policy-making, a more informed public debate on economic issues, and better informed economic decision-making by the private sector. Where small countries have a weak statistical capacity, this can be strengthened through technical assistance by the IMF, other international organizations, or in cooperation with third countries. In some instances, there may be merit in neighboring small countries operating joint statistical services.

The generally weaker statistical capacity of small countries may also have implications for access to international capital markets. It is noteworthy that while 13 small countries have subscribed to the IMF's SDDS, all are advanced or transition, rather than developing economies.²⁷ Moreover, while about one-quarter of the world's countries have populations of under 2 million, they account for only 4 percent of subscribers to the SDDS. It is unclear how many small developing countries would welcome participation in the global capital markets but are held back largely by data considerations. Even if the number is currently small, it is likely to increase as more developing countries gain regular access to market financing. The importance of developing such financing is also likely to rise, to the extent that official development assistance continues to decline. For small countries in this position, it will be important to boost statistical capacity, including through external technical assistance.

The finding that economic data dissemination is more closely related to social and political factors than strictly income-based measures of development may have implications for policies to promote improved global data dissemination. Specifically, such policies may prove most effective in countries experiencing marked social or political change. The transition economies, marked by their current strong data dissemination record, are a case in

²⁷ As of end-September 2001. Small countries are defined as being smaller than the median country size of 6.25 million.

point. The same desire for improved economic data may be found, though perhaps less marked, in other countries or regions experiencing a shift toward greater political and economic openness.

By contrast, the study suggests that countries with low social indicators are likely to have weak statistical records. This, in turn, is likely to weaken policy-making and limit access to market financing, thereby further undermining the development process. For these countries, efforts to break the cycle by enhancing statistical dissemination relative to baseline levels may have a role to play in laying the groundwork for enhanced economic growth.

The study also found tentative evidence that the demand for economic data is related to economic structure. This suggests that successful efforts to achieve economic restructuring—such as a diversification away from dependency on fuel exporting, say—may need to be accompanied by efforts to strengthen economic data on the broader economy.

Notwithstanding these influences on economic data dissemination, it is noteworthy that many countries outperform the data scores that would be predicted, given their demographic, economic, and social conditions, while others fall well short. This suggests a strong independent role for government policy. Where commitment to data quality is low, performance falls short of what would have been expected; where commitment is strong, performance exceeds expectations. This underlines the importance of government efforts to strengthen all aspects of data quality, regardless of country size, income level, or economic structure.

Table 1. Average Scores for Data Frequency and Timeliness, 1996–2000 1/

	Number of Countries	Score for Frequency 2/			Score for Timeliness 2/		
		June 1996	June 1997	Feb 2000	June 1996	June 1997	Feb 2000
All economies	180	8.5	8.5	8.8	7.6	7.6	7.4
Advanced economies	27	9.0	9.0	9.3	8.5	8.6	8.1
Major industrial economies	7	9.5	9.4	9.5	9.1	9.1	8.8
Other advanced economies	20	8.9	8.9	9.3	8.2	8.4	7.9
Developing countries	126	8.2	8.2	8.5	7.1	7.1	6.9
Africa	50	8.2	8.2	8.4	7.0	7.1	7.0
Sub-Sahara	47	8.2	8.1	8.4	7.0	7.0	6.9
Asia	25	7.9	7.7	8.3	6.9	6.7	6.4
South Asia	6	8.9	8.5	9.0	7.8	8.2	8.0
East Asia	10	8.6	8.4	9.0	7.5	7.7	7.3
Pacific	9	6.5	6.3	7.1	5.6	4.5	4.3
Middle East and Europe	17	7.6	7.7	8.3	6.0	6.2	5.9
Western Hemisphere	34	8.8	8.7	9.0	8.0	8.0	7.6
Mexico and Central America	7	9.1	9.0	9.2	8.5	8.7	8.8
South America	10	9.5	9.5	9.7	9.1	9.3	8.9
Caribbean	17	8.2	8.2	8.4	7.2	6.9	6.4
Transition economies	27	9.5	9.4	9.6	9.1	9.2	9.1
Other groups:							
Middle East and North Africa	19	7.9	8.1	8.4	6.6	6.9	6.3
Asia excluding Pacific countries	16	8.7	8.5	9.0	7.6	7.9	7.5
Western Hemisphere excluding Caribbea	17	9.3	9.3	9.5	8.9	9.0	8.9

Sources: IMF Surveys of country economic data conducted in 1996, 1997, and 2000.

1/ Country groupings based on classification in the IMF World Economic Outlook, IMF (2000).

2/ Indices calculated as unweighted average of scores for 12 economic data series.

Table 2. Scores for Data Frequency and Timeliness,
by Economic Series, 1996–2000

Data series	Score for Frequency 2/			Score for Timeliness 2/		
	June 1996	June 1997	Feb 2000	June 1996	June 1997	Feb 2000
Daily data 1/	9.3	9.1	9.3	9.2	9.0	9.1
Exchange rates	9.8	9.6	9.7	9.9	9.8	9.7
Interest rates	8.8	8.5	8.8	8.6	8.3	8.5
Monthly data 1/	8.9	8.9	9.1	7.2	7.4	7.6
Consumer price index	9.5	9.4	9.6	8.4	8.5	8.1
Reserve/base money	9.6	9.6	9.8	7.9	8.1	8.1
Central bank balance sheet	9.5	9.5	9.9	7.6	7.9	8.0
Broad money	9.6	9.6	9.9	7.6	7.7	7.9
International reserves	9.7	9.7	9.9	8.4	8.5	8.6
Exports/imports	7.3	7.4	8.0	4.8	5.2	5.9
Overall government balance	6.9	6.8	6.8	5.6	5.9	6.4
Quarterly data 1/	7.2	7.2	7.8	7.6	7.3	7.0
Gross domestic product	6.6	6.6	7.0	7.4	7.1	6.6
Current account balance	7.9	7.9	8.4	8.0	7.9	7.2
External debt	7.1	7.0	8.0	7.5	7.0	7.1

Sources: IMF Surveys of country economic data conducted in 1996, 1997, and 2000.

1/ Based on SDDS prescription.

2/ Unweighted average of scores for 180 countries.

Table 3. Periodicity and Timeliness of Country Economic Data,
Assessments by the Institute for International Finance

	Percentage of IIF standards satisfied for: 1/			
	Frequency	Timeliness	Combined frequency and timeliness	
	1997	1997	1997	1999
Advanced economies	79.0	69.3	64.7	64.0
Hong Kong SAR	44	33	33	48
Republic of Korea	89	67	67	60
Taiwan Province of China	89	83	...	...
Israel	94	94	94	84
Developing countries	73.6	54.5	53.9	59.0
Africa	78.0	67.0	67.0	60.0
South Africa	78	67	67	60
Asia	70.3	54.7	53.7	63.3
China	33	28	28	24
India	56	50	44	52
Indonesia	89	72	72	80
Malaysia	67	61	61	76
Philippines	94	50	50	56
Thailand	83	67	67	92
Middle East and Europe	59.3	27.8	27.8	31.3
Egypt	61	6	6	16
Kuwait	56	33	33	28
Morocco	61	17	17	12
Saudi Arabia	28	6	6	16
Tunisia	56	33	33	32
Turkey	94	72	72	84
Western Hemisphere	87.9	75.3	74.6	78.9
Argentina	94	67	67	92
Brazil	94	83	83	72
Chile	78	61	61	76
Colombia	78	72	72	84
Mexico	94	94	89	92
Peru	94	83	83	92
Venezuela	83	67	67	44
Transition economies	83.3	72.3	72.3	77.0
Czech Republic	94	94	94	84
Hungary	94	78	78	76
Poland	78	67	67	84
Russian Federation	67	50	50	64

Source: IIF, "Data Release Practices of Emerging Market Economies", 1997 and 1999 assessments.

1/ Based on 18 data series in the 1997 survey, and 25 data series in the 1999 survey.

Table 4. Estimation Results for Measures of Data Frequency and Timeliness 1/

Explanatory variables	Data Frequency Index 2/		Data Timeliness Index 2/	
	Simple average	Weighted average	Simple average	Weighted average
Constant	7.873 (24.03)	7.560 (14.79)	5.481 (8.69)	5.069 (7.56)
Log population	0.271 (8.65)	0.328 (6.74)	0.409 (6.74)	0.384 (5.96)
Literacy ratio	0.008 (2.34)	0.003 (0.58)	0.016 (2.47)	0.016 (2.30)
Political participation 3/	-0.101 (-3.29)	-0.103 (-2.16)	-0.179 (-2.99)	-0.148 (-2.33)
Trade openness	0.003 (1.97)	0.004 (1.41)	0.009 (2.87)	0.009 (2.71)
Fuel-exporting countries	-0.626 (-2.97)	-0.915 (-2.78)	-0.978 (-2.40)	-1.153 (-2.66)
Primary product exporting countries	-0.298 (-2.02)	-0.361 (-1.56)	...	...
Developing countries active in capital markets	0.445 (2.90)	0.542 (2.28)	0.434 (1.53)	0.531 (1.76)
Transition countries	0.534 (2.70)	0.934 (3.05)	0.708 (2.01)	0.759 (2.03)
Countries with Fund programs	0.293 (2.24)	0.604 (2.97)	0.642 (2.62)	0.810 (3.11)
Indicators				
Log likelihood function	-164.7	-229.0	-293.6	-304.0
Number of observations	169	169	169	169
R-squared (OLS estimates)	0.54	0.44	0.44	0.42

1/ Parameter estimates from tobit regressions. T-statistics in parantheses. Results in bold are significant at 95 confidence level, or higher.

2/ Indices are based on a simple average or weighted average of the sub-scores for the 12 data series, as described in Section II.

3/ Based on an index from 1-10 (high to low political participation).

Table 5. Data Dissemination: Illustrative Impact of Explanatory Factors

	Range of Explanatory Variables				Predicted Data Dissemination Indices for Countries at 10th and 90th Percentiles			
	Mini- mum (A)	10th per- centile (B)	90th per- centile (C)	Max- mum (D)	Data Frequency 1/		Data Timeliness 1/	
					10th per- centile (B)	90th per- centile (C)	10th per- centile (B)	90th per- centile (C)
Core Model	Contributions to Dissemination Index							
Population (in millions)	0.03	0.23	59.88	1,241.43	-0.40	1.11	-0.60	1.67
Social and political indicators								
Literacy ratio (in percent)	13.6	40.1	99.0	99.0	0.31	0.76	0.63	1.56
Political participation (scale of 1 to 7) 2/	7.0	7.0	1.0	1.0	-0.70	-0.10	-1.25	-0.18
Trade openness (in percent of GDP)	2.2	26.2	108.1	259.0	0.08	0.35	0.24	0.99
Constant term					<u>7.87</u>	<u>7.87</u>	<u>5.48</u>	<u>5.48</u>
Predicted Data Dissemination Index					7.16	9.99	4.51	9.53
<i>Supplementary effects for:</i>								
Fuel-exporting economies							-0.63	-0.98
Primary product exporting economies							-0.30	...
Developing countries active in capital markets							0.45	0.43
Transition economies							0.53	0.71
Countries with Fund programs							0.29	0.64

Sources: Authors' estimates.

1/ Simple average measure.

2/ Score of 7 is lowest; 1 highest.

Table 6. Explaining Economic Data Frequency, by Region

	Economic Data Frequency Index 1/	Difference from Advanced Economy Average	Estimated to be attributable to differences in:									Residual Unexplained Factors 2
			Population Size	Literacy Rate	Political Participation	Openness	Developing country capital mkt access	Fund program countries	Transition effect	Fuel-exporting effect	Primary exporters effect	
Advanced economies	9.38	...	...	...	...	...	...	...	...	...	...	...
Major industrial countries	9.50	0.12	0.47	0.01	0.03	-0.10	0.00	-0.01	0.00	0.00	0.00	-0.27
Other advanced economies	9.33	-0.05	-0.17	0.00	-0.01	0.04	0.00	0.00	0.00	0.00	0.00	0.10
Developing countries	8.63	-0.75	-0.27	-0.21	-0.26	-0.03	0.10	0.12	0.00	-0.09	-0.10	-0.09
Africa	8.42	-0.96	-0.24	-0.32	-0.32	-0.04	0.03	0.18	0.00	-0.08	-0.15	-0.17
Sub-Sahara	8.41	-0.97	-0.27	-0.33	-0.32	-0.04	0.02	0.18	0.00	-0.07	-0.16	-0.17
Asia	8.78	-0.60	-0.02	-0.19	-0.28	-0.01	0.09	0.09	0.00	-0.03	-0.09	-0.19
South Asia	9.03	-0.35	0.26	-0.32	-0.20	-0.06	0.00	0.04	0.00	0.00	0.00	-0.07
East Asia	8.98	-0.40	0.24	-0.12	-0.43	0.01	0.18	0.14	0.00	-0.06	-0.09	-0.23
Pacific	8.10	-1.28	-0.87	-0.16	-0.07	0.00	0.00	0.05	0.00	0.00	-0.18	-0.24
Middle East and Europe	8.44	-0.94	-0.27	-0.18	-0.40	-0.02	0.28	0.04	0.00	-0.31	0.00	-0.09
Western Hemisphere	8.95	-0.43	-0.46	-0.09	-0.08	-0.05	0.13	0.11	0.00	-0.04	-0.08	0.07
Mexico, Central America	9.22	-0.16	-0.14	-0.15	-0.08	-0.03	0.07	0.20	0.00	0.00	-0.09	0.03
South America	9.65	0.27	0.07	-0.05	-0.14	-0.12	0.32	0.16	0.00	-0.06	-0.12	0.13
Caribbean	8.35	-1.03	-0.97	-0.08	-0.05	0.00	0.03	0.03	0.00	-0.04	-0.06	0.05
Transition Economies	9.66	0.28	-0.17	-0.01	-0.19	0.03	0.16	0.20	0.53	0.00	0.00	-0.09
Other Groups												
Middle East and North Africa	8.35	-1.03	-0.19	-0.25	-0.47	-0.04	0.19	0.08	0.00	-0.30	-0.03	-0.05

Sources: IMF staff estimates.

1/ Based on unweighted average of scores for 12 economic data series.

2/ The residual is calculated as the difference between the actual data score and the fitted value, where the latter is equal to the sum of the estimated contributions, or a value of 10, whichever is the lower. Reflecting this, the sum of the estimated contributions and the residual differ slightly from the actual data score in some cases.

Table 7. Explaining Economic Data Timeliness, by Region

	Economic Data Timeliness Score 1/	Difference from Advanced Economy Average	Estimated to be attributable to differences in:								
			Population Size	Literacy Rate	Political Participation	Openness	Developing country capital mkt access	Fund Program Effect	Transition Effect	Fuel-Exporting Effect	Residual / Unexplained Factors 2/
Advanced economies	8.58	...	...	...	...	...	...	...	...	...	...
Major industrial countries	8.86	0.28	0.71	0.02	0.06	-0.28	0.00	-0.02	0.00	0.00	-0.21
Other advanced economies	8.48	-0.10	-0.26	-0.01	-0.02	0.10	0.00	0.01	0.00	0.00	0.08
Developing countries	7.33	-1.25	-0.40	-0.44	-0.46	-0.09	0.10	0.27	0.00	-0.14	-0.08
Africa	7.19	-1.39	-0.37	-0.67	-0.57	-0.11	0.03	0.39	0.00	-0.12	0.03
Sub-Sahara	7.13	-1.45	-0.40	-0.67	-0.56	-0.10	0.02	0.40	0.00	-0.11	-0.03
Asia	7.44	-1.14	-0.03	-0.38	-0.49	-0.03	0.08	0.19	0.00	-0.05	-0.43
South Asia	8.39	-0.19	0.39	-0.65	-0.35	-0.17	0.00	0.08	0.00	0.00	0.52
East Asia	7.45	-1.13	0.37	-0.24	-0.76	0.04	0.17	0.30	0.00	-0.10	-0.87
Pacific	6.27	-2.31	-1.31	-0.32	-0.12	0.01	0.00	0.10	0.00	0.00	-0.68
Middle East and Europe	6.29	-2.29	-0.40	-0.37	-0.71	-0.07	0.27	0.10	0.00	-0.49	-0.62
Western Hemisphere	7.97	-0.61	-0.69	-0.18	-0.15	-0.13	0.12	0.24	0.00	-0.06	0.25
Mexico and Central America	9.13	0.55	-0.21	-0.30	-0.14	-0.08	0.06	0.43	0.00	0.00	0.80
South America	9.31	0.73	0.11	-0.11	-0.24	-0.34	0.30	0.36	0.00	-0.10	0.75
Caribbean	6.54	-2.04	-1.46	-0.17	-0.09	-0.01	0.03	0.06	0.00	-0.07	-0.34
Transition Economies	9.29	0.71	-0.25	-0.01	-0.34	0.09	0.15	0.44	0.71	0.00	0.00
Other Groups											
Middle East and North Africa	6.53	-2.05	-0.29	-0.52	-0.83	-0.10	0.18	0.18	0.00	-0.46	-0.20

Sources: IMF staff estimates.

1/ Based on unweighted average of scores for 12 economic data series.

2/ The residual is calculated as the difference between the actual data score and the fitted value, where the latter is equal to the sum of the estimated contributions, or a value of 10, whichever is the lower. Reflecting this, the sum of the estimated contributions and the residual differ slightly from the actual data score in some cases.

Scoring System Used for Calculation of Data Frequency and Timeliness Scores

	0	2	Points Scored			10	SDDS prescription
			5	8	9		
Scoring System for Data Frequency							
(Periodicity of Compilation) 1/							
Real sector indicators							
Gross domestic product	n/a		A	2Q		Q	Q
Consumer price index	n/a	A	Q			M	M
Budgetary indicators							
Overall government balance	n/a	A	Q			M	M (central govt.)
Monetary sector indicators							
Reserve/base money	n/a	A	Q			M	M (W encouraged)
Central bank balance sheet	n/a	A	Q			M	M (W encouraged)
Broad money	n/a	A	Q			M	M
Interest rates	n/a	A	Q	M	2W	W	D
External sector indicators							
International reserves	n/a	A	Q			M	M (W encouraged)
Exchange rates	n/a	A	Q	M	2W	W	D
Exports/imports	n/a	A	Q			M	M
Current account balance	n/a		A	2Q		Q	Q
External debt	n/a		A	2Q		Q	Q (central govt.)
Scoring System for Data Timeliness							
(Lag in Data Availability in Months) 2/							
Real sector indicators							
Gross domestic product	n/a	10+	7-9	4-6		1-3	Q
Consumer price index	n/a	5+	3-4	2		1	M
Budgetary indicators							
Overall government balance	n/a	5+	3-4	2		1	M (central govt.)
Monetary sector indicators							
Reserve/base money	n/a	5+	3-4	2		1	2W (W encouraged)
Central bank balance sheet	n/a	5+	3-4	2		1	2W (W encouraged)
Broad money	n/a	5+	3-4	2		1	M
Interest rates	n/a	5+	3-4	2		1	3/
External sector indicators							
International reserves	n/a	5+	3-4	2		1	W
Exchange rates	n/a	5+	3-4	2		1	3/
Exports/imports	n/a	5+	3-4	2		1	8W (4-6W encouraged)
Current account balance	n/a	10+	7-9	4-6		1-3	Q
External debt	n/a	10+	7-9	4-6		1-3	Q (central govt.)

1/ A=Annual; Q=Quarterly; 2Q=Semi-Annual; M=Monthly; W=Weekly; 2W=Bi-Weekly.

2/ Defined as difference between final month in reporting period to month of data availability.

3/ Widely available from private sources. To be part of other (preferably high-frequency) official dissemination products.

Source Data for Estimation

1. Economic size

Population: In millions, 1998. Data from IMF World Economic Outlook (WEO) database and, where necessary, other sources.

Gross domestic product: In billions of U.S. dollars, 1998, at current exchange rates and purchasing power parity exchange rates. Data from IMF WEO database.

2. Economic development

Gross domestic product: In U.S. dollars per capita, 1998, at current exchange rates and purchasing power parity exchange rates. Calculated using data in Section 1 above.

Advanced, developing, and transition economies: Dummy variables based on country classification in the May 2000 WEO.

Political participation: Index of political rights for 1999 compiled by the Freedom House Survey Team. Published in "Freedom in the World: the Annual Survey of Political Rights and Civil Liberties, 1999/2000", Freedom House, 2000.

Civil liberties: Index for 1999 compiled by Freedom House Survey Team. Published as above. (In practice, the Freedom House measure of political rights is highly correlated with its measure of civil liberties, and the two series have an almost identical explanatory power in empirical work.)

Adult Literacy rate: Percentage literacy rate for age 15 and above, 1995. Published in "Human Development Report", United Nations Development Program.

Gross school enrolment ratio: Combined primary, secondary, and tertiary gross enrollment ratio, 1995. Published as above.

Education index: 1995. Published as above.

Public spending on education: Percent of GDP, 1996. Published in "Entering the 21st Century: World Development Report 1999/2000", World Bank, 1999.

3. Government size

Government expenditure and net lending: In percent of nominal GDP, 1999. IMF WEO database.

4. Economic structure

Openness: Merchandise trade (exports plus imports) as percent of GDP, 1999. IMF WEO database.

Oil exporting: Dummy variable for fuel-exporting countries. May 2000 IMF WEO.

5. Use of global capital markets

Participation in SDDS: Dummy variable for countries participating in the SDDS at mid-2000. Data from the IMF website. Separate dummies were used for advanced and developing countries, as defined in Section 2 above.

Participation in global capital markets: Estimates of global market financing per capita were calculated for developing countries using IMF estimates of equity, bond, and loan financing for 1994-99 and population data for 1998. Dummy variables were established for three developing country groups: (a) 36 countries with cumulative financing of over US\$200 per capita; (b) 11 countries with cumulative financing of US\$25-200 per capita; and (c) other developing countries, with no observed market access.

6. Transition effect

Transition countries: Dummy variable for transition economies. May 2000 IMF WEO.

BRO countries: Dummy variable for the Baltics, Russia, and other countries of the former Soviet Union.

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