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ON THE MEASUREMENT OF SOCIAL PROGRESS AND WELL BEING: SOME FURTHER THOUGHTS^{*}

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October 2011

2011 - 19

Summary

Two years after the delivery of the report on *The Measurement of Economic Performances and Social Progress* (Stiglitz-Sen-Fitoussi), this paper provides some further reflections on the subject. Since 2008, when the work of the Commission began, the world has experienced several dramatic events which all call into question our measurement systems and the policies which were grounded on them: the financial crisis of 2007-2008, the grave events in Japan, the Sovereign debt crisis, and the revolutions in the Arabic world. In particular, the Japanese earthquake and its aftermath underlines three central shortcomings of our metrics: the measurement of the “economic product”, the measurement of well being, and the measurement of sustainability.

For economists, these concerns are especially important, because we often rely on statistical (econometric analyses) to make inferences about what are good policies. Those inferences are only as reliable as the metrics that they are based on. Our statistical systems should tell us whether or not what we are doing is sustainable, economically, environmentally, politically, or socially and whether proposed policies will in fact enhance well-being. There would be little sense in pursuing policies aimed at increasing some widely used metric like GDP if such policies lead to a decrease in well being.

* Paper presented at the 16th World Congress of the International Economic Association, Beijing 4-8 July 2011.

There is a compelling case for constructing better metrics. The Stiglitz-Sen-Fitoussi report highlighted the deficiencies in existing metrics, outlined an agenda for improvements, and discussed key areas on which further research is needed. Since the publication of the report, not only have these ideas come to be widely accepted, but there has been some progress in implementing the agenda.

JEL Classification Code: E010; E300; G100; I320; Q500; Q540

Keywords: 1- Economic indicators 2- Gross Domestic Products 3-Social indicators 4- Well being 5- Sustainability

There is not a single year where our measurement systems are not called into question, and as a consequence it will take more time than we would like to understand what is going on in the world economy.

The “financial” crisis revealed that we (and especially the United States) were not doing as well as we thought we were when looking at the available metrics. That is, we realized that economic growth was not sustainable, and the output measures had been exaggerated by bubble prices in real estate and by fictional profits in the financial sector. The fact that in some countries (such as the US) GDP has returned to pre-crisis level does not capture, in anyway, the diminution in the sense of well-being. With almost one out of six Americans who would like a full time job--and other facing high anxiety at the risks they face of the loss of a home or a job--and cutbacks threatened in the basic public expenditures programs, the loss in well-being is enormous. The situation in Spain is even worst, with an unemployment rate higher than 20% on average and almost one out of two young Spanish unemployed!

The events in Japan can be seen as a metaphor of our measurement problems. Some suggest that while in the short run, GDP may go down, in the long run it will rise as a result of the reconstruction efforts. The nuclear disaster has increased anxieties--and may well have significant health effects on large numbers of the population. Again, the expenditures required to respond may raise GDP, perhaps enough to get Japan out of its long standing economic malaise. But no one would claim that Japan is better off as a result. It would require a huge increase in GDP to compensate for the destruction of capital, of all kinds of assets, that the event has caused, and to offset the increased anxieties that so many in the country face today. And we are not good – our metrics are not adapted – at measuring the value of the lost assets. And even if it were, the arithmetic of compensation will not tell us much about the way the well being of Japanese people has evolved. The mechanical nature of our economic models will tell us nothing about the immaterial consequences of the irreversible losses of the people. In the aftermath of the crisis, we now realized that our measurements before the crisis were also not accurate. GDP may have been higher because of the greater efficiency (cost savings) as a result of the reliance on nuclear (as opposed to say renewable) energy. The placement of the spent nuclear material in a way that exposed the entire country to risks that are now so evident too may have contributed to a seeming higher GDP *then*. But just as accounting frameworks before the financial crisis mispriced risk,

so too in Japan. The Japanese case is thus a metaphor because it underlines the three shortcomings of our metrics: the measurement of the “economic product”, the measurement of well being, and the measurement of sustainability.

Another universal fact well documented is the intra-country increase in inequality which has characterized at least the past quarter of century. Looking at the growth of GDP or at that of Net income, would tell us nothing about this fact, and would certainly give us a wrong impression about the evolution of societal well being. A striking fact is that in OECD countries the increase of income of 80% of the population has been lower than the rate of growth of the overall economy (which is, obvious, an average) and the more so the lower is the decile considered. If we seek numbers that assess the impact of economic growth on society as a whole, surely we want to know what is happening to *most* citizens. GDP tells us nothing about that.

Another example is provided by the revolution in the Arabic world, especially in Tunisia which opened the process. Some economists (see for example Barro¹) think that political freedom is a luxury good which leads to a lower rate of growth, because of the quest for redistribution to which it leads. Setting aside whether such claims rest either on sound theoretical or empirical foundations (at least in the case of Tunisia, the lack of democracy contributed to corruption, which had an enervating effect on growth), here too the concept used is misleading. GDP is not a measure of well being. Even if it could be shown in regressing growth of GDP on some indices of political freedom that limiting political freedom leads to increases GDP – and quite apart from the fragility of such empirical exercises – the conclusion that countries would be well-advised to postpone democratization until they can afford this luxury makes no sense. It may well be that well being increases more from an increase in political freedom than from an increase in GDP, especially given the way GDP is measured. In debating about the effect of political freedom on the evolution of GDP, we are missing an essential point: the risk taken by the people to fight for freedom is a testimony that it is a fundamental component of well-being.

¹ Robert Barro: “Determinants of Economic Growth: a Cross-Country empirical Study”, NBER Working Paper n°5698, August 1996.

These are just some examples of how our present statistical system, both flaws in the available metrics and the absence of alternatives, may implicitly lead to erroneous policy conclusions.

All of this is important because what we measure affects what we do. Reducing well-being to increase whatever imperfect measure of material wealth gives rise to totally flawed policies.

I. Metrics and policies

For economists, these concerns are especially important, because we often rely on statistical (econometric analyses) to make inferences about what are good policies. Those inferences are only reliable as the data that they are based on. Some studies suggested that financial market or capital market liberalization contributed to higher economic growth. It is now clear that such studies' conclusions were flawed because (i) GDP numbers in the growth spurts were exaggerated by the bubbles that are often associated with such liberalizations; (ii) unless an adequate time horizon is taken, the losses that follow the crashes will not be taken into account—and these losses may more than offset the short term gains arising from the bubbles to which liberalization often gives rise; (iii) the distributive consequences of those policies are not taken into account—so that even if GDP goes up, it may be the case that most citizens are worse off; and (iv) the costs to well-being—from, for example, the insecurity that follows volatility that typically accompanies such liberalization measures—are not taken into account. More generally, the empirical studies conducted to demonstrate the beneficial effect of financial market liberalization on growth and employment, are vulnerable to the same kind of limitations. There is thus a hiatus between some of the usual policy recommendations and the weaknesses of the evidence to support them.

To take another example, there has been a wealth of econometric studies aimed at showing how certain labour market institutions and the adverse effects they have on the flexibility of the labour market affect unemployment and growth. These studies of the impacts of the particular institutions under study on unemployment are, at best, able to explain effects that are of second order of importance. Two studies based on a sample

of 19 OECD countries independently conducted on the subject² reached the same conclusion. Capitalism is evidently sufficiently robust to accommodate rather different institutional settings.³

Putting aside for the moment an evaluation of the contention that more flexible labor markets do increase GDP (reducing the cumulative disparity between actual and potential GDP), of what moment is this observation if GDP is not the right measure of societal well-being?⁴

Many of the advocates of unfettered markets—who see any intervention, whether through say public policy or private institutions, as welfare decreasing—ignore the extensive and well-documented “market failures,” which are especially widespread in labor and capital markets. Some institutions have been created to make up for failures in insurance markets and training. If our metrics do not capture the benefits of the greater security that unemployment insurance provides, the reform that is needed is not the abolition of unemployment insurance, but of the flawed metrics. Some of these institutions can be thought of as reflecting a social contract that arises from a democratic process. There are winners and losers to any structural reform, so such reform is unlikely to lead to a Pareto-improving outcome, or even one supported by a majority of the electorate. But, and even more importantly, the move towards a greater flexibility of the labor market could affect negatively at least two of the main objective determinants of well-being: the quality of jobs (the quest for a decent job) and economic security.⁵ In short, out of very weak evidence drawn from ill measured

² See Jean Paul Fitoussi and Olivier Passet,: « Réduction du chômage: les réussites en Europe », Conseil d'Analyse Economique, n°23, La Documentation Française, 2000 ; and Richard Freeman :Single peaked vs diversified capitalism : the relation between economic institutions and outcomes », NBER Working Paper, n° 7556,2000.

³ That conclusion is at odds with the common wisdom according to which the diversity of institutional structures plays a determinant role in explaining both unemployment and growth. Institutions do matter—the Scandinavian experience shows that active labor market policies and the corresponding institutions may enable labor markets to function better, at least in periods in which there is not a large deficiency in aggregate demand. Our discussion here focuses on those institutions that allegedly lead to less flexible labor markets.

⁴ In particular, research growing out of the Fisher-Greenwald-Stiglitz debt-deflation literature shows that with imperfectly indexed contracts, greater wage and price flexibility may be associated with deeper downturns and slower recoveries. Indeed, in a cross section study of volatility, wage and price rigidities were far less important than financial market factors. See Easterly *et al.*(2001a, 2001b, 2003). Weaker job security will reduce workers' willingness to invest in firm-specific capital, and thus can undermine growth and productive efficiency.

⁵ Security is, of course, an important aspect of what is viewed as a good job. Here again, there are grounds for ???

phenomena, we could draw policy recommendations whose implementations may reduce the well being of the people.

Of special concern are the econometric inferences about good policies we draw from cross country regressions. Whether we like it or not, international comparisons of levels and more importantly of rates of growth play a very important role in the design of policy. To some, cross country regression provide us greater confidence in making these comparisons, by isolating the effects of certain factors that are thought to help explain differences in performance across countries.

Many of the critiques of this methodology are well known. For instance, usually this type of exercise proceeds by constraining coefficients to take the same value across countries as if it were a single model (both economic and social) that is able to explain economic and welfare outcomes all over the world quite independently of the specific choices and institutional arrangements made by different countries. If the equation fits for one group of countries but not for another the panel estimation may yield significant results due only to the inclusion of the first group. The implications are obvious: it would be wrong to extend the inferences to a country that belongs to the second group.

Our concern here with cross country regressions is about another caveat. Comparisons are only meaningful if the procedures and definitions used to compute the accounts are comparable and if there are not in-built biases in the construction of the data series themselves. Yet there are still “large differences in the ways National Accounts calculations are carried out even among European countries, let alone between Europe and the U.S⁶”. This may have far-reaching consequences. It makes no sense, for instance, to structural reforms intended to import the “best practice” of the country performing the best in terms of growth rate, if the growth rates of the two countries differ mainly because of differences in the ways National Accounts are computed

Another example, reflective of a failing in GDP measurement that has long been recognized, arises in analyses of the effect of the size of government on growth. Because output in the public sector is typically measured by its inputs, there is an

⁶ Joachen Hartwig (2005): “On Misusing National Account Data for Governance Purposes », Working paper 05-101, KOF Swiss Economic Institute, ETH, Zurich.

implicit assumption of no productivity growth, when in fact in some cases (where detailed studies have been conducted, or on the basis of casual empiricism) we know there is rapid productivity growth. Inevitably, such assumptions bias cross-country regressions, to suggest that a larger public sector is associated with smaller rates of productivity growth. The result is not a deep empirical insight; it is simply a statistical artefact of measurement. Consider, for instance, what might happen if one were to privatize America's social security (the public old age pension system.) We know that transactions costs for that system are an order of magnitude lower than for private annuity programs. It is extraordinary efficient, and surveys have shown that it is also very "customer responsive." Privatization would result in higher profits for America's financial services industry and lower benefits for American's retirees. The higher profits would likely be reflected in an increase in GDP. But the well being of Americans would be decreased, and the gains of the financial industry would be at the expense of the average retirees. Well-being, appropriately defined, would go down. But it is easy to see how in the mindless cross-country regressions that have become the fashion, one might conclude that such a privatization would be good for "growth." And more importantly, even if it were – and it is not – should we conclude that democracies all over the world should choose a small state (and become impotent)?

II. Use and Misuse of the Concept of sustainability

We can do better. The Commission on the Measurement of Economic Performance and Social Progress identified a number of reforms.⁷ Some would lead to a better GDP metric--so that even if GDP is not a measure of well-being, it is a better measure of whatever it is that it is attempting to measure. In effect, the purposes of our statistical systems are multiple, and a metric that is adapted to one purpose may be ill suited to another. Sometimes confusion is engendered when a measure adapted to one purpose is used to highlight another. For example, GDP is neither a measure of income nor a measure of well-being. What we want to measure is the key question. We may want to measure, for instance, the levels of market activity—one of the original objectives of national income measurement.

⁷Joseph E. Stiglitz, Amartya Sen and Jean Paul Fitoussi: *Mis-measuring our lives, Why GDP does not add up*, The New Press 2010

But increasingly, there is a demand to go beyond measures of market activity to measures of well-being. And even before the crisis, there were worries about sustainability—and that our metrics did not tell us anything about whether what we were doing was sustainable.

That is why some would encourage more focus on *other* metrics. Looking at the (real) income of the median individual would give us a better picture of what is happening to the typical individual in society than GDP per capita. Before the crisis, many thought that the U.S. had been performing well. But if they had looked at median income, they would have seen that incomes were stagnating or declining--and such measures did not even account for the greater insecurity as a result of reduced health insurance coverage or weaker retirement protection as a result of the shift from defined benefit programs to defined contribution programs. Growth at the expense of the sustainability of one's life?

We care about the future—that the living standards that we enjoy today should be enjoyed by future generations. Our statistical systems should tell us whether or not what we are doing is sustainable, economically, environmentally, politically, or socially. There is reason to believe that, at least in certain dimensions, what we are doing is not sustainable, but current statistics do not reflect this—just as they gave little indication of the unsustainability of the U.S. economic growth in the years preceding the crisis.

It is important for any society to form an assessment, no matter how imperfect, about whether its current consumption or well-being is sustainable, and whether this is coming at the expense of future generations. We can ascertain whether a society's wealth is increasing or decreasing (per capita). If (appropriately measured) it is increasing, then presumably society can do in the future whatever it did today, i.e. it can sustain its per-capita income. But we need a *comprehensive measure* of wealth, and we need to be sure that the valuations are correct. A comprehensive measure obviously includes measures of physical capital, human capital and natural capital (including the environment). Changes in capital include those arising from investment in plant and equipment, education, the depletion of natural resources, depreciation of physical capital, and environmental degradation.

Because we know that prices do not adequately reflect the true social costs of carbon emissions and the risks that a major change in carbon prices would impose on all asset prices, we felt reluctant to use, or at least rely on, market prices to assess environmental sustainability, suggesting instead the concurrent usage of physical metrics.

One of the problems encountered in the aftermath of the financial crisis is the misuse of the concept of sustainability. The lack of an indicator of sustainability may lead us to an unsustainable path, but a partial measure may lead us to wrong policies which would eventually jeopardize the sustainability of an economy. A case in point is Europe. Sharing a common currency in a global crisis, Euro Zone countries are currently looking for sustainability indicators in order to assess the financial sustainability – by which they mean essentially the sustainability of the public debt – of each member country: they are trying to define sustainability objectives, implement economic policies that are “sustainability friendly” and spread information to financial markets in order to reduce pressure on public and private sectors borrowing. The problem is that European countries are focussing on a very partial view of sustainability, namely the sustainability of public debt, which lead them to impose on peripheral countries austerity programmes, i.e. procyclical policies, which would likely result in a much lower rate of growth and may eventually lead to financial unsustainability both in the public and the private sector. Whatever measure we devise, we have to recognize that it will be grounded on our present imperfect knowledge of the *future*.

Inevitably, metrics are partially grounded in models: many of the metrics upon which focus are not ends in themselves, but are viewed as intermediate variables of interest because they provide insight into things we really care about. But the relationship between these intermediate variables and the things we really care about are often uncertain, and depend on the model. But there is a great deal of uncertainty about the *right* model. For instance, prior to the crisis, many believed that all a country needed to do to maintain high and stable growth was to maintain low and stable inflation. In the aftermath of the crisis, there is broad consensus that low and stable inflation was certainly not sufficient for economic stability. Those policy conclusions were themselves predicated on wrong models. And those wrong models encouraged economists to focus on a single variable, inflation, as an *indicator* of the country's

future prospects. We now know that there should have been more focus on indicators of financial stability.

Similarly, those who argue a second metric of focus should be debt/GDP, and that debt/GDP ratios above a given level (say 80%) are not sustainable are basing this conclusion on models. Given the present level of wealth (both public and private), even higher levels of debt might be sustainable, if there is rapid enough technological progress. Greece is not bankrupt, but threatened to be so. Financial markets judgment is a (possibly) educated guess about what will be the future, but can't be more than that, given their fantasy in the valuation of asset prices. Keeping that in mind, it may not be a terribly good idea to force the Government of Greece to privatize public assets to reduce its public debt. A fire sale would actually worsen the government's balance sheet. It will also lead to a dismantling of the public sector which will limit the scope for future intervention and through this limitation may impede policies geared at sustainability.

III. Assessing Well Being

The members of our Commission felt strongly that GDP did not provide a good measure of well-being, even contemporaneously—setting aside the question of whether current standards of living were sustainable. We urged the construction of broader measures of well-being that would take some account of some of the most important factors that affect well-being that were not yet included in GDP metrics, like connectedness.

In our report, and in the discussion surrounding its presentation, we highlighted though another of the debate over measurement: While a focus on *false* measures might distort policy, a dialogue around what we, as a society, care about, and whether these concerns are adequately reflected in our statistics, could contribute not only to an enhanced understanding of the limitations of these standard statistical measures, but to the formulation of *better* policies, more reflective of the concerns and values of citizens.

We believe that that in fact has been the case. In many countries, notably in France, Germany, Italy and the UK steps have been taken to implement some of the recommendations of our report. But the most comprehensive exercise undertaken has been the study of OECD released in May 2011, « [the OECD Better Life Initiative](#) ». It shows the will of the Organization to dialogue with the civil society by allowing each Citizen to build his own aggregate index of the quality of life. 11 indicators have been selected by the OECD for the 34 countries of OECD and some emerging countries, according to the domains identified in our report. People are asked to compute their own index by selecting the weight of each determinant of well being through an internet interactive tool called « [Your Better Life Index](#)».

Most of the determinants considered but one are objective (Health, Employment, Education, Housing conditions etc.), but one pertains to the subjective category, namely life satisfaction. It is obtained through surveys. The subjective determinants of well being are obviously important. In effect, a long philosophical tradition views individuals as the best judges of their own conditions. But they are subject to a kind of “time inconsistency” problem, as they may evaluate their circumstance (or even a particular event) in a different way at different periods of time. Some persons may answer at the very moment they are raising their children that this activity is painful, while when asked 20 years later they may remember of this period as the most satisfactory of their life.

How to interpret and use these different results in developing well-being metrics is a subject on which there is on-going research.⁸ We are hopeful that not only will this research lead to better metrics, but active engagement with civil society will result in policies that are directed at the improvement of societal well-being—reflected not in some flawed measure of GDP, but of the newly constructed measures.

Surely, in the present circumstances, most of our countries need more growth; But growth of what? The usual answer is the growth of GDP but a better answer should be the growth of well being, that is of what really matters for citizens. The shift from the former to the latter objective requires most probably an enrichment of the instruments

⁸ For two earlier surveys, see , Sunstein, C.R., Kahneman, D., Schkade, D., & Ritov, I. (2002). Predictably incoherent judgments. *Stanford Law Review*, 54 , 1153-1215. 2002 and Kahneman, D., & Krueger, A.B. (2006). [Developments in the measurement of subjective well-being](#). *Journal of Economic Perspectives*, 20 , 3-24. 2006.

of public policies and a much more selective approach to policies aimed at increasing GDP: it will serve no purpose if this aim is achieved at the expense of well being.

IV. Well Being and the Business Cycle

This broader and redefined perspective on measurement is relevant not only for assessing the long term progress of society, but also for understanding cyclical fluctuations, such as the one that much of the world is now experiencing. (Ironically, it was precisely to understand cyclical fluctuations that the narrower GDP measure was originally developed.) Earlier we noted that *before* the crisis, GDP was exaggerated. But one can argue that in the crisis, the loss in well-being may also be underestimated. The Commission's initial report emphasized the importance of employment itself. One point where various subjective measures of people's well-being agree is that unemployment has a very adverse effect on people's quality of life. People who become unemployed report lower life-evaluations, even after controlling for their lower income. The adverse effects persist over time. The unemployed also report higher prevalence of various negative affects (sadness, stress and pain) and lower levels of positive ones (joy). One may also suspect that the adverse effects of unemployment are felt even by those who are not themselves unemployed, especially in societies where there is high unemployment. These subjective measures suggest that the costs of unemployment exceed the income-loss suffered by those who lose their jobs, reflecting the existence of non-pecuniary effects among the unemployed, and of fears and anxieties generated by unemployment in the rest of society.

In the US, some seven million families have already lost their home. Both are contributing to increased levels of anxiety, even among those still with jobs and homes. There are identifiable effects of home ownership on individuals' sense of and participation in community and investments in local schools--and possibly therefore in the future well-being of their children. There is evidence too of adverse health effects.⁹

All of this suggests that economic fluctuations may have strong asymmetric effects on well being – something we should already intuitively have known. Moreover, some of the consequences (e.g. on health and education) may be irreversible. However, the

⁹ See Janet Currie and Erdal Tekin "Health Consequences of the Foreclosure Crisis," April 2011.

prevalent use of GDP as *the* intermediate indicator results in our not taking explicitly account of these adverse effects, not only on the current level of well-being, but also on the “stock” of human capital. The economics of the business cycles should be rethought in light of the probable discrepancies between the fluctuation of output and that of well being. It may well be that it would better for governments to devise policies aimed more at minimizing the rate of unemployment and its variation over the business cycle rather than policies aimed at maximizing output growth (as measured by GDP). Some of the instruments for implementing these two strategies may be the same – employment concerns are central to overall macroeconomic strategy – but surely the first strategy needs specific, supplementary ones, to smooth the evolution of unemployment. Risks too may be very asymmetric: an extended period of high unemployment may have far higher long term consequences than those that might arise from a slightly overheated economy. Moreover, in light of the preceding arguments such a strategy will surely enhance well being even if there were some adverse effects on growth, as measured by GDP.¹⁰ The design of good policies can’t be grounded on the artificial separation between social policies and macroeconomic ones: if the well being of the people is the ultimate end, employment, labor market analysis and income distribution must be central components of the macroeconomic analysis supporting stabilization policies.

V. Beyond GDP: The Experience of Bhutan

We should note one further example--Bhutan--whose quest for better metrics began long before the work of our Commission. Some forty years ago, the King at the time enunciated that the country's goal was not to maximize GDP but GNH, gross national happiness. Rather than turning to an Economic Development and Planning Agency for formulating development strategies, the country established a Gross National Happiness Commission. It was more than a matter of words. Questions were raised that typically do not get raised in a single-minded focus to increase GDP: (a) What is the impact on the environment (typically not priced correctly within GDP. Forest cover was increased, even if cutting down forests might have, in the short run, increased

¹⁰ We should emphasize, however, that there are some reasons to believe that a greater focus on employment security might also enhance not just current well-being, but even growth, e.g. by facilitating greater investments in human capital and a greater willingness to undertake risk.

GDP). (b) What is the impact on "social capital" (social cohesion)? This is something that is virtually never priced into GDP. Trust in government can allow better compliance with environmental regulations (without which restrictions on cutting down forests would be very hard to enforce) or more responsiveness to government efforts to improve education and health of children--actions which almost surely will improve GDP in the future, but the benefits of which will not show up in today's GDP.

Out of this has grown a more holistic approach to development, which sees development as a transformation of society, receiving the benefits of modernization (e.g. greater literacy, more political participation, better health) while retaining traditional values and a national sense of identity. Development is seen as more than just the accumulation of more factors of production or an increase in static efficiency. New questions are asked, and out of these, new approaches are taken: What is the impact on entrepreneurial and societal learning? Opening up construction bids for a new school to all contractors, foreign or domestic, might lead to lower *short* run costs--a seeming better economic performance today--but the encouragement of local builders using local materials and techniques and designs that accord to local preferences and which might have relevance for *other* construction activities might have much greater long term growth benefits.

Bhutan is consciously involved in a process of societal transformation, and so, for that country, it was imperative that they think deeply about the directions in which their society was being transformed. But all of our societies are changing, evolving, if ever so slowly, in a far more evolutionary way. If well designed, our metrics can give us indicators of where we are, and over time, can provide a picture of where we are going. They can give us information that can allow us assess whether we are achieving our objectives—and, even if we are succeeding in the metrics that we set as our objectives, are there other less toward consequences that we need to address.

Our assessment of current metrics has left us convinced that, too often, they have led countries to set off in the wrong direction, or at least to adopt policies of ambiguous benefits. Our quest for better metrics has convinced us that there are today available metrics that could provide better guidance. And our research has shown that there is

considerable scope for the improvement in these metrics and the development of new metrics that will provide corresponding more closely to societal objectives.

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