On the Integrity of the "Ease of Doing Business" Indicators

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Executive Summary

In an early 2018 *Wall Street Journal* interview, Paul Romer raised specific and general concerns about the World Bank's Ease of Doing Business indicators. The specific concern is that World Bank staff might have manipulated the indicators for Chile (or other countries). The general concern is that frequent methodology changes undermine the indicators' social value to researchers, policy-makers and the media.

We address the specific concern through a comprehensive audit of the raw data and calculations of the *Doing Business* 2015, 2016 and 2017 indicators (DB2015, DB2016 and DB2017) for Chile and a set of twelve other economies. [3] In every case we checked, the indicators are based on unaltered survey data, faithfully entered into an automated data management system, and are mechanically constructed free of manipulation by World Bank staff. **The Ease of Doing Business indicators for Chile and for the other economies we examined were not subject to manipulation by World Bank staff.**

This exercise reveals that both the survey questionnaires and how the indicators are calculated have changed frequently. Each major methodology change has economically sound justification. **However, frequent methodology changes reduce the value of the indicators to researchers, policy makers and the media.**

World Bank staff entrusted with overseeing the Ease of Doing Business database contend with difficult trade-offs between completeness, current relevance and comparability over time. Methodology changes reflect concerns about keeping the Ease of Doing Business indicators relevant to current issues and expanding their scope to implement recommendations made by its Independent Panel of Experts in 2013, World Bank Group staff, governments and the private sector. **Concerns that World Bank staff implement methodology changes to manipulate the Ease of Doing Business indicators of specific economies or to sway domestic politics in affected economies are entirely without evidence.**

Nonetheless, frequent methodology changes cause many economies' Ease of Doing Business indicators to change mechanically – that is, for reasons unrelated to real changes in the ease of doing business in these economies. This reduces their value to researchers because recent trends in econometrics contrast

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[3] These reflect conditions as of June 1st of 2014, 2015 and 2016 respectively.

the impact of changes in policy variables across data differentially affected by those changes. Mechanical changes in the data risk undermining such studies. The World Bank's practice of providing old and new methodology versions of the data for the year prior to methodology changes is helpful, but inadequate because data more than one year removed remains non-comparable. Mechanical changes also reduce the indicators' value in providing bragging rights to successful reformers, ammunition to reformers combating deteriorating institutions, and readily comprehensible information for the media.

The World Bank may wish to minimize methodology changes except to fix confirmed problems with existing methodology. Confirmation might require the identification of a problem in a peer reviewed research article and its verification by an independent review. When methodology changes to existing indicators are unavoidable, the World Bank may wish to favor changes that preserve comparability by allowing adjustment to prior years' data. For example, when the World Bank modified the Starting a Business indicator to reflect gender parity, prior years' data were recalculated using the revised methodology. This can render studies using older data unreproducible, but at least preserves comparability across years. In contrast, when the Registering Property and Enforcing Contracts indicators were modified to reflect gender parity, prior values of those indicators were not recalculated. This renders those indicators non-comparable across time.

The World Bank may wish to expand the Ease of Doing Business database with new indicators to cover additional aspects of the business environment, rather than with methodological changes to existing indicators. New factors important enough to affect how the indicators are constructed are presumably important enough to merit their own indicator. For example, to account for the unambiguously important issue of gender parity in the ease of doing business, the World Bank changed the methodologies for calculating the Starting a Business, Registering Property, and Enforcing Contracts indicators to encompass gender parity. Had the World Bank introduced an entirely new Gender Parity in Ease of Doing Business indicator based on gender parity in starting businesses, registering property and enforcing contracts, gender parity might have been more prominently addressed and the other indicators left comparable across all years.

The World Bank obviously balances such things in deciding how to update the indicators, but this balancing process in making methodology changes may *itself* need a methodology change. Developments in how researchers, policy-makers, and the media use the Ease of Doing Business indicators suggest that, **going forward, the World Bank may wish to consider assigning a much greater weight to preserving comparability in the indicators across all years.**

The media and policy-makers, especially, attend to changes in the indicators over the years and across economies. **The World Bank may wish to exploit this by providing an alternative set of stable indicators and rankings**, based solely on those subcomponents of the indicators that are free of major methodology changes, such as the compliance costs and delays, which would be comparable across all years. These might be given a different name - perhaps **Doing Business Development indicators – to stress their suggested use in tracking institutional development through time** and to distinguish them from the DB indicators.

The World Bank normalizes the indicators as Distance to Frontier (DTF) scores. These measure each economy's proximities to (not distances from) global best practice frontiers. Each indicator lies between zero (a global worst practice benchmark) and 100% (a global best practice "frontier"). A less confusing term might be simply Doing Business scores. The World Bank sensibly exercises judgement in fixing these endpoints because economies' distances to frontiers would otherwise move about whenever the best or worst among them improve or deteriorate.

World Bank staff have indicated that the World Bank contemplates updating these endpoints every five years[4]. This would render the distance to frontier measures comparable only within five-year periods. The World Bank makes non-normalized subcomponents of all Ease of Doing Business indicators for all years publicly available. This mitigates such problems for researchers. However, by directing users to Distance to Frontier scores, the World Bank risks renewed controversy every five years. **The World Bank may wish to establish objective methodologies that continuously update distance-to-frontier endpoints that need updating to avoid future controversy about methodology-driven changes.**

The Ease of Doing Business indicators are one of the World Bank's most important contributions to research and public policy. Were the indicators unimportant, controversy about them would not attract media attention. World Bank staff charged with overseeing the indicators have a difficult and challenging task. This audit finds absolutely no evidence that World Bank staff acted inappropriately or maliciously towards Chile or any other country. Rather, the World Bank's success in credibly tracking quantifiable improvements and backsliding in the ease of doing business in different economies makes concerns about its methodology global news. That importance now also encompasses the methodologies used to calculate the indicators. All this affirms the broader success of the World Bank's Doing Business initiative.

[4] The endpoints changed from year to year during a piloting phase, DB2012 through DB2015, but are fixed from DB2015 onwards. See past *Doing Business* reports for more details: http://www.doingbusiness.org/reports/global-reports/doing-business-2014

1. Why the Ease of Doing Business Database Is Important

The World Bank's Ease of Doing Business indicators is a major force for institutional development. For example, in 2018, the Rwandan government rolled out a series of reforms explicitly designed to improve its standing in the Doing Business data.[5] These included reforms to cut bureaucracy in construction, delays in connecting to the electricity grid, and delays exporters experience at customs. Similarly, *The Financial Times* describes how Senegal's government "is focused on further improving its position on the World Bank's Doing Business index."[6] A search of news websites reveals numerous items of this sort.

Politicians and journalists throughout the world have become aware of the indicators, and especially of their economies' rankings. This makes the indicators effective in encouraging politicians into enacting reforms. For example, the Indian newspaper, *The Hindu*, describes how "The low rank last year galvanised India to act. There was an explicit order from the PM (Narendra Modi) to ensure faster reforms to improve India's rankings."

The media and politicians attend more to ranking than to economically nuanced measures because economy rankings uniquely command attention. This attention is a powerful force for reform that the World Bank might wish to harness to promote economic development and institutional reform. The World Bank is aware that changes in rankings can reflect methodology changes to an extent, and deemphasizes historical rankings. An alternative strategy might exploit this media focus by ensuring that future changes in an economy's ranking primarily reflect reductions in bureaucratic delays, reduced compliance costs, and other aspects of genuine institutional development; not changes in how the World Bank constructs the indicators.[7] Otherwise, politicians overseeing deteriorating institutions can evade blame by pointing to methodology changes and politicians overseeing genuine reforms cannot highlight advancement in the rankings.

The Doing Business database is also among the World Bank's most prominent recent contributions to research into reducing poverty and promoting economic development. The first major study introducing key variables in the database, "The regulation of entry" by Djankov, La Porta, Lopez-de-Silanes and Shleifer, published in the prestigious *Quarterly Journal of Economics* in 2002, has over 4,200 citations in academic articles, books and working papers according to *Google Scholar*. The same bibliometric source lists over 13,000 articles referencing both "World Bank" and "Ease of Doing Business." Over one hundred of these articles using the data appear in prominent research journals, and many articles in less prominent journals study issues important to specific economies or regions. A lengthy tabulation, compiled by World Bank staff, of these important articles is available on the World Bank's website.[8]

Alternative measures of the business environments of different economies, such as the Heritage Foundation's *Index of Economic Freedom* or the Fraser Institute's *Economic Freedom of the World* index, are based on Ease of Doing Business quantitative data (procedures, costs, and delays). The Heritage Foundation and the Fraser Institute both have ideological agendas, which let skeptics discount

[5] Rwanda: Government Rolls out New Doing Business Reforms. *New Times*, by Collins Mwai, April 18, 2018.

[6] Reputation for stability lures new foreign investors to Senegal. *Financial Times*, by Neil Munshi, April 18, 2018.

[7] As we discuss below, the World Bank currently provides back-calculations for the year prior to the methodology changes. This is not unhelpful, but still leaves data more than one year removed non-comparable.

[8] See http://www.doingbusiness.org/research.

inconvenient findings based on their indexes. The World Bank alone has the credibility, resources, prestige, and expertise to collect the needed data and assemble it into meaningful and credible indicators. This makes the Doing Business database a unique and indispensable resource for researchers.

The comparability of data over time is crucial to its value in research. This is because economists are increasingly concerned about causal inference. For example, if fewer regulations limiting the formation of new businesses correlate positively with faster innovation, do lower barriers to starting a new business encourage innovation or does faster innovation press governments to ease regulatory barriers? If lighter regulation *causes* faster innovation, governments wanting more innovation should ease up on regulatory barriers. But if a faster pace of innovation *causes* governments to stand back, easing regulatory barriers to starting new businesses is like pushing a string.

Econometric tests of "what causes what" typically require "panel" databases – that is, databases that track the same measures for many economies and for many years. Panel data lets economists explore causality. For example, "Granger causality" tests explore whether changes in one set of variables typically precede or follow changes in other variables. "Difference-in-difference" tests, another approach to causal inference, compare differences in the values of key variables the year before versus the year after policy changes to differences in the values of the same variables over the same years in otherwise similar environments unaffected by those policy changes. Many subcomponents of the Doing Business indicators remain comparable over time (e.g. the cost and time subcomponents of the indicator sets), so researchers and policy makers could trace changes in these over multiple years. This practice might be expanded to cover as much of the Doing Business data as possible. The World Bank may wish to implement methodology-driven changes in the aggregate Doing Business indicators, which it now presents as Distance to Frontier (DTF) scores, in ways that preserve long-run comparability over time in as many components of each indicator as possible. This would allow researchers and policy-makers to analyze and track economically meaningful changes in each indicator set over the years.

In all of these econometric tests, the comparability of the data across multiple years is essential. If differences in the values of the variables reflect differences in how they are constructed, rather than genuine differences in underlying economic realities, the connection between reforms and economic outcomes is lost.

The validity of the Ease of Doing Business indicators as panel data is extremely important. The indicators are tremendously useful if changes in them over time primarily reflect real changes in economies' business environments. They are less useful if their changes reflect changes in how the indicators are constructed more than real changes in the ease of doing business. The World Bank may wish to expand its evaluation and consultation process prior to methodology changes to attach a greater weight to preserving comparability of the dataset over multiple years.

2. Why Overseeing the Ease of Doing Business Database is Challenging

World Bank staff entrusted with overseeing the Ease of Doing Business database contend with difficult challenges. These involve trade-offs between comparability over time, completeness, and current relevance. If the indicators do not change to reflect newly appreciated and obviously important concerns, they risk losing relevance. If the indicators change whenever new concerns arise, they become non-comparable across time and their usefulness to researchers, politicians and the media becomes compromised. If economies' rankings and Distance to Frontier scores change because the way the World Bank calculates the indicators changes, rather than because the ease of doing business changes, the indicators risk losing relevance more thoroughly.

This would be acceptable if the Ease of Doing Business indicators served only to compare different economies within the current year, and they certainly find use for that purpose. However, changes in economies' rankings and indicators over many years are far more socially useful if interpretable as policy progress or backsliding by research economists, the media, and government officials.

World Bank's Doing Business website cautions users about problems with comparability over time. A note at the bottom of the main download webpage reads[9]

> *Note: In recent years, Doing Business introduced improvements to all of its indicator sets. In Doing Business 2015, Resolving Insolvency introduced new measures of quality, while Getting Credit and Protecting Minority Investors broadened their existing measures. In Doing Business 2016, Dealing with Construction Permits, Getting Electricity, Registering Property and Enforcing Contracts also introduced new measures of quality, and Trading across Borders introduced a new case scenario to increase the economic relevance. In Doing Business 2017, Paying Taxes introduced new measures of postfiling processes and Starting a Business, Registering Property and Enforcing Contracts added gender components. For the details on the Doing Business methodology changes, please view the Distance to Frontier metrics.*

As a gesture towards mitigating the problems methodology changes cause, the web page elaborates "Each methodology expansion was recalculated for one year to provide comparable indicator values and DTF scores for the previous year." This is helpful, but still leaves data more than a year away from the change in one direction non-comparable to data more than a year away from the change in the other direction.

Table 1 lists the subcomponents of each Ease of Doing Business indicators, indicating which methodology changes affected which subcomponents in which years.[10] The table omits some methodology changes. For example, the addition of the Getting Electricity indicator and the dropping of the Employing Workers indicator from the ranking calculation after a transition period from DB2010 to DB2012 are not prominently addressed on the Doing Business website. Also, numerous questionnaire revisions to improve respondents' understanding of the questions are not considered methodology changes. From DB2015 on, a secondary business city in each of Bangladesh, Brazil, China, India, Indonesia, Japan, Mexico, Nigeria, Pakistan, Russia and the United States was surveyed and those economies' DTF scores became population-weighted average DTFs for the two cities. Earlier years' DTF scores for those economies reflect surveys of their main business city only, as is the case for all other economies in all years.

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[9] This refers to http://www.doingbusiness.org/Custom-Query, the World Bank's Doing Business webpage entitled "Historical Data Sets and Trends Data" as of June 6, 2018.

[10] A table of methodology changes is available at http://www.doingbusiness.org/Methodology/Distance-to-Frontier-Metrics. The webpage http://www.doingbusiness.org/Methodology/Changes-to-the-Methodology elaborates.

Table 1. Methodology Changes in the Calculation of the Ease of Doing Business Indicators

This table documents the components of the indicators as distance to frontier (DTF) measures. Changes in the wording of case descriptions and survey questions are frequent, but not included in this table. Items affected by major methodological changes are in bold red. Items whose values in earlier years are recalculated to be consistent with methodological changes are in blue italics.

DB 2004-2014	DB 2015	DB 2016	DB 2017 -2018	Stable Elements
Starting a Business				
▪ Procedures ▪ Time ▪ Cost ▪ Paid-in min. capital ▪ *Adj. for gender parity backfilled*	▪ Procedures ▪ Time ▪ Cost ▪ Paid-in min. capital ▪ *Adj. for gender parity backfilled*	▪ Procedures ▪ Time ▪ Cost ▪ Paid-in min. capital ▪ *Adj. for gender parity backfilled*	▪ Procedures ▪ Time ▪ Cost ▪ Paid-in min. capital ▪ **Adj. for gender parity**	▪ Procedures ▪ Time ▪ Cost ▪ Paid-in min. capital ▪ Adj. for gender parity
Dealing with Construction Permits				
▪ Procedures ▪ Time ▪ Cost	▪ Procedures ▪ Time ▪ Cost	▪ Procedures ▪ Time ▪ Cost ▪ **Qualitative building quality control index**	▪ Procedures ▪ Time ▪ Cost ▪ Qualitative building quality control index	▪ Procedures ▪ Time ▪ Cost
Getting Electricity				
▪ Procedures ▪ Time ▪ Cost	▪ Procedures ▪ Time ▪ Cost	▪ Procedures ▪ Time ▪ Cost ▪ **Qualitative supply reliability & tariff transparency index**	▪ Procedures ▪ Time ▪ Cost ▪ Qualitative supply reliability & tariff transparency index	▪ Procedures ▪ Time ▪ Cost
Registering Property				
▪ Procedures ▪ Time ▪ Cost	▪ Procedures ▪ Time ▪ Cost	▪ Procedures ▪ Time ▪ Cost ▪ **Quality of land admin. index**	▪ Procedures ▪ Time ▪ Cost ▪ Quality of land admin. index ▪ **Adj. for property rights gender parity**	▪ Procedures ▪ Time ▪ Cost
Getting Credit				
▪ Strength of legal rights 10-point original checklist ▪ Depth of credit info. 6-point original checklist	▪ **Strength of legal rights 12-point checklist** ▪ **Depth of credit information 8-point checklist**	▪ Strength of legal rights 12-point checklist ▪ Depth of credit information 8-point checklist	▪ Strength of legal rights 12-point checklist ▪ Depth of credit information 8-point checklist	▪ Modifications combine, improve, add and delete points. No elements are clearly stable.
Protecting Minority Investors				
▪ Extent of conflict of interest regulation index	▪ Extent of conflict of interest regulation index ▪ **Extent of shareholder**	▪ Extent of conflict of interest regulation index ▪ Extent of shareholder	▪ Extent of conflict of interest regulation index ▪ Extent of shareholder governance index	▪ Extent of conflict of interest regulation index

	governance index	governance index		
Paying Taxes				
▪ Payments ▪ Time ▪ Total tax rate	▪ Payments ▪ Time ▪ Total tax rate ▪ **Total tax rate with nonlinear DTF transformation**	▪ Payments ▪ Time ▪ Total tax rate ▪ Total tax rate with nonlinear DTF transformation	▪ Payments ▪ Time ▪ Total tax rate ▪ Total tax rate with nonlinear DTF transformation ▪ **Post-filling index**	▪ Payments ▪ Time ▪ Total tax rate without nonlinear DTF transformation
Trading Across Borders				
Given a case study: ▪ Documents to export ▪ Time to export ▪ Cost to export ▪ Documents to import ▪ Time to import ▪ Cost to import	Given a case study: ▪ Documents to export ▪ Time to export ▪ Cost to export ▪ Documents to import ▪ Time to import ▪ Cost to import	**Entirely new case study** **Time to export** ▪ **Documentary compliance** ▪ **Border compliance** **Cost to export** ▪ **Documentary compliance** ▪ **Border compliance** **Time to import** ▪ **Documentary compliance** ▪ **Border compliance** **Cost to import** ▪ **Documentary compliance** ▪ **Border compliance**	Entirely new case study Time to export ▪ Documentary compliance ▪ Border compliance Cost to export ▪ Documentary compliance ▪ Border compliance Time to import ▪ Documentary compliance ▪ Border compliance Cost to import ▪ Documentary compliance ▪ Border compliance	▪ None
Enforcing Contracts				
▪ Procedures ▪ Time ▪ Cost	▪ Procedures ▪ Time ▪ Cost	~~▪ **Procedures**~~ ▪ Time ▪ Cost ▪ **Quality of judicial processes index added**	~~▪ Procedures~~ ▪ Time ▪ Cost ▪ Quality of judicial processes index **adjusted to cover weight of women's testimony in court**	▪ Time ▪ Cost
Resolving Insolvency				
▪ Recovery rate	▪ Recovery rate ▪ **Strength of insolvency framework index**	▪ Recovery rate ▪ Strength of insolvency framework index	▪ Recovery rate ▪ Strength of insolvency framework index	▪ Recovery rate

Source: Authors annotations based on http://www.doingbusiness.org/Methodology/Distance-to-Frontier-Metrics, the World Bank's Doing Business webpage entitled "Distance to Frontier metrics" as of June 6, 2018.

We queried World Bank staff about each methodology change and, in every case, received an entirely reasonable justification. We are convinced that World Bank staff have been seeking to improve each individual indicator in each case.

Going forward, the World Bank may wish to consider a "fallacy of composition problem" associated with methodology changes. Many limited changes, each genuinely intended to improve an individual indicator, may combine to diminish the social value of the data as a whole.

This problem is most evident in comparing economies' Distance to Frontier scores and rankings across years. The World Bank is attempting to deemphasize changes in economy rankings by presenting rankings for the current year only in the Doing Business historical dataset. The final paragraph on this webpage explains this decision as follows

> *Rankings are calculated for Doing Business 2018 only. Year-to-year changes in the number of economies, number of indicators and methodology affect the comparability of prior years.*

These statements are all true. However, year-to-year changes in the number of indicators and the methodology used also affect the comparability of the Distance to Frontier scores across years. Not publishing the old rankings under old methodologies does draw attention to the fact that rankings over time are not comparable, but publishing comparable rankings would be preferable.

The World Bank appears to be urging users to rely on the Distance to Frontier scores rather than on economy rankings. Clicking on the *Frequently Asked Question* "Why are the rankings for the previous year not being recalculated in this year's report?" on the World Bank's Doing Business website returns the following explanation

> *For several years, Doing Business recalculated the published ranks, because the indicator sets underwent important methodology expansions. For example, in Doing Business 2015, Resolving Insolvency introduced new measures of quality and 2 topics (Getting Credit, Protecting Minority Investors) broadened the existing measures. Moreover, for the first time, Doing Business expanded the sample of cities in 11 large economies. In Doing Business 2016, 4 topics (Dealing with Construction Permits, Getting Electricity, Registering Property and Enforcing Contracts) also introduced new measures of quality. Moreover, Trading across Borders overhauled its methodology to increase the relevance of indicators. In Doing Business 2017, Paying Taxes introduced new measures of postfiling processes and 3 topics (Starting a Business, Registering Property and Enforcing Contracts) added gender components. In contrast, the Doing Business 2018 edition of the report introduced no major methodology expansions. Thus, the previous year's ranks are not recalculated.* [11]

Because rankings are not comparable across multiple years, the database omits reporting rankings for all prior years, not just rankings for the previous year. Moreover, as noted above, these changes also affect the comparability of the Distance to Frontier scores across multiple years.

A clearer justification for stressing the Distance to Frontier scores follows in the subsequent paragraph,

[11] This refers to http://www.doingbusiness.org/About-us/faq, the World Bank's Doing Business webpage entitled "Frequently Asked Questions" as of June 6, 2018.

which reads

> *More importantly, economies should assess their progress with the historical performance by using the Distance to Frontier score instead of the ranking. With the DTF scores, it is possible to see both how close an economy is to the global best performance at any point in time, and how big a stride it has made in improving its regulatory environment over time.*

This is entirely correct. The Distance to Frontier scores all range from zero to one hundred percent, and thus are readily comparable across economies within a given year. This also leaves them more conveniently averaged into composite indicators. However, because the Distance to Frontier scores are meaningful, ranking economies by the Distance to Frontier scores is likely to be also meaningful.

Warnings against comparing Ease of Doing Business indicators across multiple years are likely to be ignored because real changes in the ease of doing business across years are too economically important to be ignored. The World Bank may wish to adopt measures that render the Ease of Doing Business indicators reliably comparable across years to fill this very important need. The World Bank has unique capacity and credibility to do this.

Warnings that economy rankings be downplayed and ought not to be compared across multiple years are likewise likely to be ignored. How one economy ranks against another and how those rankings change over time appear to be of considerable importance in spurring politicians to improve the ease with which business can be done.

This is not bad news. If national pride associated with advancing in the rankings or from ranking above nearby economies can be harnessed as a force for needed reform, and thus for poverty alleviation and economic development, this would seem to be perfectly aligned with the World Bank's twin 2030 goals[12]

- End extreme poverty by decreasing the percentage of people living on less than $1.90 a day to no more than 3%
- Promote shared prosperity by fostering the income growth of the bottom 40% for every country

Making the Ease of Doing Business indicators more reliably comparable over time is a straightforward step towards meeting these very important goals. The World Bank may wish to prioritize the funding of such an initiative.

Because national pride associated with an economy's position in the rankings, and with its ascent or descent in the rankings, appears to be an important force for institutional development, the World Bank may wish to consider measures to make the rankings more reliably comparable, rather than measures to discourage comparisons over time in economies' rankings.

[12] Quoted from the World Bank's "What We Do" webpage at http://www.worldbank.org/en/about/what-we-do.

3. How the Ease of Doing Business Indicators Were Challenged

On January 12th 2018, *The Wall Street Journal* reported that Paul Romer, then at the World Bank, asserted that the Doing Business database is "potentially tainted by political motivations of World Bank staff."[13] The article further quoted Professor Romer taking responsibility in saying "I want to make a personal apology to Chile, and to any other country where we conveyed the wrong impression." The problems with the report, he elaborated, were "my fault because we did not make things clear enough." He further explained that he "couldn't defend the integrity of the process that led to the methodology changes."

Professor Romer's comments were widely discussed. *The Economist* summarized an especially contentious allegation that "Chile's ranking in the yearly report had dropped sharply during the presidency of Michelle Bachelet, a left-leaning politician who took office for the second time in 2014. Chile sank so heavily not because doing business had become harder, but because the bank had repeatedly changed its method of assessment."[14] *The Economist* elaborated, "The data-gathering and analysis were overseen by a former professor of economics at the University of Chile in Santiago, adding to the suspicion of skullduggery. Supporters of Ms. Bachelet, whose coalition lost the recent presidential election, were apoplectic. Some even suggested that Chile's slide in the rankings had hurt confidence, undermining investment and jeopardizing their political prospects." The Chilean government expressed deep concerns.[15]

Subsequent clarifications – by the World Bank, Paul Romer and others – responded to these concerns. Romer partly retracted his comments in his blog, writing "In a conversation with a reporter, I made comments about the Doing Business report that gave the impression that I suspected political manipulation or bias. This was not what I meant to say or thought I said. I have not seen any sign of manipulation of the numbers published in Doing Business report or in any other Bank report."[16] Nonetheless, questions about the integrity of the database remained.

The episode raises methodology changes as a general issue. In clearly worded rebuttal to Romer's charge, Augusto Lopez-Claro, who directed the Global Indicators Group from 2011 to 2017, explains why "the Doing Business indicators have been subject to substantial methodology changes during the last several years."[17] The reasons that follow are entirely sensible.

However, major methodological changes, including those that constitute genuine improvements, can compromise the usefulness of the indicators to policy makers, researchers and the media. The challenge to the Ease of Doing Business indicators thus has two parts.

1. Were Chile's Ease of Doing Business indicators manipulated?

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[13] World Bank Unfairly Influenced Its Own Competitiveness Rankings. *The Wall Street Journal*, by Josh Zumbrun and Ian Talley, Jan. 12, 2018.

[14] The World Bank's "ease of doing business" report faces tricky questions. *The Economist,* Jan. 18, 2018.

[15] See, e.g., "Chile Slams World Bank Amid Charges of Political Bias". *The New York Times*, by Pascale Bonnefoy and Ernesto Londoño, Jan. 13, 2018.

[16] My Unclear Comments about the Doing Business Report. Paul Romer's blog, Jan. 16, 2018.

[17] Lopez-Claros Replies to Charges of Gaming World Bank Rankings. *Mother Jones,* by Kevin Drum, Jan. 15, 2018. *Mother Jones* provides the full text of the reply to Romer at http://www.motherjones.com/wp-content/uploads/2018/01/blog_lopez_claros_reply_wsj.pdf.

2. Have methodology changes compromised the social value of the indicators?

The following sections investigate both. The investigation uses unpublished survey data from the Doing Business years of 2015 to 2017 (DB2015 to DB2017) and published historical data available on the World Bank's Doing Business website. Doing Business years lag calendar years – that is, DB2016 indicators reflect conditions in 2014/2015. The World Bank has made survey responses from Chile and a set of 12 comparison economies available to us. World Bank staff have cooperated by answering repeated queries about data, methodology, and changes in methodology.

The first allegation is unfounded. The second is a concern, but is readily reparable going forward.

4. No Evidence Chile's Indicators Were Manipulated

An automated Global Indicators & Analysis Data Management System (GIADMS or simply DMS) generates the Ease of Doing Business indicators from survey responses the World Bank collects from around the world. There is no visible discrepancy between the survey responses written on the questionnaires from Chile and those stored in the DMS.

Manipulation of the DMS itself would cause inconsistencies between the survey responses and the Ease of Doing Business indicators the system generates for Chile. Examination by the independent auditors of Chile's Ease of Doing Business indicators shows the published values of the indicators to follow from the survey responses the World Bank received from Chile. There is no discrepancy between the World Bank's published historical Distance to Frontier scores and manually recalculated ones for Chile over DB2015 through DB2017.

The World Bank conducts multi-level inter-departmental reviews of the data coding process. Thorough and comprehensive reviews make manipulating the data or programming to affect the indicators of a single country exceedingly improbable. Based on this analysis, we conclude that there was no manipulation of Chile's Ease of Doing Business indicators.

5. But Frequent Methodology Changes Do Cause Problems

The broader concern that methodology changes render the Ease of Doing Business Indicators of Chile – and of other economies – non-comparable over time is a separate issue. Methodology changes might have affected the data in two ways. One possibility is that methodology changes in how the World Bank constructs the indicators mechanically changed economies' standing. A second possibility is that the methodology changes treated some economies in ways that affected their standing more than that of the average economy.

The first possibility can be tested directly because, in years when the World Bank makes major changes to the way it calculates the Ease of Doing Business indicators, it publishes two versions of the affected indicators for the previous year. One uses the new methodology and another uses the old methodology. Subtracting the old from the new version lets us assess how each methodology change affected Chile.

Table 2 lists these changes, and shows that eight of the eleven methodology changes moved Chile farther below the Ease of Doing Business best practice frontier, two methodology changes moved Chile closer to the frontier, and one had no discernable impact on Chile's position. The methodology change with the largest impact on Chile was that to the Resolving Insolvency indicator, which abruptly moved Chile up from 31.5% of the way towards global best practice to 47% of the way towards the best practice. The methodology change with the largest adverse impact on Chile was that for the Getting Credit indicator, which moved Chile from 68.8% down to only 50% of the way towards global best practice.

These changes affected many economies, not just Chile. Table 2 therefore presents means of each indicator's DTF scores across all economies under the new and old methodologies and the change to the average economy's DTF score due to each methodology change. The average economy ended up farther below the global best practice frontier after every methodology change except that to the Trading Across Borders and Resolving Insolvency indicators. The Resolving Insolvency and Getting Credit methodology changes had the largest positive and negative impacts, respectively, on the average economy's DTF scores.

If these methodology changes moved Chile's indicators more than they moved the indicators of the average economy, they could be said to have *disproportionately* affected Chile. The last column in Table 2 explores this. Chile gains relative to other countries from four methodology changes and loses relative to other countries from seven methodology changes. The net effect on Chile's overall Ease of Doing Business indicator is a very small relative gain in DB2016 and very small relative losses in DB2015 and DB2017. The methodology change that affects Chile the most is that to the Resolving Insolvency indicator, which moves Chile up by 11.3 points more than the average economy. Chile's 18.8-point loss from the methodology change to the Getting Credit indicator is 6.9 points worse than that methodology change's impact on the average economy. The methodology change to the Protecting Minority Investors indicator, which affects the average economy relatively little, stands out in reducing Chile's DTF score by 5.4 points relative to the global average.

Chile is not uniquely sensitive to methodology. The approach in Table 2 reveals other methodology-sensitive economies. Narrowing the search to economies roughly as large as Chile's and with roughly similar populations, we selected a comparison economy affected by each major methodology change in Table 2. We first ranked economies by their distance-from-Chile, defined as an equal-weighted mean of the absolute percentage (log) differences between the economy and Chile in population, GDP, and per capita GDP. We then measured each economy's sensitivity to a given indicator's methodology change by the mean squared difference (MSD) in the value of its indicator's DTF scores under the new and old methodologies, where the mean is across the DB years for which such data are available.

For each methodology change, we sorted *all* economies in the Doing Business database on their sensitivities to the change and their distances-from-Chile. Then, we selected one economy that was especially sensitive to the methodology change and reasonably close to Chile on the aforementioned three dimensions. The final selection also took into account geographic representation from around the world in the list of comparison economies. The virtue of this approach is that it assembled a set of comparison economies for which the challenges the World Bank confronts in assembling the data are not too different from those for Chile, and for which methodology changes also appear important. If Chilean data alone were manipulated and the comparison economies' data were not, its methodology-driven revisions would stand out as different. If a more general pattern of manipulation were occurring, these are the likeliest places to find corroborating evidence of problems.

Table 2. List of Major Methodology Changes and Impacts on Chile

In years of major methodology changes, the World Bank provides two versions of the Distance to Frontier (DTF) scores for each economy for the previous year – one using the old methodology and another using the new methodology. This table assesses the effects on each affected *Ease of Doing Business* indicator for Chile by reporting the new version, the old version, and the difference between the two. Averages of these figures across all economies are also reported for comparison. The Chile effect is the difference between the new and old indicators for Chile relative to the average difference across all economies. Positive values of the *Chile effect* flag methodology changes that boosted Chile's standing more than the average economy, negative numbers indicate that the methodology change diminished Chile's standing more than the average economy.

Indicator Affected	*DB year*	*Methodology change*	*Average Impact across all economies*			*Impact on Chile*			*Chile effect*
			New	*Old*	*Change*	*New*	*Old*	*Change*	
Ease of Doing Business	2015	Resulting from the methodology changes of its sub-indicators	60.3	61.2	-0.9	71.8	72.8	-1.0	-0.1
	2016		60.0	61.1	-1.1	70.9	71.9	-1.0	0.1
	2017		60.2	60.5	-0.3	70.4	71.2	-0.7	-0.4
Dealing with Construction Permits	2016	Building quality control index introduced	63.8	64.3	-0.5	80.0	77.7	2.2	2.7
Getting Electricity	2016	Reliability of supply and transparency of tariff index introduced	64.5	71.2	-6.7	82.5	85.0	-2.5	4.2
Registering Property	2016	Quality of the land admin. index introduced	60.3	65.0	-4.7	71.7	79.0	-7.2	-2.5
	2017	Quality of land admin. index expanded to cover equal access to property rights	60.5	60.6	-0.1	70.9	71.7	-0.8	-0.7
Getting Credit	2015	Strength of legal rights index and Depth of credit information index changed	43.5	55.4	-11.9	50.0	68.8	-18.8	-6.9
Protecting Minority Investors	2015	Extent of shareholder governance index introduced	50.2	51.5	-1.3	60.0	66.7	-6.7	-5.4
Paying Taxes	2017	Post-filling index introduced	67.1	69.6	-2.5	77.1	83.6	-6.5	-4.0
Trading Across Borders	2016	Replacement of case study on which respondents base assessments	68.8	66.9	1.9	80.6	82.1	-1.5	-3.4
Enforcing Contracts	2016	Quality of judicial processes index introduced	55.2	55.8	-0.6	62.8	63.9	-1.0	-0.4
	2017	Quality of judicial processes index changed to include weight of women's testimony in court	55.1	55.3	-0.2	62.8	62.8	0.0	0.2
Resolving Insolvency	2015	Strength of insolvency framework index introduced	42.2	38.0	4.2	47.0	31.5	15.5	11.3

Source: Authors calculations based on *Doing Business* historical dataset available at http://www.doingbusiness.org/~/media/WBG/DoingBusiness/Documents/Data/DB18-Historical-data-complete-data-with-DTFs.xlsx

Table 3 lists these comparison economies and contrasts how much each methodology change affected their Ease of Doing Business indicator with how much the same change affected the same indicator for Chile and for the average economy. These figures differ from those in Table 2 because the focus here is the magnitudes of changes, rather than their directions. Table 2 focuses solely on the years in which methodology changes occurred. Table 3 uses all years for which old and new versions of the indicators are available. Positive and negative changes enter symmetrically by squaring each change, averaging the squared changes, and then taking the square root.

For each Ease of Doing Business indicator, World Bank staff provided original survey results and computer data from DB2015 to DB2017 for all comparison economies. Detailed inspection of them likewise reveals no evidence of impropriety, bias, or manipulation. We found no discrepancy between the responses to the questionnaires from these economies and the data the World Bank used to calculate their Ease of Doing Business indicators. Nor did we find any discrepancy between their DTF scores and manually recalculated ones.

The comparison economies' DTF scores, selected for their sensitivity to methodology changes, changed precisely as the methodology changes dictated. In all cases, we found no evidence of manipulation.

Table 3 shows that Chile is less affected by methodology changes than many other economies. Unsurprisingly, the comparison economies are more affected than Chile: they were, after all, selected precisely because of their high sensitivity to the methodology changes. More importantly, most methodology changes affect Chile less than they affect the average economy.

Indeed, the first row shows that Chile is affected only 62.5% as much as the average economy by changes in the overall Ease of Doing Business indicator. The root mean squared difference between Chile's old and new versions of the Ease of Doing Business composite indicator across all years is only 1.0; that for the average economy is 1.6.

Chile is less affected than the average economy by five of the eleven major methodology changes to specific Ease of Doing Business indicators (Dealing with Construction Permits in 2016, Getting Electricity in 2016, Trading across Borders in 2016 and Enforcing Contracts in 2016 and 2017). Chile is more affected than average by six methodological changes to specific indicators (Registering Property in 2016 and 2017, Getting Credit in 2015, Protecting Minority Investors in 2015, Paying Taxes in 2017 and Resolving Insolvency in 2015). Luck of the draw would imply a fifty-fifty split (5 to 6 one way or the other), which is roughly what we observe here.

While every number and calculation for every one of the economies covered by the Doing Business Report for every year cannot be rechecked, our complete validation of the data and calculations for Chile and the 12 comparison economies from DB2015 to DB2017 strongly suggests that the Ease of Doing Business indicators are what they are presented to be. In every case we checked, the indicators are based on unaltered survey data, faithfully entered into an automated data management system, and are mechanically constructed free of manipulation by World Bank staff.

Table 3. Old Versus New Methodology Differences: Chile versus Comparison Economies

In years of major methodology changes, the World Bank provides two versions of the Distance to Frontier (DTF) scores for each economy for the previous year - one using the old methodology and another using the new methodology. Because both versions of certain indicators[18] are available for subsequent years as well, the numbers in this table are not exactly absolute values of those in Table 2, which focuses on the years of the methodology charges. This table contrasts the effects of each methodology change on Chile, a comparison economy, and the average economy. Positive and negative changes enter symmetrically by squaring the changes, averaging the squares, and then taking the square root of the resulting average. Larger numbers indicate larger methodology-driven changes.

			Root mean squared difference between new & old versions		
Indicator	**Year of methodology change**	**Comparison economy**	**Chile**	**Comparison economy**	**Average economy**
Ease of Doing Business	DB2015, 16 & 17	Singapore	1.0	5.4	1.6
Dealing with Construction Permits	DB2016	Sri Lanka	2.2	10.6	4.8
Getting Electricity	DB2016	Lebanon	3.5	20.0	8.7
Registering Property	DB2016	Greece	7.2	11.5	5.8
Registering Property	DB2017	Ecuador	0.8	0.5	0.1
Getting Credit	DB2015	Malaysia	18.8	30.0	12.1
Protecting Minority Investors	DB2015	Hong Kong	6.7	15.0	6.6
Paying Taxes	DB2017	Peru	6.2	15.5	5.3
Trading Across Borders	DB2016	Kazakhstan	1.5	52.5	15.6
Enforcing Contracts	DB2016	Guatemala	1.0	11.8	5.5
Enforcing Contracts	DB2017	Qatar	0.0	1.9	0.2
Resolving Insolvency	DB2015	Romania	17.5	23.1	9.9

Source: Authors calculations based on the *Doing Business* historical dataset available at http://www.doingbusiness.org/~/media/WBG/DoingBusiness/Documents/Data/DB18-Historical-data-complete-data-with-DTFs.xlsx

[18] These indicators are "Dealing with Construction Permits", "Getting Electricity", "Registering Property", "Paying Taxes", and "Resolving Insolvency". "Starting a Business" is not included here, because it is back-calculated entirely after the gender parity adjustment in DB2017.

6. Methodology-Invariant Versions of the Ease of Doing Business Database

A second set of issues concerns the impact of methodology changes on the longer-term comparability of the Ease of Doing Business indicators over multiple years. The previous section could not address this because both versions of indicators constructed using old or new methodologies are not available for all years. This section compares methodology-invariant (stable) versions of the Ease of Doing Business indicators to the published indicators. This comparison lets us see how much the methodology changes affect the indicators over longer stretches of time.

On his blog, Paul Romer describes how he constructs a stable version of the indicators. The World Bank has generated an alternative set of stable indicators (dubbed "simulation" internally) based on a methodology more aligned with that used in the published indicators. We have replicated both methodologies closely enough to relegate discrepancies to rounding errors. We have experimented with further methodology invariant-versions of the indicators to isolate the factors most influential in explaining the differences between alternative versions of the indicators.

The methodology-invariant versions of the Ease of Doing Business indicators are based largely on sub-indicator components free of major methodology changes. Because major methodology changes to the subcomponents underlying the Getting Credit, Protecting Minority Investors, and Resolving Insolvency indicators are confined to the transition from DB2014 to DB2015, the new methodology version of those subcomponents can be used for DB2014 so stable versions of these indicators can be constructed from DB2014 onwards. This is adequate for investigating the years we audited; however, stable versions of these indicators spanning all years would differ from these.

Stable versions of the other indicators are based only on subsets of their subcomponents that are unaffected by methodology changes. Subcomponents affected by methodology changes are discarded. The methodology changes to the Trading across Borders indicator are too extensive to permit construction of a stable version of that indicator, so it drops from the comparisons in this section.

Table 4 compares the construction of three versions of the Ease of Doing Business indicators: the latest published version, the World Bank stable version (simulation) and Paul Romer's stable version. Stable rankings are determined by sorting economies on stable indicators' DTF scores. For large-population economies, only the largest business city is included when rankings are calculated.

Table 4. Published versus Alternative Stable Versions of the Ease of Doing Business Indicators

Changes in the wording of case descriptions and survey questions are frequent, but not included in this table. Components in the published version constituting major methodological changes are in bold red. Items that differ in Romer's stable versions are in blue italics.

Indicator	Published version[19]	World Bank stable version	Romer stable version[20]
Starting a business	▪ Procedures, time, cost, paid-in min. capital, **gender parity** ▪ Worst practice: Set by WB[21] ▪ Best practice: Set by WB	▪ Procedures, time, cost, paid-in min. capital ▪ Worst practice: Set by WB ▪ Best practice: Set by WB	▪ Procedures, time, cost, paid-in min. capital ▪ *Worst practice: minimum*[22] ▪ *Best practice: maximum*
Dealing with Construction Permits	▪ Procedures, time, cost, **building quality control index** ▪ Worst practice: Set by WB ▪ Best practice: Set by WB	▪ Procedures, time, cost ▪ Worst practice: Set by WB ▪ Best practice: Set by WB	▪ Procedures, time, cost ▪ *Worst practice: minimum* ▪ *Best practice: maximum*
Getting Electricity	▪ Procedures, time, cost, **reliability of supply and transparency of tariff index** ▪ Worst practice: Set by WB ▪ Best practice: Set by WB	▪ Procedures, time, cost ▪ Worst practice: Set by WB ▪ Best practice: Set by WB	▪ Procedures, time, cost ▪ *Worst practice: minimum* ▪ *Best practice: maximum*
Registering Property	▪ Procedures, time, cost, **quality of land admin. index, gender parity** ▪ Worst practice: Set by WB ▪ Best practice: Set by WB	▪ Procedures, time, cost ▪ Worst practice: Set by WB ▪ Best practice: Set by WB	▪ Procedures, time, cost ▪ *Worst practice: minimum* ▪ *Best practice: maximum*
Getting Credit	▪ Strength of legal rights index **(12 points)**, depth of credit information index **(8 points)** ▪ Worst practice: Set by WB ▪ Best practice: Set by WB	▪ Indicator is DTF of sum of two sub-indexes ▪ Sub-indexes rescaled for years prior to DB2015 when each had 10 and 6 points in total ▪ Worst practice: Set by WB ▪ Best practice: Set by WB	▪ *Indicator is mean of DTFs of sub-indexes as all other indicators* ▪ *Rescaling of sub-indexes unnecessary for DB2014-18* ▪ *Worst practice: minimum* ▪ *Best practice: maximum*
Protecting Minority Investors	▪ Extent of conflict of interest regulation index, **extent of shareholder governance index** ▪ Worst practice: Set by WB ▪ Best practice: Set by WB	▪ Extent of conflict of interest regulation index ▪ Worst practice: Set by WB ▪ Best practice: Set by WB	▪ Extent of conflict of interest regulation index, *extent of shareholder governance index* ▪ *Worst practice: minimum* ▪ *Best practice: maximum*
Paying Taxes	▪ Payments, time, **nonlinear transformation of the DTF of total tax rate**[23]**, post-filling**	▪ Payments, time, nonlinear transformation of the DTF of total tax rate	▪ Payments, time, *DTF of total tax rate is calculated in the same way as other indicators,*

[19] This version is as of DB2018. Table 1 details the evolution of published versions from DB2004 to DB2018.

[20] We replicated Prof. Romer's calculations as he described on his blog: https://paulromer.net/wp-content/uploads/2018/01/DB-calcs.pdf

[21] Table 5 elaborates.

[22] Calculated using DB2014-18 data.

[23] The World Bank calculates the Distance to Frontier score of the Total Tax and Contribution Rate subcomponent after applying the transformation

	index ▪ Worst practice: Set by WB ▪ Best practice: Set by WB	▪ Worst practice: Set by WB ▪ Best practice: Set by WB	*i.e.*, without a nonlinear transformation ▪ Worst practice: minimum ▪ Best practice: maximum
Trading Across Borders	▪ **Entirely new case scenario used from DB2015 onwards** ▪ Worst practice: Set by WB ▪ Best practice: Set by WB	▪ Mechanical appendage of the new-methodology time series to the old-methodology time series	▪ *Dropped due to non-comparability across DB2014-18*
Enforcing Contracts	▪ Time, cost, **quality of judicial processes index, gender parity** ▪ Worst practice: Set by WB ▪ Best practice: Set by WB	▪ Time, cost ▪ Worst practice: Set by WB ▪ Best practice: Set by WB	▪ Time, cost ▪ *Worst practice: minimum* ▪ *Best practice: maximum*
Resolving Insolvency	▪ Recovery rate, **strength of insolvency framework index** ▪ Worst practice: Set by WB ▪ Best practice: Set by WB	▪ Recovery rate ▪ Worst practice: Set by WB ▪ Best practice: Set by WB	▪ Recovery rate, *strength of insolvency framework index* ▪ *Worst practice: minimum* ▪ *Best practice: maximum*
Ease of Doing Business Composite Index	▪ Economy-level indicators are population-weighted averages of two major business cities for 11 large population economies from DB2015 onwards	▪ Economy-level indicators use only one major business city for all economies, the same methodology prior to DB2015	▪ Economy-level indicators use only one major business city for all economies, the same methodology prior to DB2015

Depending on the version, a methodology-invariant approach removes the following information:

1. The revamped trading across borders indicator and all its components (Romer stable version)
2. The building quality control index (both stable versions)
3. The reliability of supply and transparency of tariffs index (both stable versions)
4. The quality of land administration index (both stable versions)
5. The extent of shareholder rights index (World Bank stable version)
6. The extent of ownership and control index (World Bank stable version)
7. The extent of corporate transparency index (World Bank stable version)
8. The post-filing index (both stable versions)
9. The quality of judicial processes index (both stable versions)
10. The strength of insolvency framework index (World Bank stable version)

This list illustrates the cost of both methodology changes and of sidestepping them. A major cost is discarding the trading across borders indicator and all its subcomponents, whose earlier and later values are essentially incomparable because of a sweeping methodology change in terms of case scenario. The list also highlights the limited scope of the stable versions of the indicators, which must exclude newly added indexes that capture other important aspects of the business environment. Methodology changes

$$DTF_\tau = \begin{cases} 0 & \text{if } \tau \geq \tau_H = 84.0 \\ \left(\frac{\tau_H - \tau}{\tau_H - \tau_L}\right)^{0.8} \times 100 & \text{if } \tau_L < \tau < \tau_H \\ 100 & \text{if } \tau \leq \tau_L = 26.1 \end{cases},$$

where τ is the total tax and contribution rate. The Ease of Paying Taxes indicator is the mean of this and the DTF scores of the other subcomponents.

force researchers to trade-off fewer comparable years for less comprehensive indicators. Policy-makers and journalists must likewise narrow their focus to a smaller set of stable elements of the data to make longer-term assessments of the pace of institutional development.

We replicated Romer's calculations of his set of stable Ease of Doing Business indicators as described on his blog. Romer's approach deviates from the conventions the World Bank uses in calculating its published indicators in three ways. Specifically,

1. The global best and worst practice boundaries Romer uses to calculate Distance to Frontier scores are the highest and lowest values of that variable across all economies in all the years he considers. In contrast, the World Bank uses predefined global best and worst practice values. Economies whose ease of doing business is better or worse than these boundaries are considered at the boundaries in calculating their DTF scores. Assessing the World Bank's approach to establishing these endpoints is beyond the scope of this study.

2. Romer does not employ the World Bank's nonlinear transformation

$$DTF_{\tau} = \begin{cases} 0 & \text{if } \tau \geq \tau_H = 84.0 \\ \left(\frac{\tau_H - \tau}{\tau_H - \tau_L}\right)^{0.8} \times 100 & \text{if } \tau_L < \tau < \tau_H \\ 100 & \text{if } \tau \leq \tau_L = 26.1 \end{cases} \qquad [1]$$

   to calculate the DTF score of τ, the Total Tax and Contribution Rate subcomponent of the Paying Taxes indicator. This is the only subcomponent of any indicator subject to such a transformation. World Bank staff have indicated that the purpose of this nonlinear transformation is to mitigate biasing the indicator toward economies that do not levy significant taxes on companies. Assessing this transformation is beyond the scope of this study.

3. Romer calculates the Distance to Frontier score of the Getting Credit indicator in the same way as all the other indicators are calculated. In every case except this, the World Bank first calculates a DTF score for each subcomponent and then averages these to arrive at the DTF score for the Ease of Doing Business indicator. For the Ease of Getting Credit indicator alone, the World Bank calculates an economy's distance-to-frontier by first adding its score on the 12-point Strength of legal rights index and its score on the 8-point Depth of credit information index to arrive at a 20-point combined index and then assigns best and worst practice endpoints to this 20-point scale to arrive at the economy's published Ease of Getting Credit Distance to Frontier score. This implicitly assigns legal rights 1.5 times the weight assigned to credit information in the final indicator. World Bank staff argues that this deviation from their standard practice of weighting all subcomponents equally is economically justifiable. Assessing this argument is beyond the scope of this study.

Table 5 lists the global best and worst practice endpoints for calculating the Distance to Frontier scores of each subcomponent of the Ease of Doing Business indicators. The table also lists the economies at the global best practice frontier, if any are, for each subcomponent of each indicator. In most cases, the best-practicing economies are those generally thought to have highly developed institutions, though a few might be thought surprising.

TABLE 5. Global Best and Worst Practice Standards Used to Define Distances-to-Frontiers

Topic and indicator	Who sets global best practice frontier	Best	Worst
Starting a business			
Procedures (number)	New Zealand	1	18[a]
Time (days)	New Zealand	0.5	100[b]
Cost (% of income per capita)	Slovenia	0.0	200.0[b]
Minimum capital (% of income per capita)	Australia; Colombia[c]	0.0	400.0[b]
Dealing with construction permits			
Procedures (number)	No economy at frontier (June 1, 2017)	5	30[a]
Time (days)	No economy at frontier (June 1, 2017)	26	373[b]
Cost (% of warehouse value)	No economy at frontier (June 1, 2017)	0.0	20.0[b]
Building quality control index (0–15)	Luxembourg; New Zealand; U.A.E.	15	0[b]
Getting electricity			
Procedures (number)	Germany; S. Korea[e]	3	9[a]
Time (days)	S. Korea; St. Kitts & Nevis; UAE	18	248[b]
Cost (% of income per capita)	Japan	0.0	8,100.0[b]
Supply reliability & rate transparency index (0-8)	Belgium; Ireland; Malaysia[f]	8	0[b]
Registering property			
Procedures (number)	Georgia; Norway; Portugal; Sweden	1	13[a]
Time (days)	Georgia; New Zealand; Portugal	1	210[b]
Cost (% of property value)	Saudi Arabia	0.0	15.0[b]
Quality of land administration index (0–30)	No economy at frontier (June 1, 2017)	30	0[b]
Getting credit			
Strength of legal rights index (0–12)	Brunei; Colombia; Montenegro; New Zealand	12	0[d]
Depth of credit information index (0–8)	Ecuador; U.K.[g]	8	0[d]
Protecting minority investors			
Extent of disclosure index (0–10)	China; Malaysia[h]	10	0[d]
Extent of director liability index (0–10)	Cambodia	10	0[d]
Ease of shareholder suits index (0-10)	No economy at frontier (June 1, 2017)	10	0[d]
Extent of shareholder rights index (0-10)	India; Kazakhstan	10	0[d]
Extent of ownership and control index (0-10)	No economy at frontier (June 1, 2017)	10	0[d]
Extent of corporate transparency index (0-10)	France; Norway; Taiwan, China	10	0[d]
Paying taxes			
Payments (number per year)	Hong Kong; Saudi Arabia	3	63[b]
Time (hours per year)	Singapore	49i	696[b]
Total tax and contribution rate (% of profit)	Canada; Singapore[j]	26.1[k]	84.0[b]
Postfiling index (0-100)	None with CIT & VAT at frontier (June 1, 2017)	100	0
Time to comply with VAT refund (hours)	Croatia; Netherlands[l]	0	50[b]
Time to obtain VAT refund (weeks)	Austria; Bahamas; Estonia	3.2	55[b]
Time to comply with corp. income tax audit (hr.s)	Lithuania; Portugal[m]	1.5	56[b]
Time to complete corp. income tax audit (weeks)	Sweden; USA[n]	0	32[b]
Trading across borders			
Time to export			
Documentary compliance (hours)	Canada; Poland; Spain[o]	1[p]	170[b]

Border compliance (hours)	Austria; Belgium; Denmark[q]	1[p]	160[b]
Cost to export			
Documentary compliance (US$)	Hungary; Luxembourg; Norway[r]	0	400[b]
Border compliance (US$)	France; Netherlands; Portugal[s]	0	1,060[b]
Time to import			[b]
Documentary compliance (hours)	S. Korea; Latvia; New Zealand[t]	1[p]	240[b]
Border compliance (hours)	Estonia; France; Germany[u]	1[p]	280[b]
Cost to import			
Documentary compliance (US$)	Iceland; Latvia; U.K.[v]	0	700[b]
Border compliance (US$)	Belgium; Denmark; Estonia[w]	0	1,200[b]
Enforcing contracts			
Time (days)	Singapore	120	1,340[b]
Cost (% of claim)	Bhutan	0.1	89.0[b]
Quality of judicial processes index (0–18)	No economy at frontier (June 1, 2017)	18	0[d]
Resolving insolvency			
Recovery rate (cents on the dollar)	Norway	92.9	0[d]
Strength of insolvency framework index (0–16)	No economy at frontier (June 1, 2017)	16	0[d]

Source: Table 9.1 in *Doing Business 2018: Reforming to Create Jobs*. World Bank. Washington, D.C.

a. Worst performance is defined as the 99th percentile among all economies in the *Doing Business* sample.
b. Worst performance is defined as the 95th percentile among all economies in the *Doing Business* sample.
c. Another 112 economies also have a paid-in minimum capital requirement of 0.
d. Worst performance is the worst value recorded.
e. In 17 other economies it also takes no more than 3 procedures to get an electricity connection.
f. Another 25 economies also have a score of 8 on the reliability of supply and transparency of tariffs index.
g. Another 32 economies also have a score of 8 on the depth of credit information index.
h. Another 10 economies also have a score of 10 on the extent of disclosure index.
i. Defined as the lowest time recorded among all economies in the *Doing Business* sample that levy the three major taxes: profit tax, labor taxes and mandatory contributions, and VAT or sales tax.
j. Another 30 economies also have a total tax and contribution rate equal to or lower than 26.1% of profit.
k. Defined as the highest total tax and contribution rate among the 15% of economies with the lowest total tax and contribution rate in the *Doing Business* sample for all years included in the analysis up to and including *Doing Business 2015*.
l. Another 8 economies also have a compliance time for VAT refund of 0 hours.
m. Another 10 economies also have a compliance time for corporate income tax audit of no more than 1.5 hours.
n. Another 92 economies also have a completion time for corporate income tax audit of 0 weeks.
o. Another 22 economies also have a documentary compliance time to export of no more than 1 hour.
p. Defined as 1 hour even though in many economies the time is less than that.
q. Another 15 economies also have a border compliance time to export of no more than 1 hour.
r. Another 16 economies also have a documentary compliance cost to export of 0.0.
s. Another 16 economies also have a border compliance cost to export of 0.0.
t. Another 26 economies also have a documentary compliance time to import of no more than 1 hour.
u. Another 22 economies also have a border compliance time to import of no more than 1 hour.
v. Another 27 economies also have a documentary compliance cost to import of 0.0.
w. Another 24 economies also have a border compliance cost to import of 0.0.

Obviously, the frontiers cannot move whenever the best or worst-practice economy gets even better or even worse. The World Bank therefore fixes endpoints for DTF calculations. This means that, in some cases, some economies actually do better or worse than the global best or worst practice endpoints. In calculating the DTF scores, the World Bank quite reasonably takes these economies as being at the endpoints, rather than beyond them. In other cases, no economy has attained the best practice frontier.

World Bank staff provided us with their in-house stable version of the indicators, which they dub "simulation" indicators. Except for the Trading across Borders indicator, the World Bank's stable indicators are largely based on subcomponents free of methodology changes across all years, whereas Romer used a larger set of subcomponents free of methodology changes in the years he considered – DB2014 to DB2018. The World Bank's in-house stable version of the indicators also follows the World Bank's conventions regarding the above three points. Specifically, the World Bank's stable indicators are transformed into Distance to Frontier scores using the same endpoints as in the published versions; employing the nonlinear transformation on the tax rate in calculating the DTF score of Paying Taxes; and calculating the DTF score of Getting Credit as the DTF of the sum of its subcomponents, rather than the mean of the DTFs of the subcomponents, the procedure used for all other indicators.

In each case, World Bank staff were able to provide explanations of why they do what they do. The World Bank may wish to augment its website with explanations of

1. Why best and worst practice endpoints for Distance to Frontier scores are defined as they are
2. Why a nonlinear transformation is applied to the tax rate subcomponent of the Paying Taxes indicator when calculating its DTF score, but to no other subcomponent of any other indicator
3. Why the Getting Credit indicator has a Distance to Frontier score defined as the DTF of the sum of its subcomponents, while all other Ease of Doing Business indicators have DTF scores that are the simple averages of the distances to frontier of their individual subcomponents.

We were able to reproduce the World Bank's in-house stable version of the indicators to a good approximation, after following closely the method implied by the simulation spreadsheet they provided. This exercise revealed that the best and worst practice endpoints used to calculate the Distance to Frontier scores are of first order importance in explaining the differences in variability of the Romer-style and World Bank in-house stable versions of the indicators. To illustrate this, we focused on an intermediate stable version of the indicators that replicates Romer's methodology in every way except in using the World Bank's worst and best practice endpoints when calculating the DTF scores.

Table 6 summarizes differences in the variability of the published and alternative stable versions of the indicators. The upper panel compares the variability in terms of the Distance to Frontier scores. The DTF scores under Romer-style stable version vary less than those under the published version, for the overall composite Ease of Doing Business indicator and for six of the nine specific Ease of Doing Business indicators. The two versions of the Protecting Minority Investors and Resolving Insolvency indicators have statistically indistinguishable variances. The Romer-style stable version is more variable only for the Getting Credit indicator.

Table 6. Variability in Published v. Stable Versions of the Ease of Doing Business Indicators

Standard deviations of the published and alternative stable versions of the composite Ease of Doing Business indicator and of each individual Ease of Doing Business indicator are compared. The upper panel uses Distance to Frontier scores; the lower panel uses rankings. Published rankings for prior years are no longer available as part of the Doing Business historical dataset, so equivalents to published rankings are inferred from published Distance to Frontier scores in the historical dataset. Stable versions whose variances are significantly different (F-test to reject the null hypothesis of equal variances has a p-value of 5% or less) from that of the published version are in bold. The Trading Across Borders indicator is omitted because its methodology modifications are too extensive to allow stable versions to be constructed.

	World Bank's Published Version	Romer's Stable Version	Romer's version with WB Endpoints	World Bank's Stable Version
Distance to Frontier scores (DTFs)				
Ease of Doing Business	12.1	**8.9**	**11.1**	11.7
Starting a Business	13.5	**8.0**	13.5	13.5
Dealing with Construction Permits	12.9	**7.9**	**14.0**	**14.0**
Getting Electricity	18.0	**9.6**	**16.1**	**16.1**
Registering Property	15.8	**9.8**	15.4	15.4
Getting Credit	22.5	**24.1**	22.4	22.3
Protecting Minority Investors	14.2	15.0	13.7	**15.3**
Paying Taxes	17.0	**10.1**	17.0	17.0
Enforcing Contracts	13.2	**11.1**	**15.2**	**15.2**
Resolving Insolvency	24.4	24.2	23.5	**27.3**
Rankings				
Ease of Doing Business	53.4	52.5	53.5	53.4
Starting a Business	54.2	52.7	54.7	54.3
Dealing with Construction Permits	53.4	52.8	53.5	53.1
Getting Electricity	54.4	52.6	54.6	54.4
Registering Property	53.3	52.8	53.7	53.3
Getting Credit	53.1	51.8	53.5	52.6
Protecting Minority Investors	53.5	52.4	53.9	53.7
Paying Taxes	55.3	52.9	55.6	55.1
Enforcing Contracts	55.0	52.6	55.0	54.8
Resolving Insolvency	52.0	51.0	52.0	51.8

The World Bank's in-house stable versions are more variable than the published versions in four cases, less variable in one case, and have statistically indistinguishable variability in all other cases. Recalculating the Distance to Frontier scores of Romer-style stable indicators, but using the global best and worst practice endpoints defined by the World Bank, generates an intermediate set of stable indicators whose variability is almost identical to that of the World Bank's in-house stable indicators. This highlights the important role the definition of the endpoints played in calculating the Distance to Frontier scores.

The lower panel repeats the exercise comparing rankings based on the Distance to Frontier scores under different stable versions with inferred rankings based on the published historical Distance to Frontier scores. This inference is necessary because the World Bank does not report historical rankings in the Doing Business historical dataset. The various stable and inferred rankings have statistically indistinguishable variances. This is reasonable because the rankings necessarily have the same uniform distribution (the number of economies for which all indicators are reported does not change in these years). In statistical tests presuming a common variance, researchers might prefer rankings to DTF scores.

Of course, methodology-invariant or stable versions of the indicators might be calculated in other ways. World Bank staff are equipped to do this with far more sophistication than we can muster.

A second application of the stable versions of the Ease of Doing Business indicators from Table 4 reexamines the possibility that, even if the methodology changes did not systematically diminish Chile's standing when they occurred, the revised methodologies might still have affected Chile's Ease of Doing Business indicators more than those of the other economies over longer stretches of years. This exercise reaffirms our conclusion that such concerns are unfounded.

Table 7 explores whether differences between the published and stable versions of the Ease of Doing Business indicators are disproportionately more variable for Chile than for other economies. Wherever Chile stands out against all other economies in the world, Chile's difference actually *varies less*. That is, published Ease of Doing Business indicators deviate from our stable versions of those indicators less for Chile than for the average economy.

Table 7. Variability of Differences between Published and Stable Versions

A higher standard deviation indicates greater variability in the differences between the published and stable versions of the Ease of Doing Business indicators. The upper panel compares the standard deviations of the differences between published and stable versions in terms of Distance to Frontier scores; the lower panel presents the same comparison in terms of rankings. Published rankings for prior years are no longer available as part of the Doing Business historical dataset, so equivalents to published rankings are inferred from published Distance to Frontier scores in the historical dataset. Cases where Chile's variability differs significantly from that of all other economies (F-test to reject the null hypothesis of equal variances has a p-value of 5% or less) are in bold. The Trading Across Borders indicator is omitted because its methodology modifications are too extensive to allow stable versions to be constructed.

	Published versus Romer-style stable version		Published versus Romer-style stable version with World Bank DTF endpoints		Published versus World Bank's stable version	
	Chile	**Rest of World**	**Chile**	**Rest of World**	**Chile**	**Rest of World**
Distance to Frontier scores (DTFs)						
Ease of Doing Business	**1.3**	4.3	1.2	2.8	1.1	2.4
Starting a Business	**0.0**	6.7	**0.0**	0.3	**0.0**	0.3
Dealing with Construction Permits	**1.3**	7.3	**1.2**	4.4	**1.1**	4.4
Getting Electricity	**2.3**	10.9	**2.3**	7.3	**2.3**	7.3
Registering Property	4.3	7.7	4.3	4.6	4.3	4.6
Getting Credit	8.4	7.3	8.4	5.7	8.4	6.3
Protecting Minority Investors	3.0	3.9	3.0	3.7	4.5	7.0
Paying Taxes	4.0	9.1	3.4	4.2	3.3	4.2
Enforcing Contracts	**0.6**	6.4	**0.6**	6.8	**0.6**	6.8
Resolving Insolvency	6.8	5.8	6.9	5.6	8.3	11.0
Rankings						
Ease of Doing Business	8.8	14.3	8.2	11.3	7.5	9.9
Starting a Business	**1.9**	14.8	**0.5**	2.4	**0.5**	2.3
Dealing with Construction Permits	12.1	28.0	12.3	20.5	12.0	20.4
Getting Electricity	**6.5**	28.5	**6.5**	22.6	**6.5**	22.5
Registering Property	7.5	18.8	8.6	14.3	8.6	14.2
Getting Credit	8.2	10.7	8.0	7.6	8.5	10.4
Protecting Minority Investors	12.0	14.5	11.2	13.9	13.8	27.5
Paying Taxes	16.2	26.2	13.2	15.5	13.0	15.5
Enforcing Contracts	**1.0**	27.9	**2.1**	28.0	**2.1**	28.0
Resolving Insolvency	16.9	13.1	16.5	12.7	17.3	24.7

7. Conclusions

Allegations that World Bank staff have manipulated individual economies' Ease of Doing Business indicators are without foundation. All Ease of Doing Business indicators for the years DB2015 through DB2017 for Chile and 12 other economies whose indicators changed substantially when methodologies used to calculate the indicators changed were reexamined starting from survey responses. The published indicators are consistent with the data entered into the World Bank's automated Global Indicators & Analysis Data Management System and with the methodologies the World Bank uses for the year in question. The data entered into the system are consistent with the survey responses the World Bank collected.

Methodology changes reflect World Bank staff's genuine efforts to improve the indicators. World Bank staff have explained that these changes followed from consultations of World Bank Group staff, governments and the private sector. In each case, World Bank staff concluded that the changed methodologies were genuine improvements and worth the sacrifice of comparability over time.

However, the recommendation of the 2013 Independent Review Panel that

"For the purposes of international benchmarking and monitoring progress, measures also have to be comparable over time and across countries."[24]

mioght have been insufficiently forceful. Recent trends in empirical research make comparability across as many years as possible increasingly important, and the media and policy-makers pay increasing attention to how the indicators and rankings change over many years. Going forward, the World Bank may wish to assign a greater weight to preserving comparability over multiple years.

A fallacy of composition problem may have arisen. Each methodology improvement can seem incontrovertibly sensible viewed in isolation, yet frequent methodology improvements can combine to reduce the social value of the Ease of Doing Business indicators by compromising their comparability across years. If changes in the indicators come to reflect methodology changes, more than changes in the real ease of doing business, an economy ascending or descending in the Doing Business rankings no longer reliably reflects its real progress or backsliding in improving its business environment.

Changes in economies' Ease of Doing Business scores are followed intensely by international and domestic media, often without attention to notes on methodology changes, and can plausibly affect national policies and even elections. This speaks to the importance of the Doing Business project and serves as a testament to its social value. However, this very success gives the World Bank reasons to be cautious about methodology revisions:

The indicators are sufficiently prominent that methodology changes might lead voters to reward or punish elected officials for changes in their rankings that have nothing to do with economic reality. Publicity surrounding Romer's comments about Chile makes this less likely going forward. Politicians and the media now know the indicators can change for methodological reasons and therefore can diffuse such charges.

Unfortunately, this rejoinder to the one concern gives rise to a second and more serious concern. Frequent methodological changes create scope for discounting the integrity and objectivity of the Ease of Doing

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[24] See pp. 28-9 of the Doing Business Independent Panel Review Report. The full report is available at http://pubdocs.worldbank.org/en/237121516384849082/doing-business-review-panel-report-June-2013.pdf.

Business indicators. Political leaders who preside over institutional deterioration can blame lagging standing in the indicators on methodology changes. Methodology changes attenuate the link between changes in the Ease of Doing Business rankings and changes in real business environments, and this undermines their effectiveness as goalposts of institutional reform. Goalposts that move about, even for entirely innocuous reasons, invite challenges.

A third concern follows. Methodology-driven variability in the Ease of Doing Business data compromises the credibility of economic studies based on that data. Many important economic questions can only be addressed using data that are comparable across years. Such studies rely on changes in one set of variables to explain changes in another. Methodology revisions to how the Ease of Doing Business indicators are constructed cause changes in the indicators that do not reflect real changes in business environments.

In years of methodology changes, the World Bank provides two sets of data for the previous year (and for subsequent years too for certain indicators, as discussed in Table 3). One is calculated using the old methodology; another uses the new methodology. This practice is certainly helpful, but cannot really remedy the above concerns effectively unless comparable data across all years are provided.

These are largely avoidable problems. The World Bank may therefore wish to revisit its policies about methodology changes to the Ease of Doing Business indicators.

8. Recommendations

The World Bank may wish to consider a range of measures that safeguard comparability across time in the Ease of Doing Business indicators.

1. ***The World Bank may wish to minimize methodology changes in existing indicators except to fix confirmed problems with existing methodology.***

The World Bank undertook broad consultative efforts preceding the DB2015-2017 methodological changes, including input from an Independent Panel of Experts in 2013 and from World Bank Group staff, governments and the private sector. The World Bank then implemented a set of major methodological changes, whose scope for creating problems may not have been adequately anticipated. Major methodology changes move the indicators about for reasons other than changes in the ease of doing business, compromising their value to researchers, policy makers, and the media. Providing old and new versions of indicators subject to methodology changes highlights the magnitude of these issues, but does not permit comparability across multiple years. Paul Romer drew attention to these concerns, but others would almost surely have voiced similar concerns eventually, if less prominently.[25]

To minimize future controversy over methodology revisions, the World Bank may wish to adopt a conservative approach: limiting methodology changes in existing indicators to cases where substantive problems are identified and must be corrected. Substantiality might be inferred from peer-reviewed

[25] See, e.g. "Chart of the Week #3: Why the World Bank Should Ditch the 'Doing Business' Rankings—in One Embarrassing Chart" by Justin Sandefur and Divyanshi Wadhwa at the Center for Global Development, Washington, D.C., Jan. 18, 2018.

criticisms confirmed to be valid and economically significant. Minor improvements in methodology, such as improved wordings, might be avoided to safeguard the comparability and credibility of the indicators.

If methodology changes to existing indicators are necessary, the World Bank may wish to favor changes that can be applied retrospectively to prior years' data as well as current and future years' data. Prior versions of the Doing Business database using abandoned methodologies should be readily available to researchers so studies using earlier versions of the data remain replicable. The World Bank may also wish to consider allocating resources to back-calculate prior years data where this is feasible.

2. ***The World Bank may wish to incorporate additional aspects of the ease of doing business with new indicators, rather than with methodological changes to existing indicators.***

Avoiding all methodology changes is obviously unrealistic. To remain useful, the indicators must change to reflect newly appreciated aspects of the ease of doing business. Previously neglected but clearly important issues, such as gender parity, are certain to arise from time to time. Comparability of the indicators and rankings across years cannot be the World bank's only concern.

If a previously ignored dimension of the business environment is important enough to justify the attention of the World Bank, it is presumably important enough to justify its own Ease of Doing Business indicator. Gender parity is an obvious example. Modifying the methodologies used to construct the Starting a Business, Registering Property, and Enforcing Contracts indicators to reflect gender parity mars the comparability of these indicators over time. A new Gender Parity in the Ease of Doing Business indicator encompassing gender parity in starting a business, registering property, and enforcing contracts avoids this and arguably gives gender parity greater prominence.

The Starting a Business indicator was less affected because the World Bank was able to retrospectively alter its value for prior years using the revised methodology. If methodology changes to existing indicators are unavoidable, changes that facilitate backfilling are preferable.

3. ***Developments in how researchers, policy-makers, and the media use the indicators suggest that, going forward, the World Bank may wish to consider assigning a much greater weight to preserving comparability in the indicators across all years.***

The World Bank weighs comparability of the indicators across multiple years against keeping the indicators relevant in implementing methodology changes. Such compromises might be avoidable if the World Bank produced an alternative set of stable indicators, specifically designed to be comparable across years, which meaningfully tracked economies' institutional development or backsliding. Changes in economies' rankings by these measures would then also be meaningful.

4. ***The World Bank may wish to provide a set of stable Doing Business Development indicators and rankings, based solely on subcomponents of the Ease of Doing Business indicators free of major methodology changes.***

To avoid confusion, the stable indicators might be given a different name – we suggest Doing Business Development Indicators – to stress that their purpose is tracking institutional development relevant to the ease of doing business. This would also distinguish them from the primary Ease of Doing Business Indicators, whose methodologies could be modified to reflect newly appreciated issues.

World Bank staff have generated a stable version of each indicator, based largely on subcomponents not subject to methodology changes, for internal use. This exercise might be fine-tuned to produce a publishable set of Doing Business Development indicators spanning all years. These might be based on methodology-invariant subcomponents such as the number of procedures, cost and delay associated with different aspects of doing business where available. A Doing Business Development indicator is likely not possible for the Ease of Trading across Borders, whose case scenario was completely rewritten in DB2016. The Getting Credit and Protecting Minority Investors indicators derive from checklists; their Doing Business Development analogs might derive only from those checklist items that do not change from year to year.

The World Bank publishes the subcomponents of each indicator that are comparable across all years. Researchers can use these data to construct their own stable versions of the indicators; but this risks leaving studies based on alternative stable versions of the indicators non-comparable. Government offices might or might not also build their own indicators; but journalists, often operating under pressing deadlines, are unlikely to undertake such exercises. Users of the indicators would be better served were the World Bank to provide a standard well-designed set of stable Doing Business Development indicators. These would sacrifice information in the primary indicators, but let users needing comparability make ready use of one set of standard well-designed stable indicators.

Changes in such stable indicators across multiple years would be economically meaningful, so the rankings they generate would also be meaningful. The media and politicians appear most interested in rankings. The World Bank may wish to consider harnessing this interest to promote institutional reforms by publishing Doing Business Development rankings that reflect real changes in the ease of doing business, rather than emphasizing the incomparability of rankings due to methodological changes.

5. ***The World Bank may wish to establish objective methodologies to continuously update distance-to-frontier endpoints needing updating to avoid renewed controversy about methodology changes.***

From DB2015 on, Ease of Doing Business rankings are solely based on the Distance to Frontier (DTF) scores. If the global best practice gets something done in two days and the global worst practice endpoint is 502 days, an economy in which the task takes 52 days is (502 – 52)/(502 -2) = 450/500 = 90% of the way towards the best practice frontier. Each subcomponent is normalized into a DTF score. These are averaged (except for "Getting Credit") to generate each of the Ease of Doing Business indicators' DTF score. These are then averaged again to generate the overall Ease of Doing Business score for an economy, on which its Ease of Doing Business ranking is based.

Somewhat confusingly, a larger distance-to-frontier value indicates that an economy is actually *less* distant from the best practice frontier. The World Bank may wish to rename these measures Doing Business Scores.

As institutions develop worldwide, some DTF endpoints may need to change. The World Bank currently contemplates revising these endpoints every five years. Such abrupt changes invite renewed controversy about methodology-driven changes in the indicators every five years. The World Bank may wish to consider developing objective and mechanical ways of gradually adjusting DTF endpoints likely to require revision to avoid renewed problems associated with abrupt methodology changes.