XBRL US Center for Data Quality:

an industry initiative for the common good

December 12, 2019

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Summary

Smart businesses often take up causes for the common good such as sustainability, or corporate accountability. That's because many issues that redound to the common good, are also simply good business.

Better quality financial data is one such issue that has been taken up by a market-driven collaborative called the XBRL US Center for Data Quality. This initiative brings together sometimes competing organizations to improve the usability and effectiveness of XBRL-formatted public company financial statement data. While some members of the Center have business stakes in XBRL, the result of the work conducted through the Center, is helping to improve the efficiency of U.S. capital markets, benefiting investors, data preparers, regulators, and the public in general.

The Center provides funding for a working group called the Data Quality Committee (DQC) which is tasked with developing standards and guidance enabling issuers to improve the quality of their XBRL financial statement filings. Since its launch in 2015, the work of the DQC has resulted in:
- substantial improvement in the quality and consistency of corporate XBRL financials,
- greater coordination between the XBRL community, standard setters, and regulators like the Financial Accounting Standards Board (FASB), the International Accounting Standards Board (IASB), and the U.S. Securities Exchange Commission (SEC) and,
- heightened regulatory focus on data quality.

Background

In 2005, the SEC launched a voluntary program to test out the premise of structured data formatting of corporate financial data. That pilot program led to the SEC rule requiring the use of XBRL for public companies that was passed in 2008, with the first filers submitting XBRL exhibits in 2009.

XBRL US built the first two releases of the US GAAP Financial Reporting Taxonomy, under contract with the SEC. In 2010, support and maintenance of the taxonomy was transitioned to the FASB. The FASB began publishing new releases of the taxonomy each year, to accommodate changes in accounting standards, industry revisions, and investor requirements. By 2011, every public company reporting in US GAAP had begun submitting their filings in XBRL format.

In 2010, XBRL US began collecting XBRL corporate data into its own database through an RSS feed of XBRL instance documents made available by the SEC. An analysis of the XBRL-formatted data reported by public companies, revealed a significant number of inconsistencies, ranging from the use of negative values that should have been positive, to incorrect use of

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dates, to scaling errors. These errors, which resulted in data that contained inaccuracies and that could not be automatically consumed without substantial vetting, were driven by several factors, including 1) the complexity of the US GAAP Financial Reporting Taxonomy, which can lead to multiple ways to tag the same data, 2) the ability of companies to create custom elements, and 3) a lack of concrete guidance available to issuers. These issues force preparers to make numerous and often inconsistent tagging decisions, resulting in data that is difficult to consume across companies.

In response to the problems identified in corporate filings, XBRL US began creating consistent, machine-readable rules that could be run automatically against an XBRL filing to identify errors. Searching for potential problems in the XBRL tagging of these filings would be a daunting task to review by hand. For example, Pfizer's 10-K, dated February 22, 2018, contained 3,622 individual reported facts[1]. Automated rules are clearly the most efficient way, **and perhaps the only way,** to provide comprehensive, consistent, automatic checks for issuers to use as a review tool.

However, for the rules to be successful, requires **use of the rules by all public companies**, and therefore by all service providers working with public companies.

In July of 2015, several filing agents, software and service providers, that were members of XBRL US, agreed to fund the ongoing creation and distribution of the validation rules. These founding organizations recognized the importance of establishing a single standard set of rules and guidance that all public companies could freely adopt.

As an industry-led initiative, the Center has the flexibility to make changes and progress. The Center is a critical source of support to provide funding for the rules and guidance development, which are created by the Data Quality Committee (DQC).

Strategy

The DQC is comprised of investors, issuers, academics, database and analytical tool providers, as well as filing agents. Organizations represented on the Committee today include the American Institute of CPAs (AICPA), Bloomberg, Calcbench, the CFA Institute, Credit Suisse HOLT, Global Water Resources, Inc. idaciti, Morningstar, S&P Global Market Intelligence, Toppan Merrill, as well as permanent observers from the FASB and the IASB.

The committee's primary tasks are:
- Developing clear and unambiguous guidance and rules that are used by filers to flag errors in their XBRL filings, and that provide guidance on how to make corrections.
- Conducting public reviews of the guidance and rules to obtain further input and incorporating that input, where appropriate, in the final approved guidance and validation rules.

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[1] Pfizer reported facts include values, text strings, and textblocks.

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- Providing progress updates to SEC staff, and input to FASB staff to improve on the XBRL US GAAP Taxonomy and related resources.

When developing guidance and rules, the DQC focuses on:
1. meeting the needs of all stakeholders, from SEC filers through to data consumers,
2. ensuring that guidance and rules are easy to understand and instructions provided in the rule error messages are clear, and
3. Providing sufficient coverage to detect and help issuers resolve as many *types* of errors as possible.

Below are two sample error messages that a filer may receive when running the DQC rules. **Example #1** shows the result of a simple check based on the accounting rule that the value tagged for Assets must equal the value tagged for the elements Liabilities and Equity. **Example #2** shows the result of a rule that clarifies that facts reported for certain concepts must always be positive.

> Assets with a value of 340,000,000 is not equal to the total of Liabilities and Equity with a value of 350,000,000. These values should be equal.
>
> The properties of this us-gaap:Assets fact are:
>
> Period :2014-12-31
> Dimensions : none
> Unit : USD
> Rule version : 1.0

> Derivative Assets has a value of -400,000 which is less than zero. This element should not have a negative value. The properties of this us-gaap:DerivativeAssets fact are:
>
> Period: 2012-12-31
> Dimensions: none
> Unit: USD
> Rule version: 1.0

These are relatively simple rules and may seem obvious, but when applying XBRL tags to a financial statement, may not always be readily apparent. DQC rules range from very simple, like these, to relatively complex, for example, capturing errors when using dimensions, or when creating extensions.

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To develop the rules, the DQC conducts a rigorous process which is outlined in the diagram below (https://xbrl.us/dqc-process). The seven-step process is conducted for each set of rules developed by the DQC. The Appendix provides detail for each step in the process.

Steps in the DQC Rules Creation Process
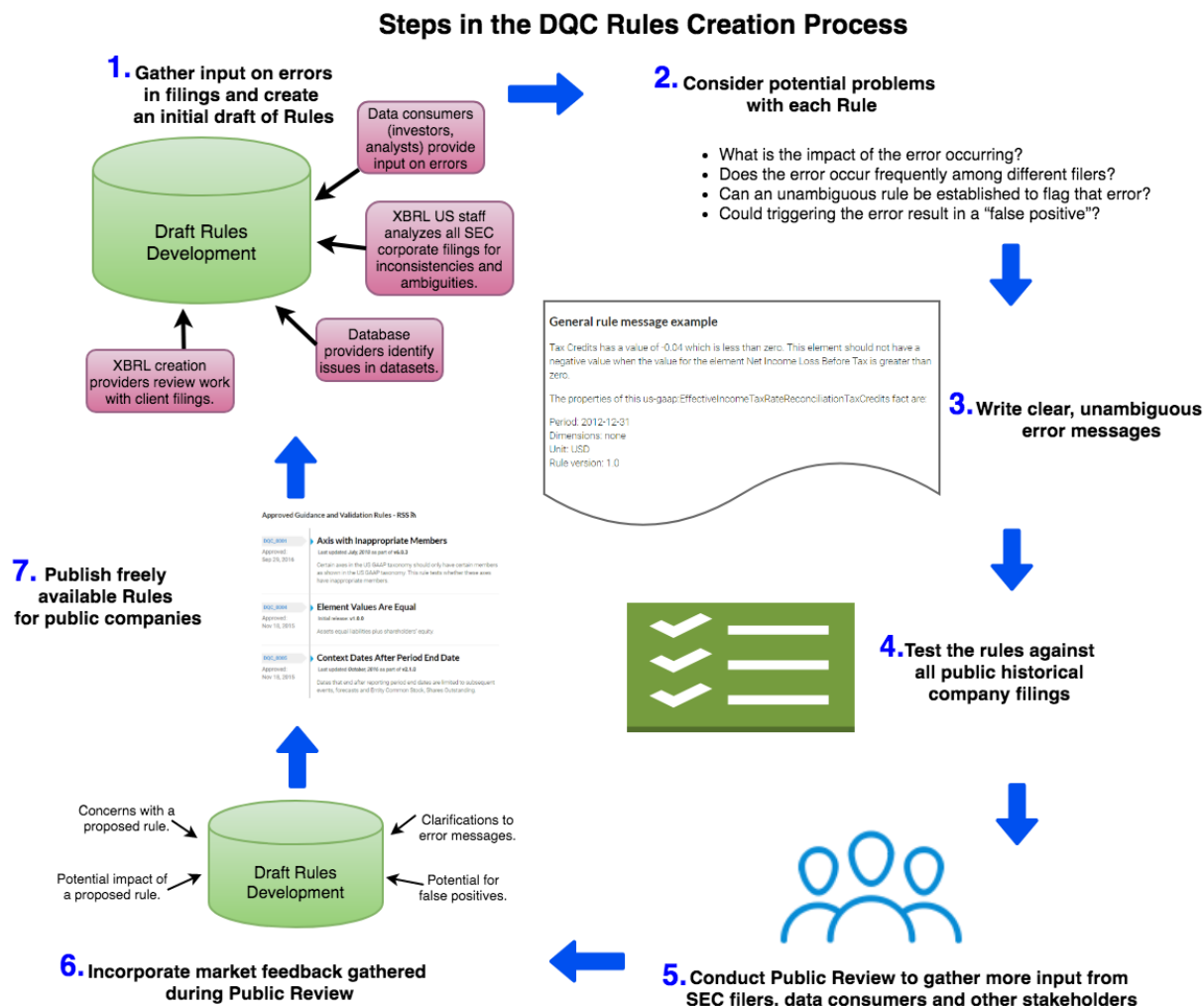
Activities and Accomplishments

In its first three years, the DQC has published seven sets of rules. It holds meetings approximately every six months with staff from various divisions and offices in the SEC, including representatives from the Office of Corporation Finance and the Division of Economic Risk and Analysis and the Division of the Office of the Chief Accountant. The purpose of these meetings is to apprise the Commission of the DQC guidance and rulemaking progress. The DQC also periodically submits letters to the SEC and the FASB, providing comments and observations related to the US GAAP Taxonomy, submitted XBRL filings, and various rule proposals.

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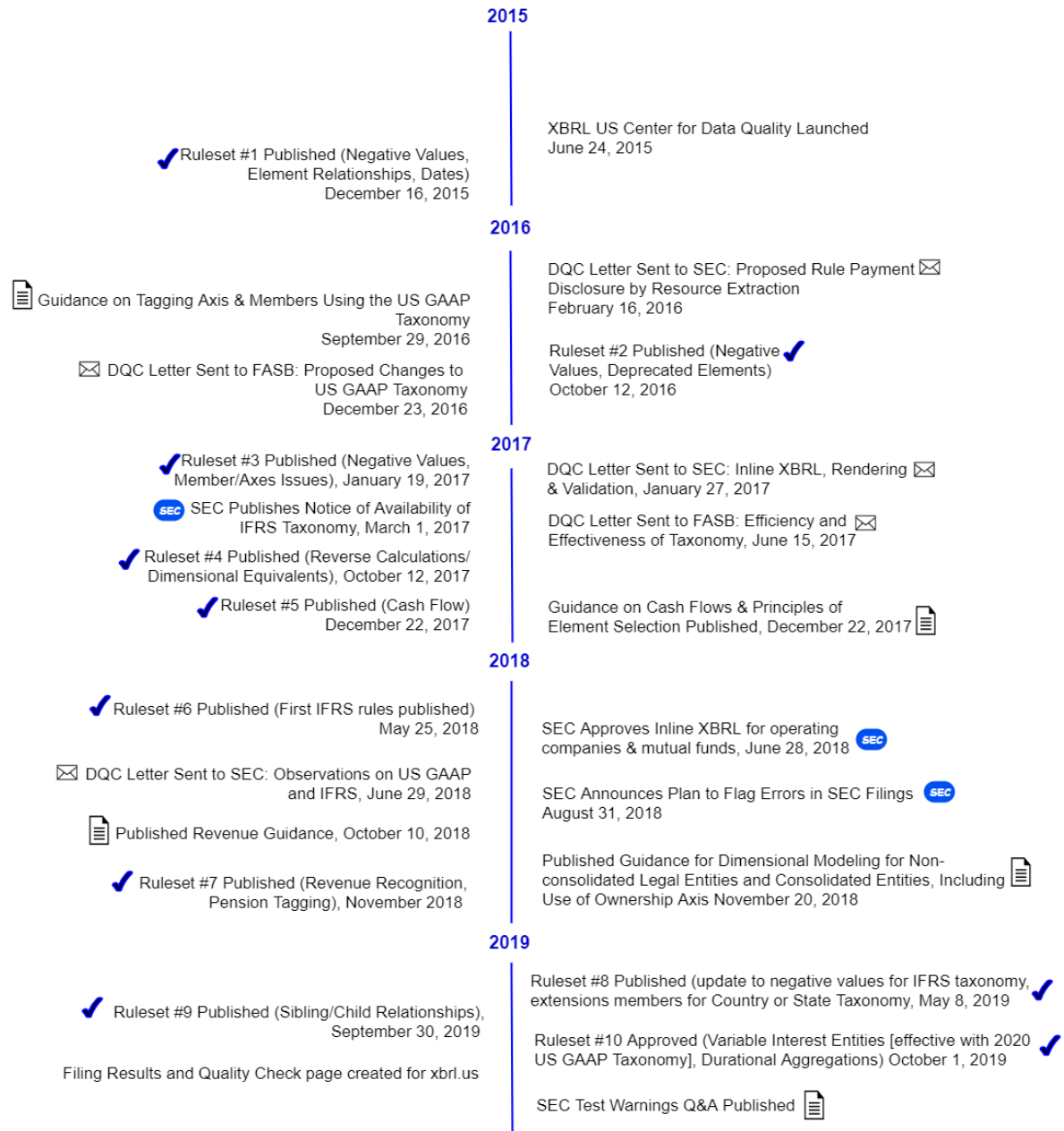
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After the Center was launched in June 2015, the first Ruleset was published at the end of that year, followed by Ruleset #2 in 2016. In late 2016, the DQC also published "Guidance on Tagging Axis and Members Using the US GAAP Taxonomy". By 2017, the Committee had established an efficient rules creation process. Three new rulesets were published in 2017, one released at the end of December.

In addition, a second guidance document was produced in 2017, "Statement of Cash Flows" which provides assistance to filers in tagging the statement of cash flows. The DQC also released the "Guiding Principles of Element Selection" which include four guiding principles which are designed to improve the usability of XBRL data by ensuring the consistency of element selection and data modeling.

In 2018, the DQC published two rulesets, and initiated a public review for a third ruleset. To support foreign private issuers filing using the IFRS Taxonomy, which was approved by the SEC in March of 2017, the DQC also began publishing rules for IFRS XBRL submissions. The DQC also released two guidance documents (revenue guidance and dimensional modeling for nonconsolidated legal entities and consolidated entities, including use of ownership axis).

In 2019, the DQC published three rulesets which included updates to the rules for new versions of both US GAAP and IFRS taxonomies. The DQC also established a Filing Results and Quality Check page on the XBRL US website. This page provides a listing of as-filed public company XBRL submissions to the US SEC's EDGAR system that have been scanned with the DQC's Approved Rules. The DQC also published Q&As to help registrants evaluate warnings they may receive in the SEC test filing system for several conditions that may have false positives. The DQC has also been coordinating with the FASB to incorporate the DQC rules into the US GAAP taxonomy.

The milestone chart below shows the pace of work conducted by the Committee, and various SEC actions that have had a significant impact on the work of the DQC.

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2015

XBRL US Center for Data Quality Launched
June 24, 2015

✔ Ruleset #1 Published (Negative Values, Element Relationships, Dates)
December 16, 2015

2016

DQC Letter Sent to SEC: Proposed Rule Payment ✉ Disclosure by Resource Extraction
February 16, 2016

📄 Guidance on Tagging Axis & Members Using the US GAAP Taxonomy
September 29, 2016

Ruleset #2 Published (Negative ✔ Values, Deprecated Elements)
October 12, 2016

✉ DQC Letter Sent to FASB: Proposed Changes to US GAAP Taxonomy
December 23, 2016

2017

✔ Ruleset #3 Published (Negative Values, Member/Axes Issues), January 19, 2017

DQC Letter Sent to SEC: Inline XBRL, Rendering ✉ & Validation, January 27, 2017

🔵SEC SEC Publishes Notice of Availability of IFRS Taxonomy, March 1, 2017

DQC Letter Sent to FASB: Efficiency and ✉ Effectiveness of Taxonomy, June 15, 2017

✔ Ruleset #4 Published (Reverse Calculations/ Dimensional Equivalents), October 12, 2017

✔ Ruleset #5 Published (Cash Flow)
December 22, 2017

Guidance on Cash Flows & Principles of Element Selection Published, December 22, 2017 📄

2018

✔ Ruleset #6 Published (First IFRS rules published)
May 25, 2018

SEC Approves Inline XBRL for operating 🔵SEC companies & mutual funds, June 28, 2018

✉ DQC Letter Sent to SEC: Observations on US GAAP and IFRS, June 29, 2018

SEC Announces Plan to Flag Errors in SEC Filings 🔵SEC
August 31, 2018

📄 Published Revenue Guidance, October 10, 2018

Published Guidance for Dimensional Modeling for Non- consolidated Legal Entities and Consolidated Entities, Including 📄 Use of Ownership Axis November 20, 2018

✔ Ruleset #7 Published (Revenue Recognition, Pension Tagging), November 2018

2019

Ruleset #8 Published (update to negative values for IFRS taxonomy, extensions members for Country or State Taxonomy, May 8, 2019 ✔

Ruleset #10 Approved (Variable Interest Entities [effective with 2020 US GAAP Taxonomy], Durational Aggregations) October 1, 2019 ✔

✔ Ruleset #9 Published (Sibling/Child Relationships),
September 30, 2019

Filing Results and Quality Check page created for xbrl.us

SEC Test Warnings Q&A Published 📄

Results

Since 2015, market and regulatory acceptance of the work of the DQC has accelerated the pace of activities of the Center, as shown in the chart above. The quickened pace has been fueled by significant results: the quality of XBRL data has improved, as more rules have been issued, and more categories of errors are covered; regulators are taking a closer look at data quality and bringing it to the attention of issuers, and; structured data is more heavily used by commercial data providers.

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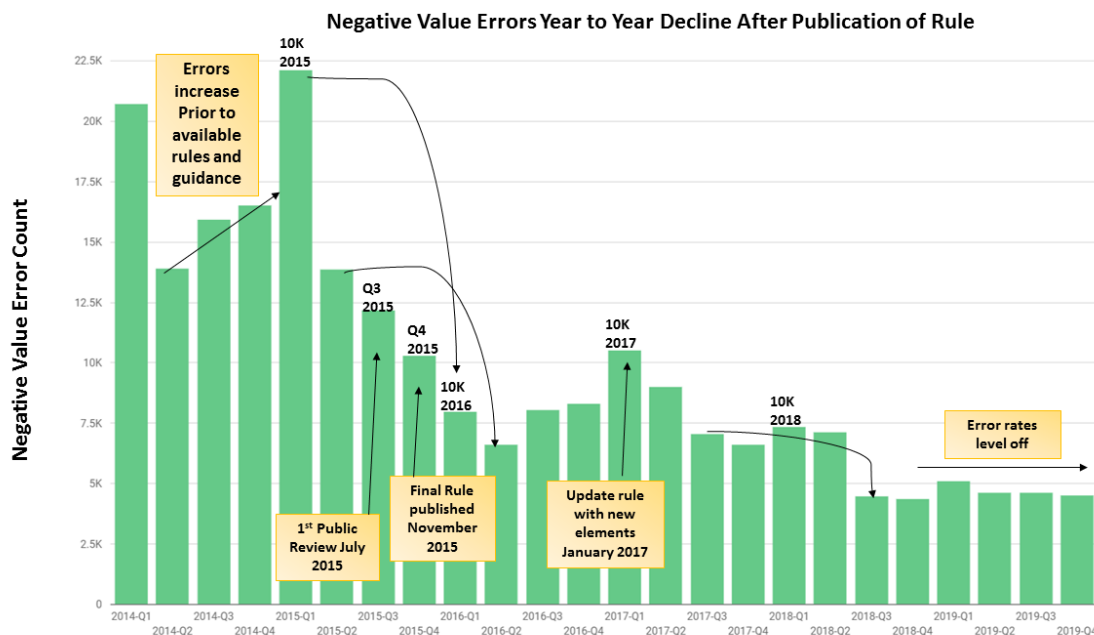
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Result: Increase in Data Quality

Analysis shows that the work of the DQC helps filers reduce the number of errors in corporate XBRL financials. The first DQC Ruleset focused on negative value errors, the most common problem in XBRL financials. As shown on the chart below, filings containing facts erroneously reported with negative signs were trending upward throughout 2014 and into the 2nd quarter of 2015.

In the 3rd quarter of 2015, as noted in the yellow box on the bottom left of the chart, the DQC launched a public review for the first set of negative values. Because these draft rules were publicly available for use by SEC filers, the trend in negative value errors began to decline immediately when the public review began in the 3rd quarter (compared to the 3rd quarter of 2014). In the 4th quarter of 2015, final rules were published, resulting in a continued downward trend in errors, comparing 2015 quarters to 2016 quarters, year over year.

In the 1st quarter of 2017, a second set of negative value rules was published by the DQC as shown in the yellow box in the first quarter on the chart. Note that the error count appears to increase in this quarter, but this is caused by additional negative value rules which automatically generate additional errors adding to the count not captured in prior quarters.

More important to note is that by the 4th quarter of 2017, the negative value rules were having their desired impact - errors in XBRL filings declined versus the 4th quarter of 2016. The results of the rule have leveled off and the error rates have not shown a significant change quarter over quarter since the third quarter of 2018.

Negative Value Errors Year to Year Decline After Publication of Rule

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Result: Comprehensive Error Reduction

The work of the DQC to date covers many different categories of rule types including axes that are used with inappropriate members, element values that should be equal, context date problems, reversed calculations, equivalency errors, the use of deprecated elements, among others. Similar analyses of these error counts also show a reduction in errors from when the rules were first introduced. Aggregate error count analyses depicting additional error categories can be found at: https://xbrl.us/dqc-results.

Result: Engagement with the SEC

Since its inception, the DQC has begun meeting with the SEC approximately every six months to share observations about the quality of filings submitted to EDGAR, and to explain the proposed and finalized guidance and rulesets. The DQC has also submitted letters to both the SEC and the FASB, explaining their position on proposed changes to the US GAAP Taxonomy, as well as proposed rules. Representatives from the FASB and the IASB (since 2017, when the IFRS Taxonomy was approved for use by the SEC), participate in DQC meetings as observers. This closer engagement is helpful at ensuring that the viewpoint of the XBRL community, as well as the preparing and consuming communities, are heard by regulators and standard setters.

Result: Regulatory Focus on Data Quality

Our research shows that until recently the SEC had adopted a protocol of publishing general observations and FAQs about XBRL submissions, instead of contacting filers individually about XBRL issues. For example, the Commission established a web page[2] that contains staff observations, guidance, and trends concerning interactive data submissions. In their Staff Observations of Custom Tag Rates, published July 29, 2014, the Commission notes: "*Analyzing the most recent XBRL exhibits as of October 30, 2013, Commission staff identified a sample of filers with custom tag rates greater than 50%. Among these, approximately 96% were smaller filers...we observed systematic evidence of smaller filers in our sample creating a custom tag instead of selecting an available standard tag.*"[3]

These SEC observations suggest that small filers should consider whether they are using custom tags inappropriately. While this information is helpful, it does not flag problems in an individual corporate filing. Issuers must review the guidance documents and consider whether a particular problem applies to them.

Despite widespread evidence of errors clearly identified in XBRL submissions, and difficulties that data consumers have found in working with the XBRL data due to quality problems, there

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[2] https://www.sec.gov/structureddata/osdstaffobsandguide
[3] https://www.sec.gov/structureddata/announcement/osd-announcement-070714---staff-observations-of-custom-axis-tag.html

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had been minimal direct outreach to filers concerning errors in individual company filings beyond the general observations noted above.

The SEC protocol for addressing data quality for filers changed on August 31, 2018, when the SEC announced that EDGAR Release 18.3, effective October 2018, would begin introducing warning messages to flag a sampling of potential errors identified on submitted XBRL filings. These new warning messages are flagged as EDGAR warnings (not suspensions) when XBRL submissions contain one or more errors of these types:

- when certain US-GAAP and IFRS numeric reporting items are tagged incorrectly as negative
- if a filing uses deprecated tags in a submission
- if a filing contains custom Axis tags for purposes already served by certain existing standard taxonomy axes

These SEC-developed rules mirror the approach first established by the DQC. The SEC errors are only a sample of the kinds of errors that can be identified. For example, the negative input errors are available for only three US GAAP and five IFRS concepts, in contrast to DQC negative value rules which cover hundreds US GAAP concepts and IFRS concepts.

Despite the limited nature of these validation checks, this move demonstrates that *the Commission is taking note of the quality of the XBRL data submitted by SEC filers*, and is drawing attention to potential errors to filers to help them correct the same errors they can correct by using DQC rules.

Result: Increasing Use of XBRL Data

The stated mission of the Center for Data Quality is to "*to improve the usability of XBRL data … to support the Data Quality Committee's initiative to address the public's concerns about the quality and usability of XBRL financial data filed with the SEC.*" Increasing the quality and consistency of the data produced from XBRL submissions makes it easier for data consumers to extract and analyze corporate financial fundamentals.

Today, corporate XBRL data is increasingly in use - by regulators, data providers, analysts, and investors. Data aggregators and analytical tool providers, including Bloomberg, S&P Global Market Intelligence, Refinitiv, Morningstar, Calcbench, idaciti, and Intrinio, all use XBRL formatted financial data in data and analytics offerings to investors and analysts. The use of commercial datasets like these is the most common method by which investors, both individual and institutional, obtain corporate fundamental data. Data providers and the analyst community joined the DQC because they recognized that automated rulesets and guidance could improve the value of the corporate financial datasets they use.

"Calcbench spends a significant amount of time vetting and fixing errors identified in XBRL filings. We joined the Data Quality Committee because we would prefer to have these errors resolved at the source – by the issuers themselves. We're confident that the work of the DQC

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has begun improving the quality of the data we're seeing reported by public companies in their XBRL submissions."
- Pranav Ghai, co-Founder and CEO, Calcbench

"XBRL data is important to analysts because the computer-readability of standardized data makes it more timely and granular than traditionally available data. The CFA Institute participates in the DQC because we know that there are errors in XBRL financials, and rules made available by the DQC can help eliminate many of these issues."
- Mohini Singh, ACA, Director of Financial Reporting Policy, CFA Institute

Going Forward

It is imperative that the work of the DQC, funded by the Center for Data Quality, continue to support the 6,000 public companies that generate new XBRL-formatted filings each quarter. The results of the Center for Data Quality and the DQC, as evidenced by a reduction in filing errors, a stronger regulatory focus on data quality, and increasing usage of XBRL data, are clear signs that the work of the DQC is providing an important and necessary benefit to the markets.

In the months ahead, the DQC will continue to develop new rulesets and guidance to address additional categories of errors.

To learn more about the work of the Center for Data Quality and the Data Quality Committee, visit our web pages:

Center for Data Quality: https://xbrl.us/cdq
Data Quality Committee: https://xbrl.us/dqc
Approved rules and guidance: https://xbrl.us/rules-guidance

Contact us for more information about how you can participate in the work of the Center for Data Quality at info@xbrl.us.

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Appendix – DQC Rules Creation Process

The DQC publishes approximately three rulesets per year. With every ruleset, a stringent 7-step development process is followed in order to ensure that the errors triggered by the rule are true errors that filers need to address before they submit their financial statements.

Step 1. Create draft rules.
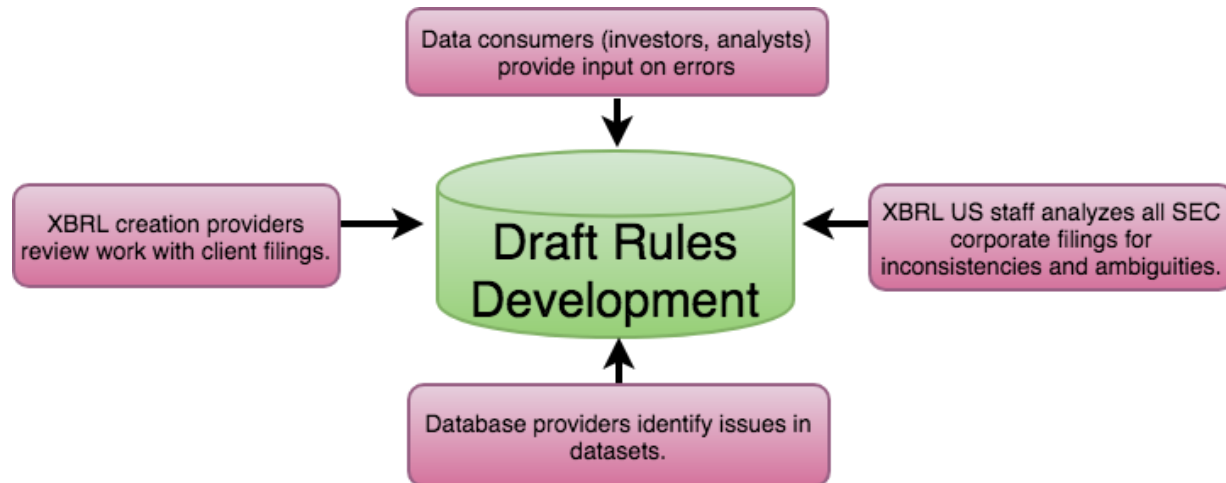
Members of the DQC are corporate issuers, filing agents, database providers, academics, XBRL experts, accountants, and securities analysts, each with different expertise to contribute to the process of identifying problem areas and drafting rules to address them. Data consumers and analysts provide input on errors they find in filings. Database providers review and weigh in on errors they find in their own datasets. XBRL US staff copies all SEC filings into the XBRL US Database of Public Filings and analyzes the filings for common errors. Filing agents and XBRL tool providers review their work with clients. The DQC also meets with standard setters and the regulators on a regular basis to review the draft rules. Guided by input from these formal and informal channels throughout the business reporting supply chain, the DQC creates and prioritizes rules to be developed, exposed for comment, and released.

Each problem area is tackled in a single rule, for example negative values (that should be positive), or invalid use of combinations of axes and members are addressed in separate rules. Sometimes, the DQC researches and develops guidance for filers on specific accounting topics (eg. revenue, cash flow) and several rules are written to support the guidance.

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Step 2. Consider potential problems with each draft rule.

Once the prioritized draft rules are established, the DQC undergoes a process to evaluate the utility of each rule.

What is the impact of the draft rule?
Repercussions of an error must be significant enough that it merits flagging to filers.

Does the error occur frequently among multiple filers?
It might just be an anomaly that only affected a single filer and therefore may not be worthwhile to include in the ruleset.

Is the rule clear and unambiguous and does the error message provide clear instructions to an issuer?
If not, a rule should not be written.

Might the rule result in "false positives"?
Validation rules must be written considering every possible situation. For example, some concepts in the US GAAP Taxonomy should always be reported as positive values, except when certain dimensions are used with these concepts. Instances where dimensions are used may be rare, but it's important that the rules handle all of these situations. The DQC rule for these kinds of concepts includes a list of exceptions so that if a filer uses one of these concepts without a dimension, he or she will get a negative value warning. But if he or she uses a concept with one of the "exception dimensions", no warning will be triggered.

Similarly, when a filer uses the 2019 release of the US GAAP Taxonomy, an error flag will appear if the filer uses a concept deprecated from the 2019 release. But if the filer is preparing a filing using the 2018 Taxonomy, and that concept was valid for the 2018 release, no error will be triggered.

The DQC researches every rule for false positives using SQL queries against the XBRL US Database of Public Filings – a copy of all XBRL SEC filings that also includes historic data quality issue records. This is because the risk is too high that a filer will be led astray and waste time attempting to correct something that was right in the first place, and potentially introduce a new error into their filing.

Step 3. Write clear, unambiguous error messages.

Each rule must provide simple instructions that issuers can easily follow to correct their filing. It is important that each rule can be easily explained. Below are examples of error messages that filers receive when running the rules. These messages explain the error for the incorrect tagging found within a filing. Example #1 states that a fact reported for a certain concept must always be positive. Example #2 states that the value tagged for Assets must equal the value tagged for the element Liabilities plus Equity.

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Example #1

Accrued Liabilities And Other Liabilities has a value of -400,000 which is less than zero. This element should not have a negative value.

The properties of this us-gaap:AccruedLiabilitiesAndOtherLiabilities fact are:

Period: 2012-12-31
Dimensions: none
Unit: USD
Rule version: 1.0

Example #2

Assets with a value of 340,000,000 is not equal to the total of Liabilities and Equity with a value of 350,000,000. These values should be equal.

The properties of this us-gaap:Assets fact are:

Period :2014-12-31
Dimensions : none
Unit : USD
Rule version : 1.0

Step 4. Test the rules.

After the logic of the rule is finalized by a rule development team, it is converted to code (https://xbrl.us/xule) operable on an XBRL data model. Every draft rule is tested by running it against historical corporate filings. Reported values that trigger the draft rule are analyzed in detail to make sure that they are flagging errors appropriately and not generating false positives.

Step 5. Conduct public review of each rule.

The DQC makes all draft rules available to the general public as human-readable 'rule submission forms' (https://xbrl.us/public-review) for at least 45 calendar days. During that period, XBRL US schedules, promotes and hosts at least one public webinar to review the rules (and/or guidance) available. In addition, a tool on the XBRL US website (https://xbrl.us/check) is updated so that filers can run the software code for the draft rules themselves to check if their filing (historical or not yet submitted) triggers a draft rule. The public can also download the open source reference code for the rules from a github repository (https://xbrl.us/dqc-releases), test cases and .zip files to test rules with filings using desktop software (Arelle). The public can provide feedback (discussion, email, phone, online public review comment form) to the members of the DQC when an error has been triggered incorrectly or if the error message is not clear. This type of input is invaluable to ensure that the rules are clear, unambiguous, and accurate at identifying mistakes. Issuers, data providers, analysts, filing agents, and accounting professionals are strongly encouraged to review the rules and provide their input.

Step 6. Incorporate market feedback.

After the public review, which usually runs 45 days, all submitted comments are reviewed by the DQC and revisions may be made.

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Step 7. Publish the final ruleset.

Once the DQC formally approves the rules, they are made freely available and can be used by filers directly on the XBRL US web site (https://xbrl.us/rules-guidance/), or are incorporated into filing agent processes and tool provider software.

XBRL US also certifies software that has been proven to successfully run the rules, flagging errors where appropriate. The DQC certification process is equally rigorous. The entire ruleset is incorporated into the software being tested, and run against historical XBRL SEC filing. Results generated through the software are analyzed to determine if errors are triggered in filings that are known to contain errors. If the results are not accurate, the XBRL US team works with the filing agent or software provider to make corrections, until the rules run smoothly and successfully, producing expected results.

The DQC also continuously receives market feedback on previously approved rules. If there is a need for a previously approved rule[4] to be updated, the DQC reviews this feedback and the update to the rule is put through the entire process. Rules with an update are indicated as such on https://xbrl.us/rules-guidance and the rule submission form may also have an appendix to summarize the change(s).

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[4]Previously approved rules are updated as needed for updates to the taxonomy or if a false positive result is found.

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