

Proof of SFAC 6

Building on the double-entry accounting model

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“I skate to where the puck is going to be, not where it has been.” *Wayne Gretzky*,
legendary Canadian hockey star

Executive summary:

- This document walks the reader through a proof that the machine-readable SFAC 6 logical system is properly functioning.

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FASB SFAC 6¹ explicitly defines 10 elements of a financial statement. Those elements are: assets, liabilities, equity, investments by owners, distributions to owners, comprehensive income, revenues, expenses, gains, losses.

The elements of financial statements are the building blocks from which financial statements are constructed. The elements are the classes of items that comprise a financial statement.

This document enhances those ten core element definitions in three ways. First, it puts these definitions in machine-readable form. Second, it puts the elements in context by showing the associations between the concepts. Third, it adds additional important concepts that are ultimately defined implicitly or explicitly by the FASB to provide a complete set of core high-level financial report elements.

Double-entry Accounting.

Single-entry accounting is how ‘everyone’ would do accounting. In fact, that is how accounting was done for about 4,000 years before double-entry accounting was invented. Double-entry accounting was the invention of medieval merchants and was first documented by the Italian mathematician and Franciscan Friar Luca Pacioli² in 1494. The section related to double-entry accounting was translated into English in 1914³.

Double-entry accounting adds an additional important property to the accounting system, that of a clear strategy to identify errors and to remove the errors from the system. Even better, double-entry accounting has a side effect of clearly firewalling errors as either accident or fraud. This then leads to an audit strategy. Double-entry accounting is how professional accountants do accounting.

Which came first, double-entry accounting or the enterprise? It is hard to overstate the impact of double-entry accounting on the evolution of the complex global enterprise⁴.

¹ FASB, *Statement of Financial Reporting Concepts No. 6 (SFAC 6), Elements of Financial Statements*, https://www.fasb.org/jsp/FASB/Document_C/DocumentPage?cid=1218220132802

² Wikipedia, *Luca Pacioli*, https://en.wikipedia.org/wiki/Luca_Pacioli

³ J. B. Geijsbeek, *Ancient Double-Entry Bookkeeping*, <https://archive.org/details/ancientdoubleent00geij/page/n3>

⁴ Ian Grigg, *Triple Entry Accounting*, https://iang.org/papers/triple_entry.html

Foundational Mathematical Equation for Double-Entry Accounting

The foundational basis of double-entry accounting is straightforward. Quoting David Ellerman from his paper *The Math of Double-Entry Bookkeeping: Part I (scalars)*⁵:

“Given an equation $w + \dots + x = y + \dots + z$, it is not possible to change just one term in the equation and have it still hold. Two or more terms must be changed.”

And so, the left-hand side of the equation “ $w + \dots + x$ ” (the DEBIT side) must always equal the right-hand side of the equation “ $y + \dots + z$ ” (the CREDIT side) in double-entry accounting. The reason that double-entry accounting is used, as contrast to single-entry accounting, is double-entry accounting’s capability to detect errors and to distinguish an error from fraud.

Of course, there are a lot of details associated with setting up and operating an accounting system appropriately, but the fundamental feature is that DEBITS must equal CREDITS and if they don’t, then something is up which needs to be investigated and corrected.

If you desire to learn more about double-entry accounting, see Colin Dodd’s rap song, Debit Credit Theory (Accounting Rap Song)⁶.

The Accounting Equation: Framework for Financial Accounting

While the model “Debits = Credits” or the notion of basically using two single entry ledgers and synchronizing them to detect errors or fraud is useful; additional power is provided to double-entry accounting via the accounting equation⁷ which is:

$$\text{“Assets = Liabilities + Equity”}$$

The accounting equation within the double-entry accounting is the fundamental basis for financial accounting. By definition, every financial reporting scheme⁸ has this high-level model at its core.

⁵ David Ellerman, *The Math of Double-Entry Bookkeeping: Part I (scalars)*, <http://www.ellerman.org/the-math-of-double-entry-bookkeeping-part-i-scalars/>

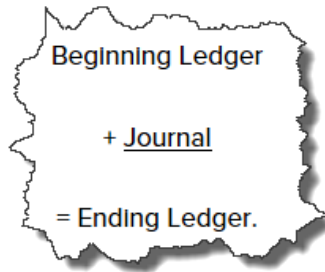
⁶ YouTube, *Colin Dodd’s rap song, Debit Credit Theory (Accounting Rap Song)*, <https://www.youtube.com/watch?v=j71Kmxv7smk>

⁷ Wikipedia, Accounting Equation, https://en.wikipedia.org/wiki/Accounting_equation

⁸ Charles Hoffman, CPA, *Comparison of Financial Reporting Schemes High Level Concepts*, <http://xbrlsite.azurewebsites.net/2018/Library/ReportingSchemes-2018-12-30.pdf>

Ledgers and Journals, Stocks and Flows

Another important piece of double-entry accounting is explained well in David Ellerman's article, *The Math of Double-Entry Bookkeeping: Part II (vectors)*, is ledgers and journals⁹. Many accountants use the terms "ledger" and "journal" incorrectly. This works the same for general and special ledgers and journals. This is the relationship between a ledger and a journal:


$$\begin{array}{l} \text{Beginning Ledger} \\ + \text{Journal} \\ = \text{Ending Ledger.} \end{array}$$

Ledgers summarized balances. For example, the general ledger summarizes account balances.

Journals record the transactions which make up the changes between ledger balances. Other terms used for the relationship shown above are "roll forward" or "movements" or "stocks and flows" or "account analysis". All three of these terms basically explain the following equation:

$$\text{"Beginning balance + Additions - Subtractions = Ending balance"}$$

Balance sheet accounts are stocks. Roll forwards of the beginning and ending balances of balance sheet accounts are flows. The income statement is a flow of net income (loss). The cash flow statement is a roll forward of the net change in cash and cash equivalents. The statement of changes in equity is a roll forward of equity accounts.

Many transactions, events, circumstances, and other phenomenon are recorded as transactions in a journal, make their way to a ledger, and then end up in the primary financial statements or within disclosures which detail the line items of the primary financial statements. Much of this information is part of the two trees which make up the roll ups of "Assets" and "Liabilities and Equity". However, other there are other trees that can make up the complete "forest" of a financial report. For more information about the "forest" and the "trees" of a financial report, see the document *Leveraging the Theoretical and Mathematical Underpinnings of a Financial*

⁹ David Ellerman, *The Math of Double-Entry Bookkeeping: Part II (vectors)*, <http://www.ellerman.org/the-math-of-double-entry-bookkeeping-part-ii-vectors/>

*Report*¹⁰. That document also has some good information related to triple-entry accounting which I am not going to get into here.

As pointed out in the document *General Ledger Trial Balance to External Financial Report*¹¹, each balance sheet line item has a roll forward. While perhaps not reported externally, these roll forwards can be quite helpful internally to verify that a financial report has been created correctly.

The Accounting Equation

The accounting equation¹² defines three core elements of a financial report:

- Assets
- Liabilities
- Equity

The accounting equation defines three terms and provides the relations between the three terms:

$$\text{Assets} = \text{Liabilities} + \text{Equity}$$

This logical system can be represented in machine-readable terms that are also readable by humans and proven to be correct with a simple proof¹³.

Describing a Logical System

A **logical system**¹⁴ (logical theory) enables a community of stakeholders trying to achieve a specific goal or objective or a range of goals/objectives to agree on important common models, structures, and statements for capturing meaning or representing a shared understanding of and knowledge in some universe of discourse.

¹⁰ Charles Hoffman, CPA, *Leveraging the Theoretical and Mathematical Underpinnings of a Financial Report*, <http://xbrlsite.azurewebsites.net/2018/Library/TheoreticalAndMathematicalUnderpinningsOfFinancialReport.pdf#page=6>

¹¹ Charles Hoffman, CPA, *General Ledger Trial Balance to External Financial Report*, <http://xbrlsite.azurewebsites.net/2018/RoboticFinance/TrialBalanceToReport.pdf>

¹² Wikipedia, *Accounting Equation*, https://en.wikipedia.org/wiki/Accounting_equation

¹³ Charles Hoffman, CPA, *Accounting Equation*, <http://xbrlsite.azurewebsites.net/2019/Core/master-ae/Documentation.pdf>

¹⁴ Charles Hoffman, CPA, *Understanding and Expressing Logical Systems*, <http://xbrl.squarespace.com/journal/2019/9/25/understanding-and-expressing-logical-systems.html>

A logical system or logical theory is made up of a set of **models, structures, terms, associations, assertions, and facts**. In very simple terms,

- **Logical theory:** A logical theory is a set of *models* that are consistent with that logical theory.
- **Model:** A model is a set of *structures*. A model is an interpretation of a theory.
- **Structure:** A structure is a set of *statements* which describe the structure.
- **Statement:** A statement is a proposition, claim, assertion, belief, idea, or fact about or related to the universe of discourse. There are four broad categories of statements:
 - **Terms:** Terms are statements that define ideas used by the logical theory such as “assets”, “liabilities”, and “equity”.
 - **Associations:** Associations are statements that describe permissible interrelationships between the terms such as “assets is part-of the balance sheet” or “operating expenses is a type-of expense” or “assets = liabilities + equity” or “an asset is a ‘debit’ and is ‘as of’ a specific point in time and is always a monetary numeric value”.
 - **Assertions:** Assertions are statements that describe what tend to be IF...THEN...ELSE types of relationships such as “IF the economic entity is a not-for-profit THEN net assets = assets - liabilities; ELSE assets = liabilities + equity”
 - **Facts:** Facts are statements about the numbers and words that are provided by an economic entity within their financial report. For example, “assets for the consolidated legal entity Microsoft as of June 20, 2017 was \$241,086,000,000 expressed in US dollars and rounded to the nearest millions of dollars.

A logical system can have high to low **precision** and high to low **coverage**. *Precision* is a measure of how precisely the information within a logical system has been represented as contrast to reality for the universe of discourse. *Coverage* is a measure of how completely information in a logical system has been represented relative to the reality for a universe of discourse.

Elements of a Financial Report Defined by SFAC 6

The FASB defines the following ten interrelated elements of a financial report:

- Assets
- Liabilities
- Equity
- Investments by Owners
- Distributions to Owners

- Comprehensive Income
- Revenues
- Expenses
- Gains
- Losses

The FASB uses the analogy of a “photograph” and a “motion picture” to differentiate the two types of elements¹⁵. Three elements that are like a photograph are “assets”, “liabilities” and “equity” and are for a point in time. In XBRL terms, they are instants or “as of” a specific point in time. The others are like “motion pictures”, over a period of time, in XBRL terms they are durations or “for period”.

The FASB explicitly states the components of comprehensive income which include: revenues, expenses, gains, and losses¹⁶.

Note that the balance types, “debit” or “credit”, of each of the ten core elements of a financial statement are not articulated by the FASB. However, professional accountants understand the balance type of the ten elements which are the building blocks of a financial report. As such, these balance types can be implied. However, I am explicitly specifying the balance types explicitly in my XBRL representation which makes this crystal clear.

Note the term “interrelated”. If you read the definitions you can implicitly understand the specific interrelations. The FASB uses the term “articulation” to describe the notion that financial statements are fundamentally interrelated¹⁷. They result in financial statements that are fundamentally interrelated and connected mathematically.

The following two equations articulate the fundamental relationships between all these elements of a financial report defined by the FASB in SFAC 6. First, as the FASB stated;

$$\text{“Comprehensive Income = Revenues - Expenses + Gains - Losses”}$$

The equation above defines the relationship between comprehensive income and its components. The equation below defines the relations between the other concepts and uses the term “Comprehensive Income” as defined above.

$$0 = (\text{Equity}^{\text{T0}} + \text{Revenue}^{\text{P1}} - \text{Expenses}^{\text{P1}} + \text{Gains}^{\text{P1}} - \text{Losses}^{\text{P1}} + \text{InvestmentsByOwners}^{\text{P1}} - \text{DistributionsToOwners}^{\text{P1}}) + \text{Liabilities}^{\text{T1}} - \text{Assets}^{\text{T1}}$$

¹⁵ FASB, SFAC 6, page 21, paragraph 20

¹⁶ FASB, SFAC 6, page 21, paragraph 20

¹⁷ FASB, SFAC 6, page 21 and 22, paragraph 21

And so, using both equations, the relations between each of the concepts is crystal clear as long as you understand the balance type (debit, credit) of each of the core elements.

As such, in more visual terms you have the following:

Shell of a statement of financial position (balance sheet)¹⁸:

Balance Sheet [Abstract]	Period [Axis]	
	2020-12-31	2019-12-31
Balance Sheet [Abstract]		
Assets	3,500	0
Liabilities	0	0
Equity	3,500	0

Shell of a statement of financial performance (comprehensive income statement)¹⁹:

Comprehensive Income Statement [Abstract]	Period [Axis]
	2020-01-01 - 2020-12-31
Comprehensive Income Statement [Abstract]	
Comprehensive Income [Roll Up]	
Revenues	7,000
(Expenses)	(3,000)
Gains	1,000
(Losses)	(2,000)
Comprehensive Income	3,000

Shell of statement of changes in equity:

¹⁸ Human readable rendering of balance sheet, <http://xbrlsite.azurewebsites.net/2019/Core/core-sfac6/evidence-package/contents/index.html#Rendering-BS-Implied.html>

¹⁹ Human readable rendering of comprehensive income statement, <http://xbrlsite.azurewebsites.net/2019/Core/core-sfac6/evidence-package/contents/index.html#Rendering-IS-Implied.html>

Changes in Equity [Abstract]	Period [Axis]
	2020-01-01 - 2020-12-31
Changes in Equity [Abstract]	
Equity [Roll Forward]	
Equity, Beginning	0
Comprehensive Income	3,000
Investments by Owners	1,000
(Distributions to Owners)	(500)
Equity, Ending	3,500

We cannot do a cash flow statement yet because SFAC 6 does not define net cash flow.

The four statement model shows the explicitly created articulation or the interrelationships between the four primary financial statements defined by the FASB. However, since net cash flow is not defined by SFAC 6 we can only represent the interrelationships of three of the four statements: balance sheet, income statement, and changes in equity.

Three of the statements of the four statement model can be seen and understood visually as such:

Balance Sheet [Abstract]	Period [Axis]	
	2020-12-31	2019-12-31
Balance Sheet [Abstract]		
Assets	3,500	0
Liabilities	0	0
Equity	3,500	0

Comprehensive Income Statement [Abstract]	Period [Axis]
	2020-01-01 - 2020-12-31
Comprehensive Income Statement [Abstract]	
Comprehensive Income [Roll Up]	
Revenues	7,000
(Expenses)	(3,000)
Gains	1,000
(Losses)	(2,000)
Comprehensive Income	3,000

Changes in Equity [Abstract]	Period [Axis]
	2020-01-01 - 2020-12-31
Changes in Equity [Abstract]	
Equity [Roll Forward]	
Equity, Beginning	0
Comprehensive Income	3,000
Investments by Owners	1,000
(Distributions to Owners)	(500)
Equity, Ending	3,500

SFAC 6 Logical System Represented Using XBRL

Here is the human-readable and machine-readable logical system that describes the elements of a financial report defined by SFAC 6:

TERMS^{20,21}:

#	Label	Data Type	Period Type	Balance Type	Prefix	Standard label, Documentation, References, Concept name	Count						
1	Assets	Monetary	As Of (instant)	Debit	core	<p><i>Filer label:</i> Assets</p> <p><i>Documentation:</i> Assets are probable future economic benefits obtained or controlled by a particular entity as a result of past transactions or events.</p> <p><i>References:</i></p> <table border="1"> <thead> <tr> <th>Publisher</th> <th>Reference Name</th> <th>Reference Information</th> </tr> </thead> <tbody> <tr> <td>FASB</td> <td>SFAC</td> <td>Paragraph: 25 URIDate: 2019-10-22 URI: https://www.fasb.org/jsp/FASB/Document_C/DocumentPage?cid=1218220132802&acceptedDisclaimer=true Number: 6</td> </tr> </tbody> </table> <p><i>Name:</i> core:Assets</p>	Publisher	Reference Name	Reference Information	FASB	SFAC	Paragraph: 25 URIDate: 2019-10-22 URI: https://www.fasb.org/jsp/FASB/Document_C/DocumentPage?cid=1218220132802&acceptedDisclaimer=true Number: 6	3
Publisher	Reference Name	Reference Information											
FASB	SFAC	Paragraph: 25 URIDate: 2019-10-22 URI: https://www.fasb.org/jsp/FASB/Document_C/DocumentPage?cid=1218220132802&acceptedDisclaimer=true Number: 6											
2	Comprehensive Income	Monetary	For Period (duration)	Credit	core	<p><i>Filer label:</i> Comprehensive Income</p> <p><i>Documentation:</i> Comprehensive income is the change in equity of a business enterprise during a period from transactions and other events and circumstances from nonowner sources. It includes all changes in equity during a period except those resulting from investments by owners and distributions to owners.</p> <p><i>References:</i></p> <table border="1"> <thead> <tr> <th>Publisher</th> <th>Reference Name</th> <th>Reference Information</th> </tr> </thead> <tbody> <tr> <td>FASB</td> <td>SFAC</td> <td>Paragraph: 70 URIDate: 2019-10-22 URI: https://www.fasb.org/jsp/FASB/Document_C/DocumentPage?cid=1218220132802&acceptedDisclaimer=true Number: 6</td> </tr> </tbody> </table> <p><i>Name:</i> core:ComprehensiveIncome</p>	Publisher	Reference Name	Reference Information	FASB	SFAC	Paragraph: 70 URIDate: 2019-10-22 URI: https://www.fasb.org/jsp/FASB/Document_C/DocumentPage?cid=1218220132802&acceptedDisclaimer=true Number: 6	4
Publisher	Reference Name	Reference Information											
FASB	SFAC	Paragraph: 70 URIDate: 2019-10-22 URI: https://www.fasb.org/jsp/FASB/Document_C/DocumentPage?cid=1218220132802&acceptedDisclaimer=true Number: 6											
3	Distributions to Owners	Monetary	For Period (duration)	Debit	core	<p><i>Filer label:</i> Distributions to Owners</p> <p><i>Documentation:</i> Distributions to owners are decreases in equity of a particular business enterprise resulting from transferring assets, rendering services, or incurring liabilities by the enterprise to owners. Distributions to owners decrease ownership interest (or equity) in an enterprise.</p> <p><i>References:</i></p> <table border="1"> <thead> <tr> <th>Publisher</th> <th>Reference Name</th> <th>Reference Information</th> </tr> </thead> <tbody> <tr> <td>FASB</td> <td>SFAC</td> <td>Chapter: Paragraph: 67 URIDate: 2019-10-22 Section: URI: https://www.fasb.org/jsp/FASB/Document_C/DocumentPage?cid=1218220132802&acceptedDisclaimer=true Subparagraph: Number: 6</td> </tr> </tbody> </table> <p><i>Name:</i> core:DistributionsToOwners</p>	Publisher	Reference Name	Reference Information	FASB	SFAC	Chapter: Paragraph: 67 URIDate: 2019-10-22 Section: URI: https://www.fasb.org/jsp/FASB/Document_C/DocumentPage?cid=1218220132802&acceptedDisclaimer=true Subparagraph: Number: 6	3
Publisher	Reference Name	Reference Information											
FASB	SFAC	Chapter: Paragraph: 67 URIDate: 2019-10-22 Section: URI: https://www.fasb.org/jsp/FASB/Document_C/DocumentPage?cid=1218220132802&acceptedDisclaimer=true Subparagraph: Number: 6											
4	Equity	Monetary	As Of (instant)	Credit	core	<p><i>Filer label:</i> Equity</p>	4						

Statements that provide additional information about a term such as labels, references to authoritative literature, properties of the term, etc.²²:

²⁰ Machine-readable terms, <http://xbrlsite.azurewebsites.net/2019/Core/core-sfac6/core.xsd>

²¹ Human-readable terms, <http://xbrlsite.azurewebsites.net/2019/Core/core-sfac6/evidence-package/contents/ReportElements-Concepts.html>

²² Human-readable term, <http://xbrlsite.azurewebsites.net/2019/Core/core-sfac6/term.jpg>

Report Element Properties

Report Standard Label	Assets
Documentation	Assets are probable future economic benefits obtained or controlled by a particular entity as a result of past transactions or events.
Report Element Class	Concept
Prefix (From Taxonomy)	core
Balance Type	Debit
Period Type	As Of (instant)
Data Type	Monetary (xbrli:monetaryItemType)
Name	core:Assets
ID	core_Assets

Labels of Report Element

From	Role	Label	Lang
core	Standard label	Assets	en
core	Period end label	Assets, Ending	en
core	Period start label	Assets, Beginning	en

References of Report Element

Publisher	Reference Name	Reference Information
FASB	SFAC	Paragraph: 25 URIDate: 2019-10-22 URI: https://www.fasb.org/jsp/FASB/Document_C/DocumentPage?cid=1218220132802&acceptedDisclaimer=true Number: 6

ASSOCIATIONS^{23,24}:

#	Label	Report Element Class	Period Type	Balance	Name
1	02-Mathematical Associations Between Elements [Table]				(Implied)
2	<i>Mathematical Associations Defined by FASB [Abstract]</i>	[Abstract]			core:MathematicalAssociationsDefinedByFASBAbstract
3	<i>Elements of Balance Sheet [Set]</i>	[Abstract]			core:ElementsBalanceSheetSet
4	Assets	[Concept] Monetary	As Of	Debit	core:Assets
5	Liabilities	[Concept] Monetary	As Of	Credit	core:Liabilities
6	Equity	[Concept] Monetary	As Of	Credit	core:Equity
7	<i>Elements of Comprehensive Income Defined by FASB [Set]</i>	[Abstract]			core:ElementsComprehensiveIncomeDefinedByFASBSet
8	Revenues	[Concept] Monetary	For Period	Credit	core:Revenues
9	Expenses	[Concept] Monetary	For Period	Debit	core:Expenses
10	Gains	[Concept] Monetary	For Period	Credit	core:Gains
11	Losses	[Concept] Monetary	For Period	Debit	core:Losses
12	Comprehensive Income	[Concept] Monetary	For Period	Credit	core:ComprehensiveIncome
13	<i>Elements of Financial Statements Defined by FASB [Set]</i>	[Abstract]			core:ElementsFinancialStatementsDefinedByFASBSet
14	Assets	[Concept] Monetary	As Of	Debit	core:Assets
15	Liabilities	[Concept] Monetary	As Of	Credit	core:Liabilities
16	Equity	[Concept] Monetary	As Of	Credit	core:Equity
17	Investments by Owners	[Concept] Monetary	For Period	Credit	core:InvestmentsByOwners
18	Distributions to Owners	[Concept] Monetary	For Period	Debit	core:DistributionsToOwners
19	Comprehensive Income	[Concept] Monetary	For Period	Credit	core:ComprehensiveIncome

The graphic above shows one of the sets of associations that document the relations between terms.

²³ Machine-readable associations, <http://xbrlsite.azurewebsites.net/2019/Core/core-sfac6/core-presentation.xml>

²⁴ Human-readable associations, <http://xbrlsite.azurewebsites.net/2019/Core/core-sfac6/evidence-package/contents/index.html#NetworkStructure-AS-Implied.html>

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ASSERTIONS^{25,26}:

ASSERTION_CORE_Equality_AccountingEquation (evaluation 1)	satisfied	$\$Assets=0 = \$Liabilities=0 + \$Equity=0$
ASSERTION_CORE_Equality_AccountingEquation (evaluation 2)	satisfied	$\$Assets=3500 = \$Liabilities=0 + \$Equity=3500$
ASSERTION_Core_ROLLUP_ComprehensiveIncome (evaluation 1)	satisfied	$\$ComprehensiveIncome=3000 = (\$Revenues=7000 + \$Gains=1000 - \$Expenses=3000 - \$Losses=2000)$
ASSERTION_CORE_ROLLFORWARD_Equity (evaluation 1)	satisfied	$\$Equity_BalanceStart=0 + \$ComprehensiveIncome=3000 + \$InvestmentsByOwners=1000 - \$DistributionsToOwners=500 = \$Equity_BalanceEnd=3500$
ASSERTION_CORE_CONCEPTUAL_FRAMEWORK_RECONCILIATION (evaluation 1)	satisfied	$0 = ((\$Equity_BalanceStart=0 + ((\$Revenues=7000 - \$Expenses=3000) + (\$Gains=1000 - \$Losses=2000))) + (\$InvestmentsByOwners=1000 - \$DistributionsToOwners=500)) + (\$Liabilities_BalanceEnd=0 - \$Assets_BalanceEnd=3500))$

The statements above are assertions that are applicable if an economic entity is a for-profit entity.

FACTS^{27,28}:

#	Reporting Entity [Axis]	Period [Axis]	Concept	Fact Value	Unit	Rounding	Parenthetical Explanations
1	GH259400TOMPUOLS65II (http://standards.iso.org/iso/17442)	2020-01-01 - 2020-12-31	Losses	2000	USD	INF	
2	GH259400TOMPUOLS65II (http://standards.iso.org/iso/17442)	2020-01-01 - 2020-12-31	Investments by Owners	1000	USD	INF	
3	GH259400TOMPUOLS65II (http://standards.iso.org/iso/17442)	2020-01-01 - 2020-12-31	Gains	1000	USD	INF	
4	GH259400TOMPUOLS65II (http://standards.iso.org/iso/17442)	2019-12-31	Assets	0	USD	INF	
5	GH259400TOMPUOLS65II (http://standards.iso.org/iso/17442)	2020-12-31	Assets	3500	USD	INF	
6	GH259400TOMPUOLS65II (http://standards.iso.org/iso/17442)	2020-01-01 - 2020-12-31	Revenues	7000	USD	INF	
7	GH259400TOMPUOLS65II (http://standards.iso.org/iso/17442)	2020-12-31	Equity	3500	USD	INF	
8	GH259400TOMPUOLS65II (http://standards.iso.org/iso/17442)	2019-12-31	Equity	0	USD	INF	
9	GH259400TOMPUOLS65II (http://standards.iso.org/iso/17442)	2020-01-01 - 2020-12-31	Comprehensive Income	3000	USD	INF	
10	GH259400TOMPUOLS65II (http://standards.iso.org/iso/17442)	2020-12-31	Liabilities	0	USD	INF	
11	GH259400TOMPUOLS65II (http://standards.iso.org/iso/17442)	2019-12-31	Liabilities	0	USD	INF	
12	GH259400TOMPUOLS65II (http://standards.iso.org/iso/17442)	2020-01-01 - 2020-12-31	Distributions to Owners	500	USD	INF	
13	GH259400TOMPUOLS65II (http://standards.iso.org/iso/17442)	2020-01-01 - 2020-12-31	Expenses	3000	USD	INF	

Facts are statements or the words and numbers reported within a financial report differentiated from one another by their distinguishable aspects.

STRUCTURES^{29,30}:

²⁵ Machine-readable assertions, <http://xbrlsite.azurewebsites.net/2019/Core/core-sfac6/core-formula.xml>

²⁶ Human-readable assertions, <http://xbrlsite.azurewebsites.net/2019/Core/core-sfac6/evidence-package/contents/index.html#BusinessRulesSummary.html>

²⁷ Machine-readable facts, <http://xbrlsite.azurewebsites.net/2019/Core/core-sfac6/instance.xml>

²⁸ Human-readable facts, <http://xbrlsite.azurewebsites.net/2019/Core/core-sfac6/evidence-package/contents/index.html#FactTableSummary.html>

²⁹ Machine-readable structures, <http://xbrlsite.azurewebsites.net/2019/Core/core-sfac6/core-presentation.xml>

³⁰ Human-readable structures, <http://xbrlsite.azurewebsites.net/2019/Core/core-sfac6/evidence-package/contents/index.html#RenderingSummary.html>

Component: (Network and Table)	
Network	06-Changes in Equity (http://www.xbrsite.com/core/role/CE)
Table	(Implied)

Slicers (applies to each fact value in each table cell)

Reporting Entity [Axis]	GH259400TOMPUOLS65II (http://standards.iso.org/iso/17442)
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Changes in Equity [Abstract]	Period [Axis]
	2020-01-01 - 2020-12-31
Changes in Equity [Abstract]	
Equity [Roll Forward]	
Equity, Beginning	0
Comprehensive Income	3,000
Investments by Owners	1,000
(Distributions to Owners)	(500)
Equity, Ending	3,500

The changes in equity structure is distinguishable from, say, the balance sheet structure or the income statement structure.

MODELS:

In this particular logical system, there is only one set of structures and that set of structures is universally applicable to all economic entities. The relation between “assets” and “liabilities” and “equity” is interpreted to be “assets = liabilities + equity”, there is our only interpretation provided for in this logical system.

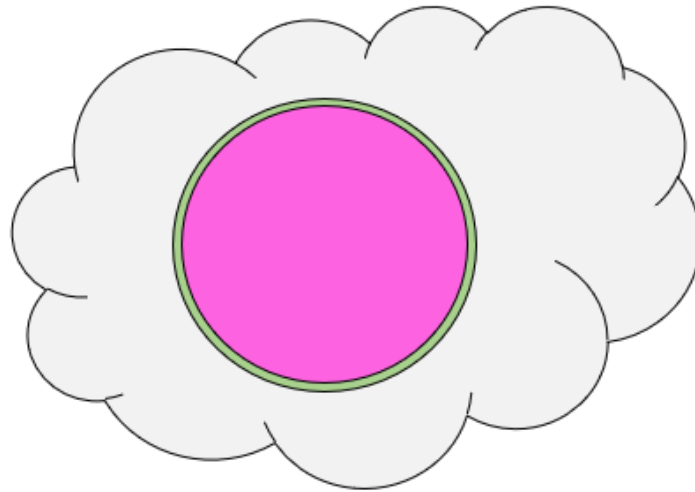
However, SFAS 6 allows for another permissible interpretation: “net assets = assets - liabilities”. But we do not use that second interpretation of the logical theory in this specific logical system of the financial report we are specifying and describing. We use the first permissible interpretation. We could add another structure to represent this permissible interpretation.

PRECISION AND COVERAGE:

The **precision** of the statements made by the models, structures, terms, associations, assertions, and facts in this logical theory or system we are describing is HIGH because the logical system is provably consistent with reality defined by SFAC 6. Further, the **coverage** of the logical system is HIGH because we cannot think of or demonstrate that anything is missing from the system. No important *terms* seem to be missing, no *associations*, no *assertions*, no *models* seem to be causing logical problems such as errors, inconsistencies, contradictions, etc. Therefore, this logical system can be deemed to be **properly functioning**.

Showing this graphically below, the universe of discourse we are concerned with at the moment is only SFAC 6. That is represented by the GREEN circle. Because the logical

representation has high precision, the representation in PINK is essentially the same size as GREEN showing that the coverage is appropriate. The description is precise because no one really can demonstrate or prove that anything in the system is imprecise. Further, the facts reported, the terms used, the assertions, the associations, the structures that make up the model are all consistent with expectations of all stakeholders that are concerned with this system.



High precision, High coverage (Very good)

All important aspects of reality related to some universe of discourse necessarily to achieve some goal or objective or a set of goals/objectives have been represented.

While representing the proof that a smaller logical system such as the accounting equation was properly function is easier to show because that system has only three terms, one assertion, and one structure³¹; as the number of terms, associations, assertions, and structures become increasingly difficult to represent in a small space. As such, software applications can create something like a dashboard that provides a summary of the proof of the logical system and then additional views that show specific details.

Here is a verification dashboard provided by XBRL Cloud in the commercial product that they call their Evidence Package³²: (note that this information can also be provided in machine-readable terms and imported into a software application interface)

³¹ Accounting Equation, page 9, <http://xbrlsite.azurewebsites.net/2019/Core/master-ae/Documentation.pdf>

³² XBRL Cloud, Evidence Package, Verification Dashboard, <http://xbrlsite.azurewebsites.net/2019/Core/core-sfac6/evidence-package/contents/index.html#VerificationDashboard.html>

Component (Network/Table)	Status	Count of Relations	XBRL Technical Syntax Rules	Model Structure Rules	Business Rules ^(a)	Roll Up Rules ^(b)	Other Manual Review Tasks	Other Rules and Best Practice Tasks
01-Elements of Financial Statement Defined by SFAC 6	Completed	11	OK	OK	OK	OK	OK	OK
02-Mathematical Associations Between Elements	Completed	18	OK	OK	OK	OK	OK	OK
03-Balance Sheet Elements	Completed	4	OK	OK	OK	OK	OK	OK
04-Comprehensive Income Statement Elements	Completed	7	OK	OK	OK	OK	OK	OK
06-Changes in Equity	Completed	7	OK	OK	OK	OK	OK	OK
(Component not specified)	Completed	0	OK	OK	OK	OK	OK	OK

The details of each structure, term, association, assertion can be viewed within an interface that is autogenerated by validation software³³.

Variability Caused by Alternative Intermediate Components

While financial reports must fit within the elements of a financial report defined by a financial reporting scheme; financial reports are not forms. Specific variability is anticipated and allowed by financial reporting schemes such as US GAAP, IFRS, IPSAS, GAS, FAS, etc.³⁴ By far, the most variability that exists within a set of financial statements exists on the income statement. SFAS 6 discusses the notion of intermediate components³⁵ of comprehensive income:

“Examples of intermediate components in business enterprises are gross margin, income from continuing operations before taxes, income from continuing operations, and operating income. Those intermediate components are, in effect, subtotals of comprehensive income and often of one another in the sense that they can be combined with each other or with the basic components to obtain other intermediate measures of comprehensive income.”

Variability can be caused by choosing to report different common subtotals, by choosing to report specific line items rather than others, by either providing or not providing a subtotal such as “Noncurrent assets”, etc. This variability is not random, arbitrary, or illogical; there are common patterns.

³³ XBRL Cloud Evidence Package, <http://xbrlsite.azurewebsites.net/2019/Core/core-sfac6/evidence-package/contents/index.html#Rendering-Core-Implied.html>

³⁴ Charles Hoffman, CPA, *Comparison of Elements of Financial Statements*, <http://xbrlsite.azurewebsites.net/2019/Core/ElementsOfFinancialStatements.pdf>

³⁵ FASB, SFAC 6, page 47, paragraph 77.

Here are common examples of variability using the accounting equation terms, association, and facts:

- **Add new term:** As mentioned, the term “Net Assets” is not provided in this model but is a permissible alternative to the term “Equity” for specific industries with which an economic entity is associated.
- **Add new association:** If a new term such as “Net Assets” is created, then a new association will always be necessary to relate the new term within some a structure to existing terms.
- **Change existing association:** If an existing association exists such as the association of “Equity” to “Balance Sheet”; it is possible to change that existing association and replace it with another permissible association.
- **Add new assertion:** If a new term is created it is likely that a new assertion will also tend to be necessary. For example, if the term “Net Assets” is created, the new assertion “Net Assets = Assets + Liabilities” would be created.
- **Change existing assertion:** Usually, existing assertions would not be changed but rather the existing assertion would not be used and would be replace by some other permissible assertion.
- **Add new structure:** An economic entity could decide to add an entirely new additional disclosure, creating a new structure that is used to articulate the associations between the terms that make up the new structure.
- **Change existing structure:** An economic entity could choose to modify the associations within an existing structure to provide a different but still permissible alternative disclosure.
- **Unreported fact:** An economic entity could choose to modify an existing structure to remove an association that provided an optional subtotal term and if so then the fact used to report that optional subtotal would not be provided within a report.

Note that “Change existing term” is not included in the list because it is never permissible to change the meaning of an existing term.

And so, the variability caused by these sorts of adjustments to some base model of a financial report must be managed and controlled in order be certain that the adjusted version of the model is still a permissible interpretation of a financial report and that the report is properly functioning.

All XBRL Reports Work this Same Way

Every XBRL-based financial report submitted to the SEC works exactly the same way as the accounting equation example³⁶ and the elements of financial statement example³⁷. It is just that those other reports have different and more terms, associations, assertions, facts, and structures. This can be seen by looking at the next layer of complexity, the common elements and structures of a financial report³⁸.

³⁶ *Accounting Equation*, <http://xbrlsite.azurewebsites.net/2019/Core/master-ae/Documentation.pdf>

³⁷ *Elements of Financial Statements defined by FASB in SFAC 6*, <http://xbrlsite.azurewebsites.net/2019/Core/core-sfac6/>

³⁸ *Common Elements of a Financial Report (Master)*, <http://xbrlsite.azurewebsites.net/2019/Core/master-elements/>