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### **Conserved Value Based Accounting Principles** Removing Chaotic Fluctuations from Financial Statements

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FOR SUBMISSION**

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## **RESUMEN DE LA THESIS DOCTORAL**

La reciente crisis financiera ha despertado un debate generalizado sobre el sistema financiero internacional y los motivos de la aparición de la crisis económica global. Aunque con anterioridad a la introducción de la Contabilidad del Valor Razonable (FVA son sus siglas en inglés), ya se habían producido burbujas y crisis financieras, muchos académicos y profesionales creen que la introducción y aplicación de la FVA tuvo, al menos, parte de la responsabilidad en la crisis actual. Sin embargo, otros le atribuyen toda la responsabilidad. Quienes defienden el uso del valor razonable suelen hacerlo por considerarlo más relevante que el coste histórico. No obstante, el valor razonable, en el sentido de los precios de mercado actuales, muestra un fenómeno llamado caos matemático, que provoca una nueva serie de problemas para los usuarios de la información contable. El objetivo de esta tesis es desarrollar unos principios contables que eliminen de los estados financieros las caóticas fluctuaciones antes mencionadas.

**PREFACE**

This dissertation is the result of the research conducted as part of Prof. Dr. Michael Grabinski's project group "Chaos in langen Planungsketten" at the Neu-Ulm University of Applied Sciences funded by the Bavarian Ministry of Science. I would like to take this opportunity to thank Professor Grabinski not only for inviting me to join the Finance and Economics team of his project but also for his support and encouragement throughout the entire process. I would also like to thank him for his invaluable advice and continuous guidance as well as his seemingly endless patience with me.

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**LIST OF ABBREVIATIONS**

A/P	Accounts Payable
A/R	Accounts Receivable
Bn	Billion
Bps	Basis Points, Bips
BS	Balance Sheet
CCC	Cash Conversion Cycle
CEO	Chief Executive Officer
CFS	Cash Flow Statement
CoGS	Cost of Goods Sold
CPI	Consumer Price Index
CVBAP	Conserved Value Based Accounting Principles
EU	European Union
FAS	Statement of Financial Accounting Standards
FASB	Financial Accounting Standards Board
FIFO	First In, First Out

## List of Abbreviations

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FTT	Financial Transaction Tax
FV	Fair Value
FVA	Fair Value Accounting
GAAP	Generally Accepted Accounting Principles
GDP	Gross Domestic Product
GmbH	Gesellschaft mit beschränkter Haftung
HC	Historical Cost
HFT	High Frequency Trading
IFRS	International Financial Reporting Standards
IRS	Internal Revenue Service
IT	Information Technology
LCM	Lower of Cost and Market
LIFO	Last In, First Out
OTC	Over The Counter
PnL	Profit and Loss (Statement)
PP&E	Property, Plant, and Equipment
R/E	Retained Earnings

## List of Abbreviations

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SDIC	Sensitive Dependence on Initial Conditions
SE	Societas Europaea
UK	United Kingdom
US	United States
VAT	Value-Added Tax
Y	Year

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**CHAPTER I****SUMMARY<sup>1</sup>****1 Antecedentes**

La reciente crisis financiera ha despertado un debate generalizado sobre el sistema financiero internacional y los motivos de la aparición de la crisis económica global. Aunque con anterioridad a la introducción de la Contabilidad del Valor Razonable (FVA son sus siglas en inglés), ya se habían producido burbujas y crisis financieras, muchos académicos y profesionales creen que la introducción y aplicación de la FVA tuvo, al menos, parte de la responsabilidad en la crisis actual (cf. Magnan 2009, Laux and Leuz 2009b, Enria et al. 2004, Wallison 2008b). Sin embargo, otros le atribuyen toda la responsabilidad.

Quienes defienden el uso del valor razonable suelen hacerlo por considerarlo más relevante que el coste histórico. Esto es así porque, en general, el coste histórico no refleja los cambios que puedan darse con el paso del tiempo en el valor de un activo o de un pasivo y por consiguiente, se considera una previsión menos relevante del futuro rendimiento de la entidad informante.

No obstante, el valor razonable, en el sentido de los precios de mercado actuales, muestra un fenómeno llamado caos matemático, que provoca una nueva serie de problemas para los usuarios de la información contable. Debido a la caótica fluctuación de los precios de mercado, los balances basados en los precios de mercado también fluctuarán caóticamente, es decir, imprevisiblemente. Si asumimos que la contabilidad se limita a retratar la realidad, esto no supondría un problema grave. Una sociedad va bien (o no) independientemente de las cifras contables. Aunque no es tan sencillo como eso. La gente actúa en función de estas cifras contables. Además, la contabilidad influye también en sus

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<sup>1</sup> This chapter was translated from English to Spanish by a translator.

## Summary

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decisiones de involucrarse en la empresa y en la gestión de los beneficios de la sociedad informante. Por consiguiente, la introducción de los precios de mercado en la contabilidad hace que esta sea imprevisible. También provoca inestabilidad en otras áreas, por no hablar de la pérdida de utilidad de los estados financieros para la toma de decisiones.

Es sabido que el precio y el valor son conceptos distintos. Adam Smith, en su libro *La riqueza de las naciones* (1776), resaltó la diferencia entre valor de uso y valor de cambio. Casi un siglo antes, otros pensadores como Barbon (1696) y Locke (1691) habían debatido también esta diferencia. La importancia de este tema se ha mantenido a lo largo de los siglos. En la actualidad se alude frecuentemente a la famosa cita de Warren Buffet (2009, cf. CAPÍTULO III4). Appel (2012) marca la diferencia entre los términos e introduce una definición factible para estimar lo que él denomina Valor Funcional.

Fama fue galardonado con el Premio Nobel de Economía en el 2013 por su investigación sobre la imprevisibilidad a corto plazo del rendimiento de las acciones. Shiller, por otra parte, recibió el Premio Nobel el mismo año por su investigación sobre la previsibilidad a largo plazo del rendimiento de las acciones. A primera vista puede parecer contradictorio: la evolución a largo plazo de las acciones está vinculada a la evolución financiera de la sociedad emisora. Pero los precios a corto plazo están sujetos a la especulación y a la consideración de los inversores (cf. por ej. Hirshleifer y Shumway 2003). No obstante, a largo plazo explotan las burbujas y los resultados financieros reales de la sociedad hunden el precio de las acciones. Aunque, mientras tanto, la rentabilidad fluctúa caóticamente.

En el ámbito de la contabilidad, Hills (1996) confirma la dependencia del flujo de caja operativo de una compleja red de flujos entre sociedades. Debido a la retroalimentación, por ejemplo los retrasos provocados por el intento de las sociedades de optimizar su flujo de caja, pueden desembocar en unos modelos caóticos. De igual modo, Tse y Robb (1994) afirmaron que el origen del comportamiento caótico en los costes se debe a unos ciclos de retroalimentación complejos. Etheridge y Sriram (1993) y Priesmeyer y Baik (1989) van aún más lejos y sugieren el uso del conocimiento de la teoría

## Summary

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del caos en el análisis de otra serie de indicadores financieros. Lindsay y Campbell (1996), por ejemplo, declaran que el análisis de las cotizaciones de los títulos y el nivel de caos en los rendimientos son un indicador útil para la previsión de quiebras. Taniguchi et al. (2008) identifican una cantidad casi semiconservadora (cf. CAPÍTULO III3) a la que llaman energía en la economía y afirman que los cambios en esta variable indican burbujas y convulsiones externas.

Grabinski (2007), Appel et al. (2012), Appel (2012), y Appel y Grabinski (2011) plantean el problema de una manera distinta. Identifican las cantidades conservadoras del valor pero no como un indicador, sino más bien como un elemento para sacar provecho de sus características, por ejemplo la capacidad de prever y planificar sin la intromisión del caos. Appel y Grabinski aplican este planteamiento a la sempiterna cuestión de la definición del valor, cuya importancia no se reduce únicamente al contexto de la contabilidad según el valor razonable.

## 2 Objetivos

El objetivo de esta tesis es desarrollar unos principios contables que eliminen de los estados financieros las caóticas fluctuaciones antes mencionadas. Para ello se utiliza la medición basada en cantidades que conservan el valor, en contraposición a las opciones actuales de medición del valor, por ejemplo el coste histórico y las mediciones basadas en el mercado. El autor sugiere una forma de valorar distinta, basada en el Valor Funcional tal como lo definen Appel y Grabinski (2011) y Appel (2012), como medición primaria alternativa. Concretamente, en esta tesis se plantean las siguientes preguntas:

- ¿Qué es el caos y por qué causa problemas (en los negocios)?
- ¿Qué es una cantidad conservadora del valor y cómo podemos reconocerla?

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- ¿Cuál es la diferencia entre los supuestos y los objetivos de contabilidad de los PCGA y los de los Principios Contables Basados en Cantidades que Conserven su Valor (CVBAP, por sus siglas en inglés)?
- ¿Cuál es el tratamiento de los CVBAP para el Balance y el Estado de Pérdidas y Ganancias?
- ¿Cómo clasifica y presenta los CVBAP el flujo de caja?
- ¿Cómo son los Estados Financieros de los CVBAP?
- ¿Cómo puede utilizarse el concepto de Valor Funcional en la legislación fiscal?

### **3 Metodología**

Esta tesis desarrolla una nueva serie de Principios Contables basados en Cantidades que Conserven su Valor (CVBAP). En primer lugar, el CAPÍTULO III presenta los antecedentes necesarios sobre la contabilidad y la necesidad de la valoración en la información financiera. Para entender las cuestiones relacionadas con el valor razonable, se facilitan algunas referencias al caos, a las cantidades que conservan valor, y por último, al Valor Funcional. En el CAPÍTULO IV se examinan los PCGA actuales y se analizan los objetivos y las características deseadas de la contabilidad y de la información contable. Después de esta información preliminar, el CAPÍTULO V presenta los Principios Contables Basados en Cantidades que Conservan su Valor. En primer lugar se desarrolla la teoría de los principios y a continuación se ilustran con ejemplos. Por último, en el CAPÍTULO VI, se aplican los CVBAP en los estados financieros de Porsche SE.

## 4 Conclusiones

El caos es un problema fundamental en muchas áreas de negocio ya que imposibilita la previsión con un cierto grado de rigor. Esto provoca también problemas en la contabilidad debido a que el papel de los estados financieros ha evolucionado desde una mera herramienta de documentación a un método de información y comunicación para prever el futuro rendimiento de la entidad informante. El comportamiento caótico de las variables, y como tal impredecibles, reduce claramente, por no decir debilita completamente, la utilidad de dicha información. Para alcanzar el principal objetivo deseado (en la NIIF y en los PCGA) de utilidad de la decisión, la contabilidad necesita por tanto utilizar variables que no se muevan caóticamente. El Valor Funcional es una forma de valorar las diferentes partidas de los Estados Contables que satisface también las otras características deseadas de las cifras contables: relevancia, fiabilidad, prudencia y equiparación.

El Valor Funcional es una cantidad que conserva el valor dado que, el Valor Funcional total en un determinado sistema se mantiene constante salvo que se produzca un cambio con el exterior. Puesto que, las sociedades normalmente interactúan con entidades externas, es mejor incluir a todas las partes implicadas como parte del sistema observado. Si nos limitamos a examinar una sola sociedad, el Valor Funcional parece haber sido “creado” de la nada cuando se cierra una transacción especulativa y la sociedad recibe dinero en efectivo. Si miramos la transacción en su totalidad, veremos que el Valor Funcional fue transferido por otra entidad cuando el Valor Funcional estaba supuestamente “destruido”. Los CVBAP deben ser capaces de representar correctamente este tipo de transacción al igual que cualquier otra transacción. Los CVBAP deben también ofrecer a los lectores información sobre los precios actuales de mercado y/o sobre las cifras comparables de los PCGA ya que los precios pueden variar del Valor Funcional durante cierto tiempo, y los precios, especialmente para los activos y pasivos circulantes, son información relevante.

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Esta aparente doble contabilidad se consigue con la ayuda de un sistema de contracuentas y una cuenta de reserva para participaciones que muestra la participación en riesgo cuando los precios retoman el Valor Funcional. Existen otras cuentas de ajuste para cada partida de la cuenta de pérdidas y ganancias destinadas al ajuste de las cifras del valor razonable a los Valores Funcionales. Los ajustes reclasifican la diferencia entre los importes del valor razonable y del Valor Funcional en un ajuste fijo fuera de balance, lo que explica la diferencia entre los ingresos según los CVBAP y los ingresos según los PGCA tradicionales. El estado de cuenta del flujo de caja funciona de una manera parecida en cada una de las categorías del flujo de caja. La cuenta de efectivo, a diferencia de las otras cuentas del Balance y de las Cuentas de Pérdidas y Ganancias, no puede clasificarse como Valor Funcional ya que el efectivo es canjeable. Para solucionar este problema, los CVBAP utilizan el conocido método de la media ponderada de la valoración de las existencias. Todos los flujos de caja se asignan a un flujo de caja conservador y no conservador proporcionalmente a la transacción que ha generado el flujo de caja. Debido a esta dificultad, deberá registrarse la información adicional sobre las transacciones subyacentes de cobros y pagos.

Debida a la naturaleza más compleja de las cuentas de participaciones en los CVBAP, las declaraciones de cambios en las participaciones de los propietarios es una parte importante de cualquier informe financiero elaborado según los CVBAP. Los principales cambios en la reserva para participaciones atribuibles a grandes transacciones o a partidas individuales del balance, son presentados por separado ya que representan un gran riesgo para la sociedad.

Por último, los Anexos a los Estados Financieros deben proporcionar información adicional a los lectores, al igual que en los PGCA tradicionales. Debe presentarse y discutirse la base para las estimaciones y deben desvelarse las principales fuentes de incertidumbre en estas estimaciones.

Con la aplicación de estos principios en Porsche SE se elimina la exorbitante fluctuación de las cifras de los ingresos. El elevado riesgo que asumió Porsche SE en el

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2008, y que desembocó en una pérdida de cuatro mil millones en el 2009, no sorprende en absoluto si examinamos sus Estados Financieros de 2008 pero queda perfectamente enmarcado en el intervalo de participación en riesgo a finales del ejercicio financiero 2008. Aunque Porsche logró sobrevivir (con la ayuda de Volkswagen), muchos bancos quebraron o tuvieron que ser rescatados cuando se enfrentaron a problemas parecidos durante la última crisis financiera. Los CVBAP realzan claramente este comportamiento de riesgo, y con la ayuda de una normativa adecuada, pueden disuadirlo.

Los gobiernos diseñan impuestos por dos razones: para recaudar dinero y para influir en el comportamiento. El concepto del Valor Funcional puede utilizarse de ambas maneras: para estabilizar los impuestos sobre la renta y hacer que sean más predecibles, y para contener la curva de la especulación y reducir la diferencia entre el valor razonable y el Valor Funcional.

## CHAPTER II

### INTRODUCTION

#### 1 Background

The recent financial crisis has given rise to an extensive discussion about the global financial system as well as the reasons for the global crisis. Although there have been bubbles and financial crises before Fair Value Accounting (FVA), many academics and practitioners believe that the introduction and application of FVA was (at least) partially to blame (cf. Magnan 2009, Laux and Leuz 2009b, Enria et al. 2004, Wallison 2008b) although some hypothesize that it has caused the financial crisis. Even if FVA accounting has not caused the crisis, but has facilitated both the creation of a bubble and the subsequent downward spiral, the current development in accounting standard setting (in US GAAP and IFRS, cf. the introduction of IFRS 13 and FAS 157, Ball 2006, Bertoni et.al 2005, and Madray 2008) to increase the importance of fair value as a measurement basis should be reexamined.

In recent years, various accounting systems (such as International Financial Reporting Standards (IFRS) and US Generally Accepted Accounting Priniples (US GAAP)) have started to move away from historical cost as the preferred measurement basis and towards the use of the fair value (FV). The International Accounting Standards Board (IASB) and Financial Accounting Standards Board (FASB) define fair value as the exit price of an asset to be sold or a liability to be settled in the market in an "orderly transaction" between independent parties (FAS 157.5 and FAS 157.10 as well as IFRS 13.9).

People in favor of the use of FV tend to defend it because it is more relevant than historical cost. In particular, historical cost does not reflect any current changes to the

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value of an asset or a liability and thus is deemed less relevant to forecasting the future performance of the reporting entity (cf. for example Penman 2007).

Fair value – in the sense of current market prices – however shows a phenomenon called mathematical chaos, which causes a new set of problems for the users of accounting information. As market prices fluctuate chaotically, balance sheets based on market prices will also fluctuate chaotically, i.e. unpredictably. In a way the stock market gets detached from economic (not financial) reality. Introducing market prices to financial reports consequently can result in balance sheets that do not reflect what the German media termed the “Realwirtschaft” (real economy) and become unpredictable in nature.<sup>2</sup> Assuming that accounting were just a way of reporting the current state of reality, this would not be a major problem. A company is doing well (or not) irrespective of the accounting numbers (as can be seen by the fact that accounting figures differ considerably depending on the accounting rules applied)<sup>3</sup>. Nevertheless, it is not quite as simple as that. People act based on the accounting numbers (the very objective of financial reporting as stated by the FASB and IASB) and regulations and tax accounting are typically based on the reported figures of the prevailing accounting system (though details might differ). Further, accounting also influences the choices of people in the reporting company, as they engage in balance sheet and earnings management (the author is not referring to any illegal manipulation of financial reports in this case but rather to legal choices given by the current standards). Thus introducing market prices into accounting, making it unpredictable, also introduces unpredictability into other areas not to mention hampering the usefulness of financial reporting in decision-making.

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<sup>2</sup> Though the real economy and the financial economy are related in each transaction, the balance sheet reporting about these transactions could be misleading. For example, a balance sheet with Volkswagen stock during the squeeze would move up and down rapidly within a few days without any real corresponding world changes.

<sup>3</sup> Deutsche Telekom published comparative figures for the financial years 2003 and 2004. E.g. for the year 2004 they reported net income of €4.6 bn and €1.6 bn under German GAAP and IFRS, respectively. Equity was €37.9 bn and €45.9 bn respectively, showing clearly the dependence of the reported figures on the reporting rules (Deutsche Telekom (2005)).

## Introduction

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The reason behind this problem is a misinterpretation of the three distinct concepts of cost, price, and value(-in-use)<sup>4</sup>. In most areas this is not a problem as they are similar. The value for cost and price are typically linked in the free market, and value is linked to price, as people tend to be willing to pay a price similar to the expected value. Currently all accounting systems assume that we are in this normal range. This is not always the case though. The following two examples highlight cases when this is not the case; one is growing wheat or roses in Antarctica. There is no market for it and thus the price would be zero while the cost would be tremendously high. As there is no application, the value-in-use would also be zero. Secondly, we look at a theoretical stock with a very high P/E ratio – say 1,000,000 – because of an expected higher price tomorrow, but without being based on real business to the same extent (similar to the overvalued companies during bubbles, when investors are not only speculating on future company income but the rising stock prices). It has no (very little) value, but a very high price and cost today. This example shows that the disconnect between the three is easier when there is no physical object associated with it (though it is by no means limited to this scenario). It is easy when all three variables have a similar value, however if cost and price are not similar, it is not a huge problem for accounting. This scenario is caused by lack of a free market for the asset (e.g. items sold with a large profit margin due to a monopoly)<sup>5</sup>. As long as there is no sudden change (e.g. in regulations) there is no accounting problem. However, if price and value are not similar there is a severe problem as value is estimated with market prices.

The fact that price and value are different concepts is common knowledge. Adam Smith, in his work *The Wealth of Nations* (1776), distinguished between value-in-use and value-in-exchange. Nearly a century earlier, other thinkers such as Barbon (1696) and Locke (1691) had discussed the distinction as well. Throughout the centuries, this topic remained relevant. Today it is the famous quote by Warren Buffet (2009, cf. CHAPTER III4) that is oft-quoted. Appel (2012) does not only distinguish between the terms but also introduced a workable definition to estimate what he termed Functional Value.

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<sup>4</sup> For this discussion, value is not used in the financial economic and accounting sense of “market price” but rather more as intrinsic value or value-in-use.

<sup>5</sup> Microeconomics teach us that in an ideal market, price and cost are the same in equilibrium

Fama was awarded the 2013 Nobel Prize in Economics for his research on the short-term unpredictability of stock returns. Shiller, on the other hand, received the Nobel Prize in the same year for his research on the long-term predictability of stock returns. At first glance, this may seem contradictory: The long-term development of stocks is linked to the financial development of the issuing company. Short-term prices, though, are subject to speculation and investor sentiment (cf. e.g. Hirshleifer and Shumway 2003). In the long run, however, bubbles burst, and the actual financial performance of the company grounds the stock price. In the meantime, though, the returns fluctuate chaotically.

With this information about chaotic i.e. unpredictable behavior (cf. Baumol 1985, 1987) of market prices, the question arises as to how to deal with the problem. Researchers in various fields have investigated this problem in their field. Filipe et al. (2010) point out the problems of chaotic behavior of ecological systems and fisheries in particular. Because of the problem of predicting stock chaotic behavior has to be considered when setting fishing regulations to avoid extinction. Hibbert and Wilkinson (1994) as well as Diamond (1993) find chaos also relevant to marketing and the unpredictability of sales figures. Butler (1989) points out the problem of chaos in economic data; he suggests using the (mathematical) tools of chaos theory to reexamine economic models. Cartwright (1991) points out the impossibility of forecasting in chaotic situations and suggests the use of sensitivity analysis to deal with the problem.

There has also been research into the role of chaos in accounting. Hill (1996) finds operating cash flow to be dependent on a complex web of flows among companies. Because of the feedback, i.e., delays caused by companies trying to optimize their cash flow, chaotic patterns can evolve. Similarly, Tse and Robb (1994) find chaotic behavior in cost, because of complex feedback loops. Etheridge and Sriram (1993) and Priesmeyer and Baik (1989) go even further and suggest the use of insights from chaos theory in analyzing other financial time series. Lindsay and Campbell (1996) for example find the analysis of security prices and the level of chaos in the returns to be a useful indicator in forecasting bankruptcies. Taniguchi et al. (2008) identify a quasi-conserved quantity (cf. CHAPTER

III3) they call energy in the economy and find changes in this variable to indicate bubbles and external shocks.

Grabinski (2007), Appel et al. (2012), Appel (2012), and Appel and Grabinski (2011) approach the problem differently. They identify conserved quantities, not, however, as an indicator, but rather to exploit their characteristics, i.e., the ability to forecast and plan without chaos interfering. Appel and Grabinski apply this approach to the long-standing question of the definition of value, which is not only important in the context of fair value accounting.

## **2 Objectives and Methodology**

The objective of this thesis is to develop accounting principles that remove the above-mentioned chaotic fluctuations from financial reports. In order to achieve that, measurement based on conserved quantities, as opposed to the current choice of measurement of value, i.e., historical cost and market-based measures, is used. The author suggests a different measurement, Functional Value as defined in Appel and Grabinski (2011) and Appel (2012), as an alternative primary measurement basis. As the valuation and thus the balance sheet changes, there will also need to be a change in the derived income statement as well as cash flow statement (CFS) consistent with the balance sheet. The current accounting treatment is used to derive CVBAP treatment of the same transaction. The impact on the different parts of the financial statements is explored in examples first and then the insights are used to analyze important items presented in detail in comparison to current accounting treatment. The insights are then used to create the CVBAP financial statements for Porsche SE.

In particular, the following questions will be addressed in this thesis:

- What is chaos, and why does it cause problems (in business)?

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- What is a conserved quantity, and how do we recognize it?
- How do assumptions and goals of accounting differ between conventional GAAP and Conserved Value Based Accounting Pinciples (CVBAP)?
- What is the CVBAP treatment of important balance sheet and income statement positions?
- How do CVBAP classify and report cash flow?
- What do CVBAP financial reports look like?
- How can the concept of Functional Value be used in tax legislation?

As there are no Functional Values publicly available for either traded or privately held companies this research takes the form of a gedankenexperiment.

The thesis is structured as follows:

CHAPTER III provides the necessary background on accounting and the need for valuation in financial reporting. In order to understand the issues with fair value, some background on chaos, conserved quantities, and finally Functional Value is presented.

CHAPTER IV provides information about current GAAP, its value definition as well as the assumptions and goals underlying the financial reporting and the current rules.

CHAPTER V introduces Conserved Value Based Accounting Principles. Assumptions, goals, and then accounting for selected balance sheet and income statement items are presented.

CHAPTER VI uses CVBAP presented in the previous chapter to analyze the financial report of Porsche SE.

CHAPTER VII is an excursus exploring the consequences of CVBAP to taxation and the potential of reducing speculation by using CVBAP.

CHAPTER VIII concludes this thesis with an outlook on future research.

### **3 Conclusions**

Chaos is a fundamental problem in many business areas, as it makes forecasting, with any degree of accuracy, impossible. This also causes problems in accounting, as the role of financial reporting has evolved from a pure documentation tool into a method of communicating information to forecast the future performance of a reporting entity. Chaotic behavior of variables, by definition unpredictable, clearly limits if not completely undermines the usefulness of such information. To fulfill the highest stated goal (in IFRS and US GAAP) of decision-usefulness, accounting therefore needs to utilize variables that cannot move chaotically. Functional Value is a variable that also fulfills the other desired characteristics of accounting figures: relevance, reliability, prudence, and comparability.

Functional Value is a conserved quantity, i.e., the total Functional Value in an observed system remains constant unless there is an exchange with the outside. As companies regularly interact with outside entities, it is better to include all involved parties as part of the observed system. When just looking at one company, Functional Value seems to be “created” out of nothing when a speculative transaction is closed and the company receives cash. Looking at the whole transaction, though, reveals that the Functional Value was transferred from another entity where Functional Value was seemingly “destroyed”. CVBAP have to be able to correctly represent such a transaction just as any other transaction. CVBAP also have to provide readers with information about current market prices and/or comparable GAAP numbers, as prices can differ from Functional Value for quite some time, and thus prices, particularly for current assets and liabilities, are relevant information.

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This apparent double accounting is realized through a system of contra accounts and an equity reserve account that is showing the equity at risk when prices revert to Functional Value. There are additional adjustment accounts for the income statement for each line item to adjust fair value numbers to Functional Values. The adjustments reclassify the difference between fair value and Functional Value amounts into a below-the-line lump sum adjustment, explaining the difference between CVBAP income and traditional GAAP income. The cash flow statement works in a similar way in each of the three cash flow categories. Cash, unlike balance sheet and profit and loss (PnL) accounts, cannot be categorized into Functional Value and other, though, as cash is fungible. CVBAP use the weighted average method known from inventory valuation to overcome this problem. Each cash flow is assigned to conserved and non-conserved cash flow in the same proportion as the transaction that caused the cash flow. Because of this difficulty, additional information has to be recorded about the underlying transactions of receivables and payables.

Due to the more complex nature of the equity accounts in CVBAP, the statement of changes in owners' equity is an important part of any CVBAP financial report. Major changes to the equity reserve that can be attributed to large transactions or single balance sheet items are presented separately, as they represent a large risk to the company.

Finally, the notes to the financial statements have to provide additional information to the readers, just as in conventional GAAP. The basis for the estimates has to be presented and discussed, and major sources of uncertainty in these estimates disclosed.

When applying these principles to Porsche SE, the immense fluctuation is removed from the income numbers. The high risk Porsche was taking in 2008 that resulted in a four billion (bn) loss in 2009, does not come as a surprise when looking at the 2008 financial statement but is well within the range of equity at risk at the end of the 2008 financial year. While Porsche survived (with the help of Volkswagen), many banks either failed or needed to be bailed out when faced with similar problems during the last financial crisis. CVBAP

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clearly highlight such risky behavior, and with appropriate regulation, can help discourage it.

Governments impose taxes for two reasons: to raise money and to influence behavior. The concept of Functional Value can be used in both ways: to stabilize tax revenue and make it more predictable and to curb speculation to reduce the gap between fair value and Functional Value.

## CHAPTER III

### THEORY

#### 1 Accounting

Accounting and bookkeeping were developed in Italy in the Middle Ages (cf. Lee 1977). At the end of the 15<sup>th</sup> century Luca Pacioli documented the state of the art in accounting at the time and is thus considered the founding father of accounting (cf. Willekens and Lauwers 1994). At the time, Italian merchants used double entry bookkeeping, though regular closing of accounts was uncommon. The objective was to keep track of many complex transactions and to provide information to the merchant. This can still be seen in the terms “debit” and “credit”, to owe and to trust (in Latin). Though business transactions have become more complicated the mechanics of bookkeeping are the same today; however, the focus of discussion has moved. Simon (1898), though over 100 years ago, mentions one of the topics still debated in accounting today, i.e. how to measure assets and liabilities. Simon (and Bieg 2006) also mentions the implications of different measurement bases for the usefulness of the numbers to different groups of users. While German GAAP has creditor protection as one of the main concepts in accounting, other GAAP do not outright favor some user groups over others. With the changing role of accounting, academics and professionals alike also consider (and discuss) the role of accounting in today’s business world and the economy, the choice of accounting treatment and valuation has gained a much larger impact than the mere recording of business transactions in the Middle Ages and Renaissance.

Valuation, as the word suggests implies the measurement of value. Value though, is a difficult concept and hard to measure. First, the measurement unit of value is a currency. Currencies however, in comparison to other currencies and over time do not have a constant value (easily seen when comparing prices from 100 years ago with current prices). Furthermore, though price, cost, and value are distinct, all have the same measurement unit.

Secondly, it is hard to define value. Mostly in accounting, the idea of fair value is considered an appropriate measure of value (cf. FAS 157 and IFRS 13). Fair value relies on market prices in many instances. Market prices however can fluctuate chaotically.

## 2 Chaos

The word chaos stems from the Greek version of the word describing the state before the creation of the universe in Greek mythology. Today the word is generally used to mean disorder. However, chaos also describes a mathematical property. The Oxford Dictionary (2010) defines chaos (in the mathematical sense) as follows:

*"[T]he property of a complex system whose behaviour is so unpredictable as to appear random, owing to great sensitivity to small changes in [initial] conditions".*

The characteristic of a system to be highly sensitive to small changes in input variables is also called sensitive dependence on initial conditions (SDIC, cf. Peters 1996). This characteristic is the cause of the inability to forecast chaotic systems long-term, even if (which is not always the case) the deterministic model is known. A well-known example is the inability to forecast weather long-term. The deterministic relationship between the input variables and the output (the weather) is known, but small changes in the initial conditions, as small as the impact of the beating of a butterfly wing, can lead to completely different forecasts long-term. Hence, this phenomenon is commonly known as the butterfly or butterfly-wing effect (cf. Lorenz 1972).

Besides the knowledge to recognize chaotic systems, one also needs strategies to deal with them. While it is possible to live without long-term weather forecasts, it is not possible (or advisable) to run a business without planning mid- and long-term. Seemingly simple decisions, such as optimizing the location of a warehouse, can show chaotic effects, making any planning or forecasting with input variables in a certain range meaningless (cf.

Grabinski and Klinkova 2011). Consequently, avoidance of the chaotic system altogether is often not a possibility.

Before deciding how to proceed one needs to find out if the model or reality is showing chaos and SDIC. If it is just the model, the obvious solution is to adjust the model to better match reality i.e. to simplify it. If it is both reality and the model that show chaotic effects, the solution is not quite as simple. A simplified, non-chaotic model might be enough to plan the considered process (cf. Grabinski 2007).

Tofallis (1995) described a simple constructed example of chaotic behavior of the ending balance of a bank account. He assumed yearly interest income and a fixed payout if the balance reached a certain threshold. There is a jump when the interest income increases the balance to above the threshold. When this method is iterated many times, the ending balance cannot be forecasted from the beginning balance if the initial amount in the account is not known exactly. Though there is a deterministic relationship, the outcome appears to be random. The below graphic shows the ending balances for different numbers of iterations and starting values. The interest rate is assumed 0.08, the threshold is 1,000, and the amount to be transferred is 250.

Besides Tofallis' theoretical example, chaos can be observed in everyday life, e.g. when considering commuting. Commuting can show SDIC and thus unpredictable outcomes. Leaving just minimally later and one could e.g. miss the bus or train. Travel and arrival time would shift considerably. The same is true when using a car. Minimally later, and one could be held up in traffic. So how do we deal with such complicated matters in real life? Most people cannot avoid planning arrival times, as they have to be at work (or school) by a certain time. If the points in the journey that create the non-linear jumps only cause small shifts in arrival time, people tend to ignore them and just add a little extra to the total expected travel time. Examples for such points are traffic lights. People do not usually plan when to leave their home based on when the traffic lights turn green. If the impact is larger, people tend to avoid the time around the point, which is causing SDIC.

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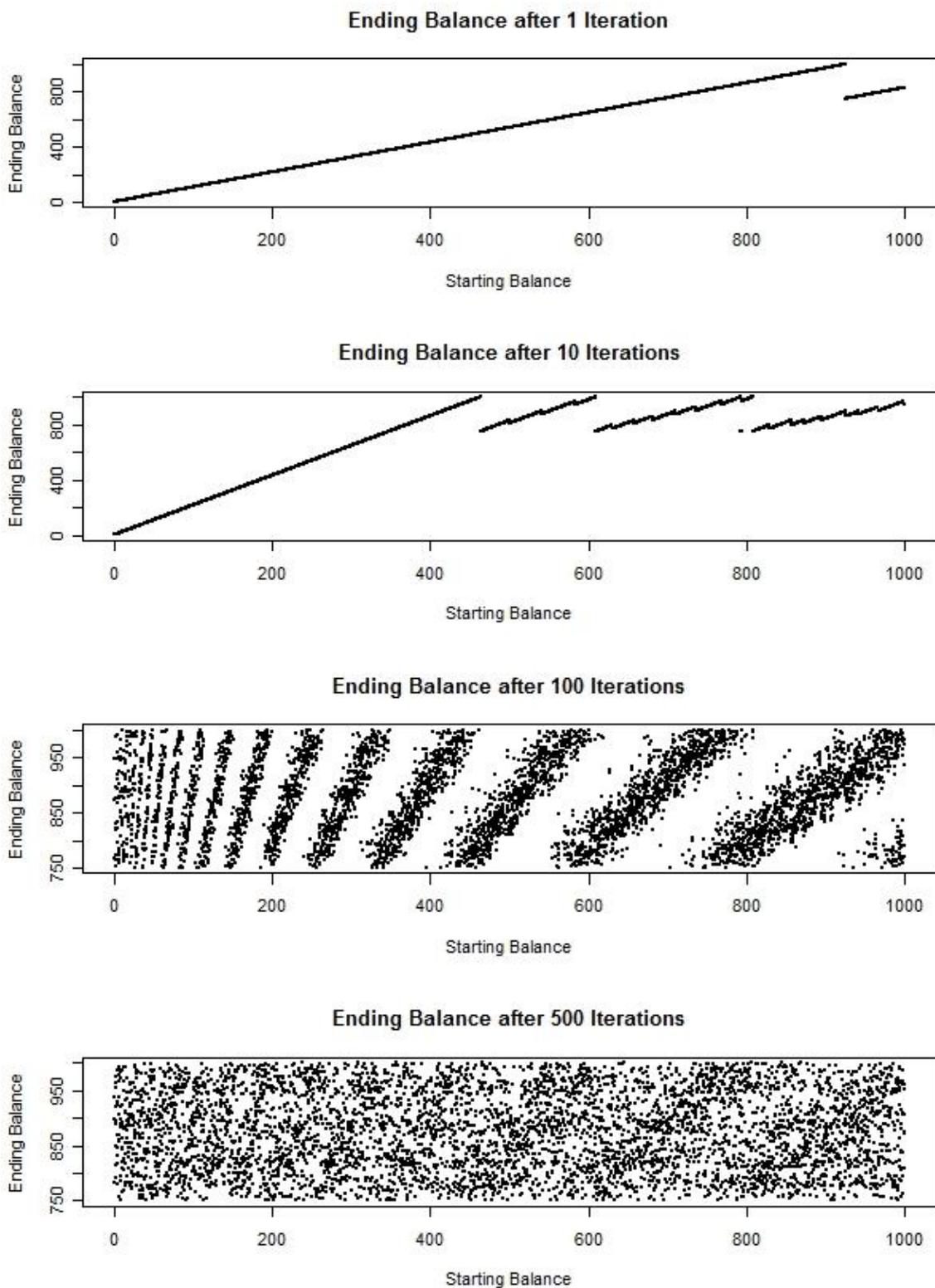


Figure 1: Ending Balances of Tofallis' Bank Account Example

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If one needs to take the ferry to get to work, one would try to avoid arriving at the ferry pier close to when the ferry is scheduled to leave. One would rather schedule to arrive a few minutes early, so that small changes (e.g. caused by traffic lights) do not get the traveler into the chaotic timeframe and thus could miss the ferry. In order to do this, we require additional information i.e. the ferry schedule. In some instances, the impact of a jump is so small that the additional time is all that is communicated, e.g. a bus schedule stating that busses leave every 3-5 minutes during peak hours.

This approach is not always possible though, as there are typically no schedules alerting us to the chaotic region in our model. Even if it is possible to identify those regions, it might take a lot of time and might be quite costly in business, since many models are unique to one company and sometimes even to only one decision.

An alternative, which is quite common though not usually successful, is to approach the problem with better data and more calculation power (cf. Grabinski 2007). There are several hurdles preventing such an approach to be successful:

- Limitations on the accuracy of measurement
- Limitations in computing power
- Quantum mechanics<sup>6</sup>
- Randomness

To forecast the flow velocity of water molecules in a waterfall (cf. Grabinski 2007), one would have to measure a practically impossible amount of data. Besides the sheer amount of data that has to be collected the accuracy has to be very high, as small differences can have a large impact on the calculation result. Even if current measurement techniques were improved, at a certain detail level, the measurement in itself actually

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<sup>6</sup> For an overview of physics see Feynman Lectures on Physics (Feynman 2010)

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influences the measurement result, e.g. if you try to measure the temperature of a small sample, the temperature of the thermometer can significantly influence the reading.

Assuming the measurement problem could be solved, we would still need the computing power to process all the data, as well as the results to gain any meaningful information from the calculation. One mole of water weighs about 18 g and consists of roughly  $6 \cdot 10^{23}$  molecules. To calculate the molecule velocities for a small stream of just a few liters per second would be immense.

If the need for accuracy were high enough to reach the atomic level the Newton mechanics we use in our model do not apply anymore, we would have to look into quantum mechanics. The gap between the two levels is not easily bridged.

Finally, there are truly random events on a level that can affect the molecules under observation, i.e. atomic decay. It is not necessarily the atomic decay of any part of the molecules, but could also be other atoms or molecules such as in the riverbed or even as far as the sun. If one of the molecules were hit by another unpredicted particle, the impact on the final forecast would be devastating.

Grabinski (2007) suggests a more promising approach to deal with chaos and what to look for in these situations. It is called the *hydrodynamic* approach. One could say it is avoiding chaos through a macroscopic view or aggregation. One cannot predict the behavior of any one water molecule in a glass of water; however, it is possible to predict the behavior of the glass of water as a whole. Depending on what we actually need the information for, a big picture estimate might suffice. Thus looking for other variables to forecast, one can find variables that exhibit certain (desired) characteristics; in particular, it is useful when these variables describe conserved quantities, as they do not fluctuate chaotically.

The following sections introduce conserved quantities in general and in business in the form of Functional Value in particular.

### 3 Conserved Quantities

In physics, as in other sciences, variables are used to describe the state of a system or various aspects of it. The term system here is used in a very broad sense, e.g. a certain amount of gas, a company, or the economy in a particular country (cf. Oxford Dictionary 2010). Further, these variables are used in models that aim to explain and predict changes in the system as well as future states of the same. Scientists from various disciplines have developed/discovered variables that are now commonly used for the description of such systems and models. Volume, net income, and gross domestic product (GDP), for example, are used to describe a gas, a company, and an economy, respectively. These variables do not describe each aspect of the system in question but rather one specific attribute. Some variables (or a combination of variables) are better able to describe the current state of a system than others are. The state of a gas is usually described using a combination of pressure, volume, and temperature. One could also use velocity (a vector including direction) to describe each particle. However, velocity can change suddenly, for example, when particles collide. Thus one would not generally use the velocity of the molecules even though it would be a valid description of the gas. In turn, to describe a company people often use the number of employees or the revenue of said company; it is rarer to read descriptions of a company that includes its current stock price, though market capitalization is used as a proxy for size. Among other things, this might have to do with the fact that stock prices change nearly constantly, just as the velocity of any one particle in a gas. By the time such an article were printed, the price would most probably have changed again already.

For some of the variables mentioned above, one reason why they are chosen to describe a complex system is that they are aggregate or average numbers. GDP and GDP per capita, for example, are unlikely to fluctuate wildly, as outliers in the population cancel each other out, at least in part. The same is true about average stock prices. Thus the index, as a proxy for the market average, is usually reported to give an impression of how the market is doing. Though the index can change very rapidly, aggregation or averaging alleviates the problem of outliers by removing the unsystematic risk, while leaving the

market risk; however, it does not remove either randomness or chaos from the system (or the risk of bubbles).

There are many examples of this principle. Rather than using one single good to determine price changes, the price index is usually based on a basket of goods, again averaging out any outliers (cf. Cezanne 2005). When judging the impact of greenhouse gases one also looks at global average temperature and not at individual data points. If the average temperature in January in one location were a few degrees higher than the long-term average that would not normally give cause for concern. If however the average temperature in many locations changes by just 1-2°C that is noteworthy and has caused a lot of debate (cf. Ranger et al. 2012 and dpa 2011b).

As one can see from the examples above, users of models generally prefer variables that do not fluctuate widely and unpredictably in order to describe a system. The same is obviously true for any model and for forecasting models in particular. Variables that are conserved quantities are particularly suitable to describe systems and to be used in forecasting models.

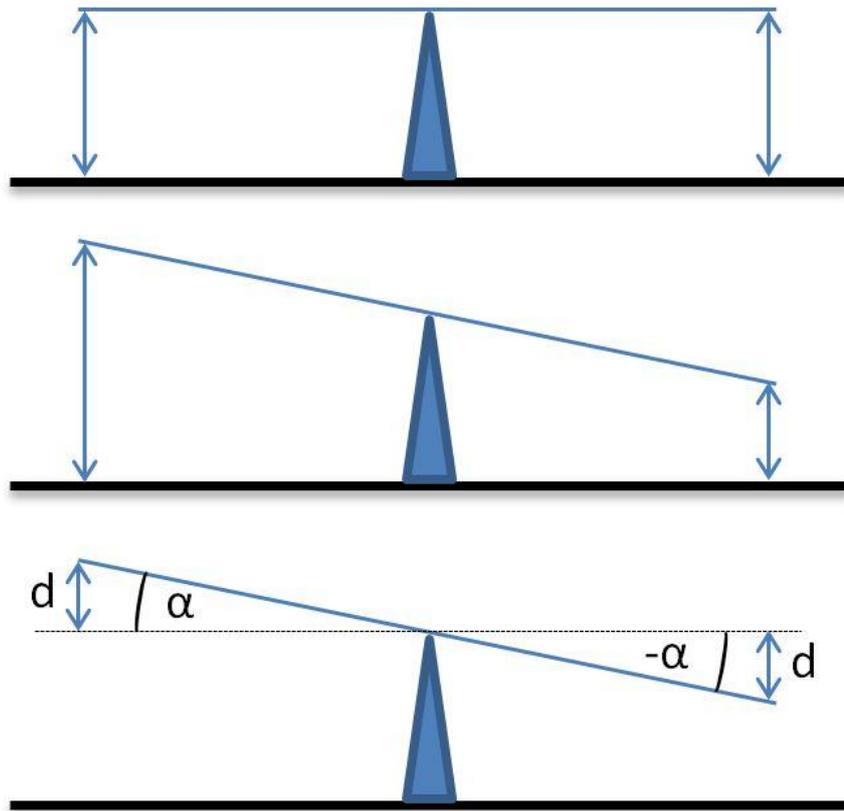
In physics, scientists have found conserved quantities useful for forecasting and describing systems. The distinguishing characteristic of a conserved quantity is the fact that the property cannot change without another change elsewhere. Possible scenarios for a conserved quantity to change are:

- There is an exchange between objects within the observed system.
- There is some kind of interaction with the surroundings of the observed system.
- Another property or characteristic changes inside or outside the system, causing a change in the initial property.

For now leaving aside the third alternative, one can see the symmetry in the first two options. The distinction between options one and two stems merely from the way the

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system is defined. One could simply define the system so, as to include the object outside its boundaries. The third kind of change would be a destruction or production of some quantity of said object, thus changing the quantity in the observed system.



**Figure 2: Basic Seesaw Example**

The above-mentioned symmetry can easily be pictured in the form of a seesaw, lending itself as a simple example to show the concept. On the (symmetric) seesaw as one end goes up, the other moves down by the same distance  $d$  with  $d = \pm \sin(\alpha) \cdot l$ ; where  $\alpha$  is the change in angle from the horizontal position and  $l$  the length of each side of the seesaw. Thus any change will leave the sum of both heights above ground constant, at least as long as there are no other changes to the seesaw. This is the first kind of the above-mentioned changes, the exchange between objects (in this case, the ends of the seesaw).

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The other possible change to the height of seesaw's ends is to move the whole seesaw. This is an exchange with the outside of the original system (with the same variable, i.e., height), changing the total of the sum of the heights. Once stable though – when the seesaw is not moved any further up or down – the sum stays constant again. Finally, another variable (or property) in the system that can change is the length of each side of the seesaw. In order to keep the sum constant, both sides have to be altered by the same length. Once the "exchange" with the outside has taken place, the sum is stable again. Consequently, the sum of the heights is a very simple example of a conserved quantity and thus is suitable to describe the system of the seesaw. One can easily see that this is a more useful description than, say, giving the height of each end at some point in time (especially if the seesaw is in motion). The complexity of the example can be increased by allowing the length of the seesaw to vary on the two opposite sides. The new conserved variable would be the sum of the heights multiplied by a factor representing the relative length of each side. The change in height would be  $d_1 = \sin(\alpha) \cdot l_1$  and  $d_2 = -\sin(\alpha) \cdot l_2$ , respectively. In order to keep the sum constant, one would have to multiply by the ratio of the lengths of both sides.

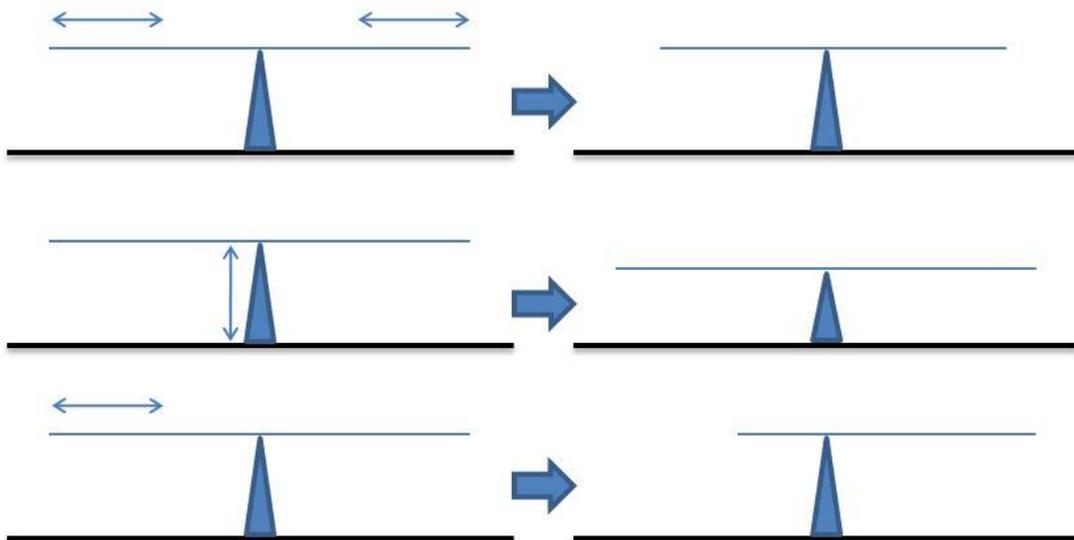


Figure 3: Possible Changes to the Seesaw System

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Aside from this very simplified example, one can find conserved quantities in natural sciences (sometimes called hard sciences, such as physics) but also in social sciences such as business and economics.

A widely known example for a conserved quantity is energy. The conservation law of energy states that the amount of energy in a closed system is constant, i.e. if there is an increase in energy in part of a system, there has to be a corresponding decrease in another part. The form of the energy can change, e.g. from kinetic energy to heat energy (first kind of change), the total however is constant over time. The second kind of change, interacting with the outside of a system, can increase the total of energy. A simple example is a kettle that is brought to a boil. Additional heat energy is transferred into the system *kettle with water*. Finally, another variable can change, leading to a change in the total energy in the observed system that is the conversion of mass to energy.

The conservation law of mass and energy as well as the corresponding conserved quantity can easily be visualized in an economic setting. The closed system corresponds to a simple isolated economy e.g. on an island (cf. e.g. Mankiw and Taylor 2011 or other introductory economics texts). There is a certain amount of money (cash only) on that island, which corresponds to the energy in the system. The people in this economy who hold the money would be like objects of the system containing the energy. When people in this economy now start trading money for goods or services that money changes hands; however the total number of bills will not change. Nevertheless, there are two other possibilities how the amount of money in our island economy can indeed change. Outsiders could come to the island and bring money or the inhabitants might venture out themselves and leave money at their destination. This is a change of the same variable outside the system. The second possibility is the destruction or production of new bills. If the government were to start printing money, the amount of cash would clearly increase without the amount of cash in the surrounding economies changing. The real economy however does not work like this model economy. The amount of money is not limited by the physical amount of cash available (cf. Cezanne 2005). The banking system allows for money to only exist on the books of financial institutions. Once somebody deposits cash at

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a bank, the bank can lend the money to another customer or pay out another customer's deposit, since the bank does not keep the physical money that was handed in. There is a limit however, to this multiplication as there is a required reserve to be kept by the bank. Nevertheless, the amount of money in an economy is not limited to the narrow definition of physical cash. A broader view is to include any short-term depositions when counting the amount of money in the economy. The amount of money in the economy, counting deposits and cash, can change at any time. Assuming the amount of cash stays constant (as described earlier) the amount of money can still change because banks can lend out the deposits several times. Without a reserve requirement, they could theoretically lend out the money an infinite number of times. Cash or deposits can change ownership between people (or institutions) in our model economy, in accordance with the first characteristic of a conserved quantity. The amount of deposits can change without the exchange between people and even without any interaction with the surroundings. It cannot however, change without a corresponding change in another variable that is the amount of debt in the economy. Though the amount of money is not conserved, the amount of cash as well as the sum of cash, deposits, and debt is conserved.

If you add "accounting money" to the example, the amount of cash is not conserved anymore. Consider e.g. the case of the "smart" farmer from an old joke. The farmer sold a cow for 1 million USD. However, he does not sell it for cash. He takes four chickens for USD 250,000 each. In terms of accounting numbers 1 million USD have been "created" on the spot. The same can happen in the stock market. If a share is revalued upwards, the total amount of money and fair value has increased without any necessary changes in the physical world.

The important point is that conserved quantities cannot change randomly. As there always has to be an accompanying change in another variable, there are no chaotic movements while this is not true for not conserved quantities. Market prices do not necessarily move chaotically, but because they are not conserved quantities, they can. Thus they can change spontaneously and unpredictably. A popular example for such behavior is the tulip bubble of 1634-1637. Tulip prices increased without any fundamental changes.

People of all classes engaged in tulip trading to the extent that other industries were neglected at the time (Mackay 2001).

Though the impact on other industries as described by Mackay (2001) is debated today, the bubble and the following bursting of the bubble had a severe impact on many tulip traders at the time. The sudden change of prices in the flower bulb market though, was not limited to the 17<sup>th</sup> century but has also been observed in the market for tulips and hyacinths in the 18<sup>th</sup> century (Garber 1989).

If one were to consider only the functional use of the tulips, there is no reasonable explanation why the value of tulip bulbs would fluctuate that much in the considered period.

## **4 Functional Value**

As stated in the financial framework to IFRS, accounting provides information about the economic situation of a company by assigning currency values to past and future events and business transactions. Besides the decision when to account for a transaction, the measurement of these transactions is one of the fundamental questions to be answered before any reporting can take place. Thus the measurement principles have evolved over time and are still revised and evaluated on an ongoing basis. Accounting developed from documentation to include estimates and reports enabling the users of financial reporting to forecast and base economic decisions on the provided information. This shift though, has increased the complexity and difficulty that accountants are faced with. In particular, accountants (as far as accounting standards allow it) and standard setters have to decide which measurement basis to use, followed by estimating the value, as most values are not easily observable.

When choosing a measurement basis, one can choose between a number of different approaches. One could use market prices (to which historical cost and fair value

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belong) both as an entry price or an exit price as well as any point in between the two, the value the object has to the owner, commonly referred to as value-in-use, deprival value (see CHAPTER IV2 for a definition), or some kind of intrinsic i.e. inherent value of the valued item.

Most accounting systems now use some combination of the before mentioned valuation bases. IAS 36.30 defines value-in-use as the preset value of all the expected future cash flows discounted for risk and the time value of money. This is the same idea as used in many approaches to value financial assets; thus, at least in theory, the value-in-use should equal the fair value of such assets (even if the estimate might differ when using different methodologies). Nevertheless, the market price of many exchange-traded assets fluctuates significantly even in short time spans, so it is doubtful that within such short time the estimates of the future cash flows fluctuate as much, many times without the arrival of any significant news. Warren Buffet (referring to a lesson taught by Ben Graham) brought the difference to the point stating: “Price is what you pay; value is what you get” (cf. Buffet 2009). Warren Buffet was not the first to note the difference between price and value. Marx (1872) also pointed out that there are two types of values: market value and intrinsic value. Marx refers to Locke (1691)<sup>7</sup> and other English authors in the 17<sup>th</sup> century as they distinguish the two concepts by using the word “worth” for intrinsic value and value-in-use and “value” for the market value, i.e. the value when trading or in an exchange. Marx also refers back to Barbon (1696) and Samuel Butler that the value of something is not in itself, but what it “brings”. This can be seen as either the value generated from the use of the “thing” or what you can get in exchange for it. The use one takes from the asset can be manifold. The need that is satisfied through the use, does not necessarily have to be a physical need, but can be psychological in nature (cf. e.g. Marx (1872), Barbon (1696) in Marx (1872), Maslow’s hierarchy of need). So the use one gets e.g. from driving a car can be the use of transportation, but also the comfort level and the self-esteem, from the recognition of others (about the great car).

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<sup>7</sup> Cited in Marx (1872)

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Though the difference between value and price is easy to see, it does not help getting us closer to a workable definition of value. Appel and Grabinski (2011) and Appel (2012) thus describe another approach to define value, using the concept of conserved quantities, also providing information about measurement. This alternative measurement basis is the Functional Value. It is a variable to describe the value or worth of an asset or a liability at a given point in time. As the Functional Value is a conserved quantity, it can only change if something else changes accordingly. If that is the case, the future cash flows determine the value. Consequently, the measurement of Functional Value considers the future cash flows (Appel 2012):

*[T]he discounted net Conserved Cashflow realizable in course of the acquisition and application of any item's conserved Required Functions, adjusted for the expected risk, uncertainty, inflation, currency exchange rates (if applicable) and the item's obsolescence during its period of use.*

Functional Value changes very little over time. There is a normal decay of the value of assets as the expected cash flows are realized and thus the value of the asset decreases. This can be interpreted as an exchange within the system (cf. section 3 of this chapter). The company now holds the anticipated cash, moving the value from the asset to the cash account. There are also changes in the value if there is an exchange with other objects (companies) in the system, such as market share changes. If the market size stays constant, this is a zero-sum game. There could also be changes in significant influence factors changing the market size and/or its value. Changes can occur from any part of the system; typically, the changes are classified by the PESTEL<sup>8</sup> framework. When for some reason the sale of the product is restricted or banned (e.g. the use of lead in electronics) the Functional Value decreases. The change can be either a shift to a substitute or the reduction in Functional Value, as the need is not met anymore or some of both. Political changes include (but are not limited to) subsidies and taxes. Environmental changes and concerns can also influence economic activity. Finally, there is the risk of the unexpected loss of the

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<sup>8</sup> Political, economical, social, technological, environmental, and legal

asset or some resource needed for operations. The tsunamis of 2005 and 2011 have demonstrated clearly that the risk of damages and large-scale destruction is quite real and the impact potentially devastating. The loss does not have to be unintentional; wasting resources can also decrease overall Functional Value. An example would be if a company wasted energy or material during production.

The other reason Functional Value seems to change (though Functional Value itself does not change) is that it is an estimate. Estimates can change over time, as additional information is available through either research or just the passage of time. Many developments within companies should already be accounted for, i.e. the value “moves” from the human resource capital to the extra return on the asset. As people usually do not know ahead of time the value of such developments (or even if they will occur), there will typically be an adjustment in the estimate of the Functional Value. The stock market today also shows the recognition of the value of human capital. For example, whenever Steve Jobs, who has without doubt shaped Apple and has influenced the whole industry, appeared publicly there was great discussion about his health (cf. Koch et al. 2011). When he died in 2011 investors wondered, whether Apple could continue to operate in such innovative and creative way, this worry also affected the stock price and the estimated value of Apple.

## **5 Business Activity**

When narrowing the definition of value strictly to conserved quantities, i.e. Functional Value, one consequently also reexamines the definition of value added activity and thus, the definition of business activity itself. In order to define business activity, we have to look at business decisions and the reasoning behind those decisions.

If a business is not speculating, they should be willing to pay as much as the Functional Value for any asset or service. That is, when buying a machine, one should be willing to pay the conserved amount of cash one can expect to earn applying the machine,

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adjusted for the timing and the risk of the expected cash flows. If anybody is willing to pay more, they are either not making a good business decision or they are speculating on the future cash flow being higher (or less risky or with a different timing) than the expected conserved cash flows. It does not mean that if one business is willing to pay more than another business for an asset that the first is speculating. Differences in willingness to pay can stem from a variety of sources, including a different intended use of the asset or simply different estimates of the conserved cash flows.

Assuming a company already owns a machine, but one key part is broken, so that production on this machine had to be stopped. The replacement parts are made out of a commodity whose price is fluctuating widely and showing a large gap between its Functional Value and its market price. The willingness to pay for this part would be nearly the value of the whole machine, as production is halted until the replacement part is in place. Thus the company should be willing to pay just as much, to get it running again. This is related to the concept of deprival value (cf. Zijl 2006 and Baxter 2003). Deprival value, as the name suggests, is the value a company would be worse off by, if it were deprived of the asset. The owner should be willing to pay up to the amount that he is worse off without the asset to get it working again. If the initial situation were that there is no machine to begin with, obviously the company would not be willing to pay that much for the one part, as the total of the machine then would cost more than its Functional Value. The concept here is also related to the idea of sunk costs, as is typically used in cost accounting and capital budgeting. The concept of varying (reasonable) amounts one is willing to pay can be mirrored on the revenue side. While it is acceptable short-term to only recover variable costs, in the long-run fixed costs also have to be covered. Nevertheless, the Functional Value of the part is not as high as the willingness to pay, otherwise there would be many competitors offering the small replacement part eventually bringing down the price to little over cost.

In the end it boils down to the question whether the business concept behind the purchase can be explained with solid business reasoning or just with "we hope the price will go up". The above example is clearly not speculation on the price fluctuation but

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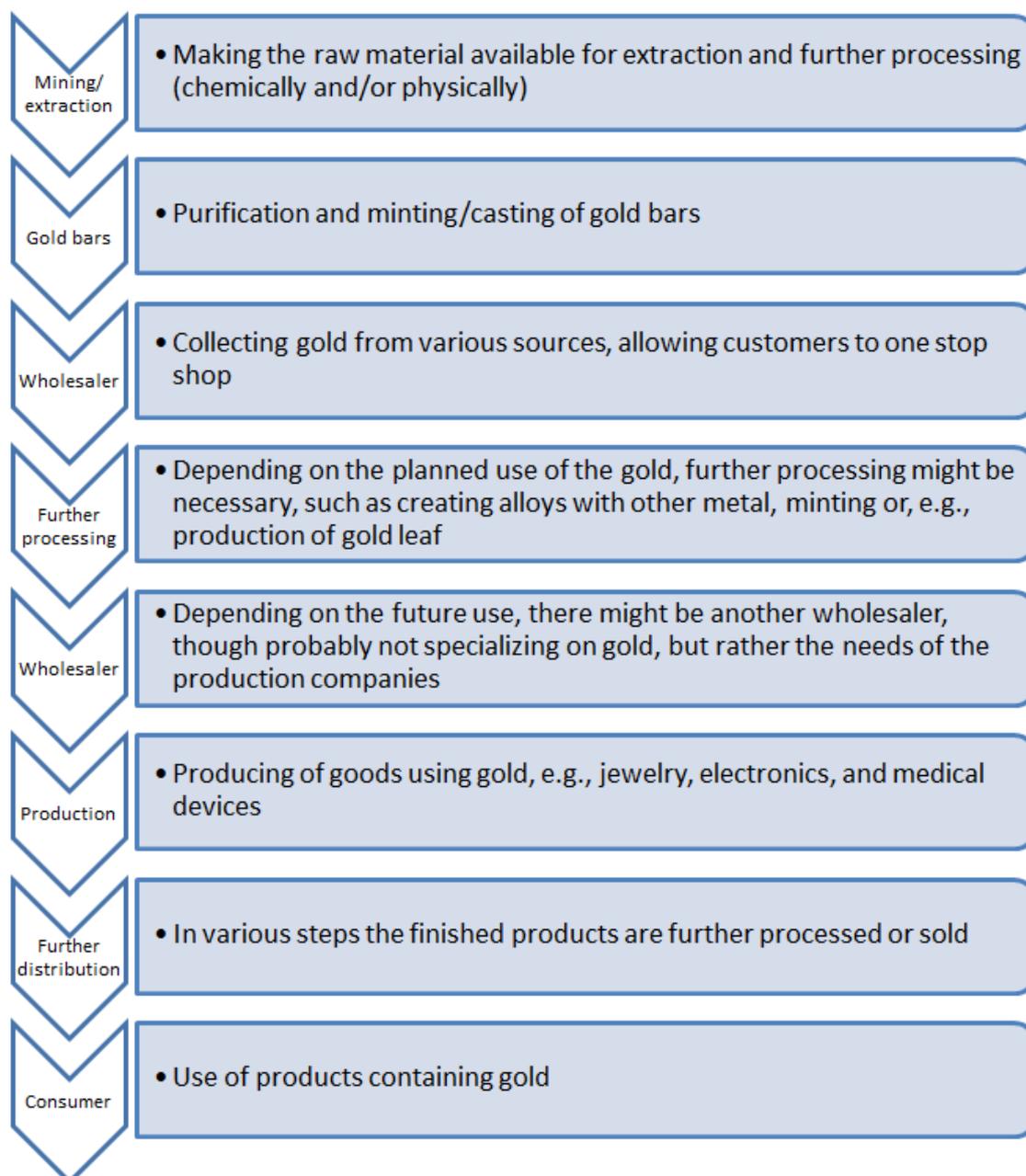
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instead based on the objective to increase Functional Value of the product by either changing the product physically or some other feature that adds Functional Value to the customer. Though wholesalers e.g. do not change the product, they add Functional Value by increasing convenience for consumers, who in turn are willing to pay for the additional Functional Value. This also includes asking, why some institutions (supposedly) can deal better with certain risks (as in a financial asset, insurance etc.) than others, either by being able to avoid the negative outcome or deal with it more cheaply. If there is no reason why this should be the case, again one can question whether the decision to trade this risk is business activity or speculation. To summarize the above, business activity in this thesis is considered only such activity that seeks to increase Functional Value, either by processing input factors or by some other means.

To illustrate the above principle a simplified model of the supply chain and production process of gold is illustrated in Figure 4. Each step has to be evaluated, whether it adds Functional Value or has the potential to add Functional Value.

First, the gold is extracted from the ground by some technological means. This step obviously adds value to the gold, since it is closer to a state that can be further processed or used. Next, the gold is purified and formed into bars. This step facilitates trading and processing of the extracted gold. Next wholesalers buy and sell the gold. Thus sellers do not have to market their product directly and buyers can buy more efficiently. Depending on the final product, the last two steps might be repeated. When e.g. producing gold leaf further processing has to take place. Gold leaf then will be sold to a wholesaler for art or building supplies (or a similar trader). Both steps add Functional Value, as the interim or final consumer receives additional benefits from these steps. In some industries, the involvement of intermediaries is declining or very low to begin with. This just means that the customers do not value the additional benefit either as much as they were charged or they are able to create the additional value at a better price. Finally, the product is sold to the customer, again potentially through some sales channels or intermediaries.

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**Figure 4: Simplified Supply Chain for Gold**

Besides the physical flow of the gold however, there are financial flows associated with the supply chain of gold, which can have a significant impact on the price of gold (and other assets correspondingly). The financial flows are not as straightforward. First, there is a cash flow whenever the gold or a product using gold is sold in the spot market. Additionally, the participants might wish to hedge the risk of the gold price. One can use

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derivatives to do so. There are many ways to classify derivatives; one of them is to distinguish between physical settlement and cash settlement. When the derivative is due and the actual underlying – in this case gold – is delivered, the derivative is physically settled. If an amount of cash is paid that is calculated depending on the current price or some other observed number (such as the observed standard deviation, the number of hours of sun in a certain time, etc.), it is called being settled in cash. An example can be a simple forward agreement, which is when one agrees to buy something (gold) at a certain time in the future at a price fixed today (delivery price). Instead of actually buying the gold from the seller, both parties agree to pay the difference between the current price and the agreed price at the specified future date. If the price rises, the seller pays the buyer the difference to what he has to pay now in the open market. The buyer then can go and buy the gold in the open market; the cash he receives from the seller mitigates the higher price he pays. If the spot price is below the delivery price, the buyer pays the difference to the seller and then buys the gold in the spot market. Cash settled derivatives facilitate trading in gold or rather participating in the risk of the gold price, without actually owning any gold. This feature of the financial market enables speculative trading not only in financial products but also in commodities. It further facilitates speculation from third parties that are not originally involved in the supply chain of the delivered product and consequently allows the market price of a product to disconnect from any physical flows associated with the product itself. This by no means should imply that all trading of cash settled derivatives and involvement of previously outside parties is speculation. One of the offers of financial institutions is to trade risks, in particular to take over risks that their customers are not willing to bear. Consequently, a bank offering a forward to a gold mine (at an appropriate price) to insure or fix the price of gold for a future date is a business activity adding Functional Value to the customer and the bank can earn a fee for this service.

The fluctuation of the gold price is a typical example where the financial industry creates the price fluctuations but claims to curb it. The production (i.e. mining) of gold is quite steady. The consumption (for gold contacts and jewelry) is also not fluctuating very much. In addition, there are very large physical gold reserves functioning as storage. Considering such a supply chain the price must be almost constant when ignoring the

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effects of inflation. However, pure speculation makes the gold price vary in the first place. Especially due to the aforementioned cash settled derivatives it is possible to “buy” tons of gold. This makes the price fluctuate wildly and increases the need for insurance for those dealing with (physical) gold. The healing in this case is very simple:

- Limit the use of gold derivatives to transactions associated with physical gold
- Consider the transaction an insurance policy and tax it accordingly (in Germany currently 19%). Insurance tax is only for end consumers and thus not passed on like value added taxes. Therefore companies will only buy as much insurance as it really needs.

Using this refined definition of business activity has consequences in financial reporting as well. First, it gives a method to classify cash flow and income in companies that engage in speculation. Secondly, it enables the readers and users of financial statements to use the additional information. Investors and creditors can better estimate which part of the business is stable and can be forecasted with reasonable accuracy. Additionally, standard setters can use the information to judge possible volatility and risk in the *business* model. Finally, public authorities, such as the local tax authorities, can use the information and adjust their tax laws accordingly.

## CHAPTER IV

# CURRENT GENERALLY ACCEPTED ACCOUNTING PRINCIPLES

## 1 Introduction

This chapter gives a broad overview of some currently used accounting principles and assumptions.<sup>9</sup> The described concepts are not currently applied consistently on a global scale; however, one can see some of them in the local accounting rules. It is not the objective of this chapter to provide a comprehensive list of accounting principles either, as the current rules are too diverse. The different measurement bases and qualitative characteristics indicate the global disagreement among standard setting bodies. The discussions in the joint project from FASB and IASB (cf. FASB 2010) to issue a common comprehensive framework offers a glimpse of the different understanding and use of even the most basic accounting terminology (e.g., assets, cf. FASB 2008 for an example on joint discussions from FASB and IASB). Besides disagreement on the exact definition of the terminology, there are also different ideas about the objective of financial statements and consequently about the importance of the different qualitative characteristics all leading to disagreements on preferred accounting treatment and measurement bases. This overview does not aim to settle this debate but rather to introduce some of the common challenges in accounting as well as typical solutions and the reasoning behind them.

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<sup>9</sup> Intermediate accounting textbooks give a general overview of US GAAP and IFRS, e.g. Alves (2007), Stice and Stice (2009), Epstein et al. (2006).

## 2 Definitions

### 2.1 Fair Value

As mentioned before, both US GAAP and IFRS share the definition of fair value “as the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date” (IFRS 13.9). Though the definition seems straight forward, there are still details to add to this definition to be useful in practice. If the asset is traded in more than one market, which one should be used? If there are many markets available, how much effort should the reporting entity put into defining the right market to use? Further questions arise when the market is very illiquid such as real estate. IFRS answers these questions by selecting the primary market for the asset or the typical one to use for the entity if there is no primary market. They further introduce the notion of “highest and best use” of an asset, as an alternative pricing method. The basic idea is the value-in-use of the asset; however, even if the entity chooses not to use the asset (e.g. patents), the value is still assumed the “highest and best use”. The standard setting bodies have recognized that the reliability of the fair value and the potential bias differ considerably depending on the source of information that is actually reported. Consequently, they introduced a hierarchy of inputs. Directly observable prices are at a higher level than prices that are inferred or calculated with/from observable inputs. Finally, unobservable inputs make up the lowest level.

### 2.2 Historical Cost

Historical cost accounting, i.e., historical cost as a measurement base, is very common in different accounting systems. The asset or liability is recognized on the balance sheet “at the amount of cash or cash equivalents paid or the fair value of the consideration given to acquire” (IFRS Framework.100<sup>10</sup>) the asset. The details of what exactly has to be

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<sup>10</sup> References to paragraphs in the IFRS framework are referring to the original (not revised) framework unless stated otherwise

included or is optional vary between the regional GAAP. Historical cost can be used for any asset, including inventory and property, plant & equipment (PP&E).

### **2.3 Deprival Value**

Deprival value is answering the question of how much an entity would be worse off (or better off in the case of a liability) if the entity did not have the asset. Therefore, the replacement cost is the upper limit of deprival value, as that is the maximum you would have to spend to bring the entity back to the original situation. If the upper bound is not reached the new lower bound is the higher of the realizable value and the value-in-use (cf. Macve 2010, Whittington 2008). Again, one has to be specific on how to define the realizable value as well as the replacement cost.

## **3 Assumptions**

Accounting rules are formed by various standard setting bodies around the world. As not all of them publish the consensus building process that leads to a final version of the accounting standards, one can only guess about the discussions taking place to reach the consensus. When such accounting rules are issued the standard setting bodies take into consideration a number of assumptions and objectives. As with the discussions, not all standard setting institutions publish these assumptions. Below is a list of some of these assumptions stated explicitly or implied. Obviously, some of the assumptions are contradicting (as not all standard setters come to the same conclusion). Though accounting research in many instances has tried to quantify the impact of the application of accounting rules based on various of these assumptions, as of now the debate about the assumptions has not been settled. Many times the reason for the different accounting treatment lies in the historic development of the accounting rules and thus in the historic view of the role of accounting in a company, the economy and society in general. The distinction is also visible in the often-codified objectives of financial reporting under different GAAP. Below you find a list of assumptions that are either explicitly stated by the standard setting bodies,

the summaries of the discussions leading to the accounting rules, or are implied in the published accounting standards. The assumptions are loosely grouped into the following three categories: general assumptions, the role of the components of financial reporting, and valuation of balance sheet and income statement items. After the overview, each of these principles and assumptions will be explained in more detail with some of the problems caused by these assumptions.

### **3.1 General Assumptions**

There are a number of general assumptions fundamental to accounting systems that are used in different legislations. This chapter will touch upon some of the important assumptions.

Cash based accounting is the most simple form of accounting. Within long periods ( $t \rightarrow \infty$  or the life of the reporting entity) it is exact and all other GAAP lead to the same identical results (neglecting the differences in naming of e.g. equity accounts). However, considering short periods of time, cash flow usually presents a misleading picture. As the goal of all sophisticated GAAP is to give a realistic picture also for short periods, accrual basis of accounting was introduced. The idea is to separate the event of earning income from the timing of the cash flow associated with the earned income. Thus earnings will not change if a customer happens to pay before or after the accounting period ended. The same is true for expenses. An expense is not recognized when e.g. inventory is ordered, or even when it is paid, but rather when it is used. One of the reasons for accrual basis of accounting is to make manipulations harder. In cash-based accounting, one can easily change the earning figure by moving the timing of payments or order placements. Using accrual accounting does not allow for such simple manipulation. Accrual accounting introduces a new problem though that is estimating the future (cf. Penman 2009b). As it is not possible to forecast the future exactly, there is no exact accounting either. Consequently using Functional Value is ameliorating the problem, because it is possible to forecast a conserved quantity quite accurately as opposed to non-conserved quantities such as market prices. This is especially true for financial products which has been proven recently (cf. Klinkova et al. 2013). This is completely analogous to e.g. metrology. It is

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possible (and desirable) to forecast the average temperature on earth over the next decade highly accurately (due to conservation of energy). However, guessing the average temperature of say Germany over the next decade is very inaccurate. So inaccurate that taking the average temperature of the last decade is as accurate as any complex super computer model (cf. CHAPTER III2). This does not change if there is a strong desire to estimate it. Even if there were a law about it, it remains impossible. (Please note that some countries have laws to perform very long weather forecasts, just as many countries require accountants to forecast future prices, both are senseless for the same reason.)

Accounting assumes constant monetary units over time (cf. Framework.104). Thus in any financial report values are given as of the time of the valuation, i.e. when using historical cost accounting the value is in the reporting currency as of the year the asset was purchased. This is the case, even for times of relatively high inflation and for very old assets (e.g. real estate and buildings). This practice in historical cost accounting adds to the problem of non-comparable numbers by not actually using the same measurement unit. For example, in the US, the consumer price index (CPI) more than doubled in the 9 years between 1973 and 1982 (cf. US CPI, source: Datastream). Consequently, even without any changes besides inflation the reported numbers on the balance sheet of two assets bought at either end of the given time period are not comparable. As the income figures depend on the balance sheet numbers, this also leads to non-comparable income numbers.

As there is a discussion happening about whether accounting rules have influenced the course of the financial crisis one should also consider the impact of accounting rules on behavior. While some interpret accounting as merely reporting facts and that should supply information to users, so they can make informed decisions, others clearly use accounting as a means to influence the behavior of the business. One example for this is the reporting of regulatory capital, which is based on accounting figures. Oversight agencies actually use those numbers with certain rules to force companies such as banks and insurances to incorporate goals, other than profit maximization, into their decision-making process.

Business activity is sometimes defined as regular (legal) profit seeking activity. This is a very broad definition though, as it would include playing the lottery for many people (except those, who play for entertainment reasons only). The same is true for any gambling. Playing cards might possibly be a professional career; however, it is not a business endeavor. Gambling in financial markets though is a common occurrence not only in banks<sup>11</sup>, but also in companies and organizations from other industries<sup>12</sup>. See CHAPTER III5 for a more detailed discussion.

Finally, there is the going concern assumption. Financial statements are prepared assuming the continuation of operations for the near future. If there is reason to doubt this assumption, management has to disclose this fact and the financial statements have to be prepared under a different assumption.

### **3.2 The Balance Sheet and Income Statement**

Accounting rules have developed with different historical backgrounds and thus the view on accounting differs. This fact is visible in the role of the balance sheet and the income statements. Some see the balance sheet merely as a retainer of values yet to be assigned to the income statements at the appropriate time. Because of the link between the balance sheet and the income statement, this puts the focus on the income statements and the balance sheet has to follow. Another approach is to see the balance sheet as a proper valuation of assets and liabilities and the net available to creditors in case of liquidation. The income statement then is a byproduct of the balance sheet and its changes over time.

The two points of view stated above are closely related and in a way opposite ends of the spectrum of interpreting the role of the balance sheet and the income statement and their relationship. The different views can also be interpreted as a different focus on different groups of users of financial information. Many stockholders and analysts focus on

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<sup>11</sup>JP Morgan Chase's reported loss of 2 bn in May 2012, WSJ May 11, 2012 , Fitzpatrick (2012)

<sup>12</sup> A German TV station lost money speculating in the Ecuadorian market, Handelsblatt October 18, 2000, The German town of Übach-Palenberg lost money with interest rate derivatives, Windelen (2011). Also see 2011 financial reports of BASF SE (BASF 2012), stating that they are holding commodity derivatives for prop trading and participate in arbitrage trading in the CO<sub>2</sub> certificate market

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the income statement and the cash flow statement in their analysis as a forecasting tool for future performance. In particular, when there is a choice to have more accurate data in the balance sheet or the income statement, the performance measurement is chosen. This approach has the effect that the balance sheet merely retains values that will flow through PnL and the cash flow statement at some point in the future. It is not meant to be (or rather it cannot be) an accurate valuation of the assets currently held. Looking at inventory valuation methods clearly illustrates this problem. Assuming rising prices Last-In, First-Out (LIFO) will value the used goods with the most recent and higher prices. Thus cost of goods sold (CoGS) is based on the most recent prices and consequently close to replacement cost and current market prices. The PnL derived from this number is then using both the most current sales prices (revenue) and thus the best estimate as to the currently achievable profit. On the other hand the items still in inventory are valued with the older prices. These could be decades old, and assuming rising prices, the balance sheet would not reflect the current value of the inventory at hand whatsoever. Using First-In, First-Out (FIFO) has the opposite effect. CoGS are valued with older prices, while inventory is valued with the most current prices. FIFO does have the advantage though, that prices are no older than the inventory turnover time, while LIFO can create so-called LIFO layers, which can exist for many years and obstruct the current reporting of income when liquidated.

Others put the balance sheet into the focus of financial reporting. The balance sheet then would aim to show the best possible valuation of the controlled assets. In particular, this is somewhat the case when focusing on creditors as users of financial information. Simon (cf. Simon 1898) stresses the importance of financial reporting to keep the shareholders in check, so that they cannot pay out dividends beyond what is healthy for the company and (when financial trouble does arise) cheat the creditors out of their money. Creditor protection can be seen as an objective in other laws in Germany as well. A limited company e.g. could only be registered with what was deemed a healthy amount of equity and the use of other assets to replace of paid in capital is limited. There have been some changes to this general rule; however, the legal form of Gesellschaft mit beschränkter Haftung (GmbH) still is protected with these minimum standards, companies with less

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equity can achieve limited liability but have to use a different legal form. Adopting this view and focusing on the valuation of the balance sheet limits the choice of valuation for the income statement, i.e., the PnL is just a byproduct of two consecutive balance sheets and explains the difference in equity (plus other transactions effecting equity such as issuing or retiring stock).

This view is particularly problematic when paired with the use of historical cost. Historical cost is viewed as conservative and thus an appropriate measure when current value is unclear or not easily verifiable. Valuing the balance sheet at a mix of historical costs (throughout the life of the reporting company) leaves the reader of the financial statement with both a skewed balance sheet and the profit explaining the year-to-year differences.

In a perfect accounting system one would not have to choose between those two options. If value could be measured perfectly, the profit or loss would reflect the value created (or destroyed) by all management decisions and the operating activities. The cash flow statement would show how much of that profit has been converted to cash as of now. This however is impossible, as complete information about future cash flows would be required. If there were perfect information available to everybody there would be no need for financial reporting in the current form.

As discussed above the balance sheet and the reported income are closely linked. This cannot only be seen looking at inventory valuation but also looking at PP&E. In accounting, the use of a fixed asset is recorded as an allocation of the historical cost over the useful life of the asset. This is done either by the amount the asset is used as compared to the expected usage over the life of the asset or as if more common by some formula that usually results in a constant or declining yearly depreciation. The latter is usually chosen for tax purposes, as it delays the payment of taxes.

This method does not reflect the value or even the use of the asset, but it makes life a lot easier, i.e. it is just some simple method to estimate the numbers needed for reporting.

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There are three (flawed) underlying assumptions behind this approach. First, the allocation of expenses is based on the historical cost, i.e. what was paid to acquire the asset. If the asset was acquired below value the valuation as well as the decline in value would be not only be reported incorrectly each time period but also as a life-to-date number and at the end of the life of the asset. Secondly, the amount of the depreciation is mostly declining (or constant), while the actual change in value does not usually follow this pattern.

Finally, following a predetermined schedule to depreciate and consequently value an asset, has nothing to do with the Functional Value of the asset. Going back to the framework of both IFRS and US GAAP an asset is defined as a future economic benefit to the company. It would be logical to report the asset as the value of that economic benefit. Scheduled depreciation however, completely removes the valuation of the asset from any expected cash flows or economic benefits expected to arise from the asset.

### **3.3 Valuation**

There are plenty of contradicting valuation assumptions concerning valuation of assets and costs. Some state the superiority of market or fair value over historical cost, while others prefer historical cost. Others yet prefer a mix of the two methods depending on the asset/liability. The different motivations are not only based on the before discussed different views on the role of the balance sheet versus the income statement, but also on disagreements on the best approach on how to achieve the stated goal of accounting as well as the ranking of the desired characteristics of financial reports. This also leads to quite a number of inconsistencies in current GAAP. The frameworks of IFRS and US GAAP both state the objective of comparable financial reports, though consistent application of rules does not necessarily lead to comparable numbers because of the mixed valuation bases used in GAAP.

The choice of valuation basis is, as mentioned above, root for an on-going discussion among academics and practitioners about the role of fair value accounting in the recent financial crisis. Further, there is disagreement about the relative importance of the

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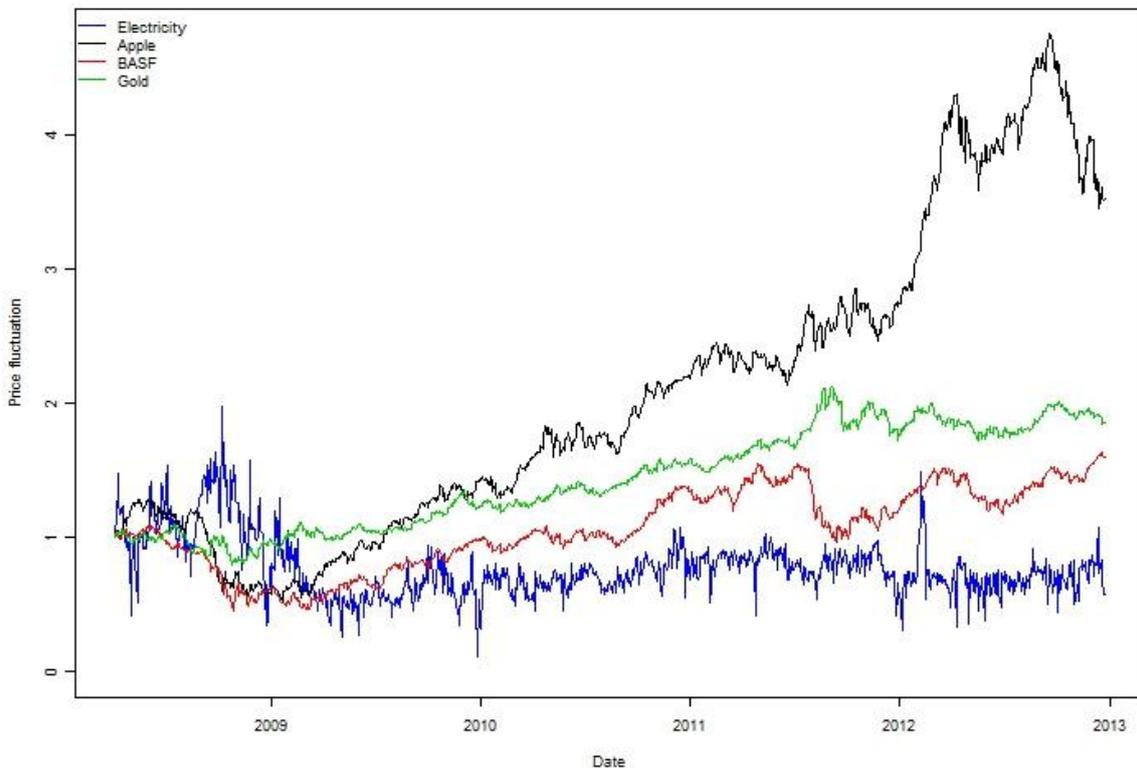
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two accounting goals relevance and reliability, as fair values are generally considered more relevant while less reliable.

As defined before there is a subtle difference between market price and fair value. In many cases though, it is the same. Thus the fair value of assets, as used in accounting, exhibits the same characteristics as market prices. While many prices do not show a large volatility (such as the price of food and services for end consumers), other prices fluctuate wildly and show non-linearities (cf. Peters 1996).

The idea to introduce current prices to accounting is not limited to full fair value accounting. The German Commercial Code, as does US GAAP, requires the use of lower of cost and market (LCM). Variations include the requirement to always write down to the lower of cost and market, or to write down if the impairment is permanent. Other rules allow for downward as well as upward adjustments.

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**Figure 5: Price fluctuations of example assets<sup>13</sup>**

One side effect of the fluctuating value is the corresponding change in equity. Not all rules call for the inclusion of the changes in the PnL, but rather include the changes directly in equity. Once the profit or loss is realized that amount may or may not be recycled (i.e. moved through PnL).

Interpreting accounting just as a reflection of the past, this would not be a problem. The users of financial information however base their predictions of the future on the reported figures and thus, fluctuating equity numbers can have major consequences. For example, stakeholders might judge the company to be more risky than it actually is based both on the fluctuating equity and the temporarily lowered equity. On the other hand, a company might be judged healthy, though the profit and when it is realized, the cash, is

<sup>13</sup>Prices were adjusted to 1 at the base date. Source: Datastream

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only the result of a lucky gamble in the financial markets. Both situations show the problem in presenting useful information that is representing reality faithfully when the valuation basis is fluctuating chaotically.

Besides stakeholders in the company, other organizations use the provided information and base their rules and regulations either directly on accounting information or on some adjusted figures. In particular, some industries have capital requirements they need to maintain. Unpredictable and widely fluctuating equity will lead to frequent obligatory adjustments. Unfoundedly high asset valuation numbers would redeem the company from necessary measures.

A lot of critique of fair value accounting argues that it is impossible to establish a fair value in an arm's length transaction in illiquid and distressed markets as has happened to collateralized debt obligations (CDOs) during the recent financial crisis. The problem of using market prices to represent the value of an asset (as opposed to the value of an asset) however is not only hindered in illiquid markets suffering from distress sales. The same is true in overly optimistic or bubble markets as well as during events such as a squeeze (cf. the Volkswagen squeeze in Germany in October 2008 and Davidson 2008).

Additionally, there is an implementation problem concerning fair value. Managers might not deviate from market prices although the criteria from the fair value definitions are met because they fear litigation (cf. Laux and Leuz 2009a). The rules concerning fair value have to be strict to avoid manipulation but lenient enough to allow deviation from market prices when necessary. It is not easy to come up with a rule that caters to both needs.

Given the recent events during the financial crisis some academics (cf. Magnan 2009 and Laux 2009a) argue that using fair value accounting has aggravated the financial crisis and thus historical cost accounting would have either prevented the crisis or at least would not have let it spill as easily from the financial industry to the other sectors. Further, historical cost accounting is said to be more reliable (see part 3 for a discussion on

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reliability). It is true that is a lot easier to both verify and agree on. However, the value is not necessarily without bias – historical cost corresponds to the market value at an earlier time. Any bias or part of speculative pricing (bubble) that was included in the price at that time is going to stay reflected in the historical cost until the asset is removed from the balance sheet (e.g. retired or sold).

For assets, whose prices do not fluctuate a lot and that are only held for a short period, historical cost and fair value do not differ a lot. Consequently, differences can be seen for particularly old assets as well as assets with a high volatility in market prices. Thus in these cases historical cost accounting removes the somewhat undesired volatility in exchange for outdated information. Historical cost accounting (including any adjustments for scheduled depreciation) hampers comparability between figures in one company over time as well as between different companies. Crude oil for example, purchased at different times within one reporting period would be accounted for differently in different companies. The balance sheet (and the future PnL from the sale of said oil) would differ, though at the end of the year the expected economic future benefit of the same amount of oil, would be the same for both companies.

Finally, the strict use of historical cost accounting creates opportunities for manipulation. If a liquid asset is sold and rebought with minimal profit or loss the balance sheet can be adjusted to reflect current prices. If a company seeks to lower its income (e.g. for tax purposes or to lump together losses) it can sell assets that are currently reported above market prices and realize the loss. The reverse can be done to increase income, selling assets with higher market prices than book value.

Given the discussed issues with both fair value accounting and historical cost accounting one can see that neither is without flaws and any problem with one of them does not mean the other method is the a better choice overall (cf. 24, Laux and Leuz 2009a).

The historical development of current GAAP has caused inconsistencies in valuation and reporting. Currently some asset classes use predominantly historical cost while others use fair value. Adding the mixed forms of valuation, such as impairment adjustments but no upward adjustments makes any reports hard to impossible to compare. Further inconsistencies are that assets bought at the same time but used by different companies show the same value though one company might generate more value from the use. If the same assets are bought by the same company at different times, using them the same way the book value might differ. Immaterial assets, purchased and produced within the company, have a different set of rules altogether.

## **4 Accounting Goals and Desired Characteristics of Financial Reports**

When comparing and evaluating different accounting treatments of business transactions it is important to keep the goals of accounting in mind.<sup>14</sup> As different accounting systems have different objectives, one cannot assess if some treatment is more appropriate than another or if one leads to better results as the objectives are not that same to begin with (Laux and Leuz 2009a). Given the different historical development, there are different objectives and thus, there most likely is no perfect solution for all users of financial information. In particular, historical cost and fair value might either be the most suitable measurement depending on the circumstances. Additionally, one has to take into consideration the cost of different rules. That is not only the development and implementation cost (training, IT systems etc.) but also the loss of comparability and the possibility of manipulation (Laux and Leuz 2009a) Even when standard setters can agree

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<sup>14</sup> There are also different objectives of the management of the reporting company. While German small and medium-sized companies try to minimize profits to keep the tax burden low, American publicly traded companies try to report large profits to keep shareholders happy and management bonuses high.

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on a set of objectives there is disagreement on how best to achieve these goals. FASB and IASB have issued a list of characteristics of financial statements as well as assumptions used when preparing statements to ensure that the stated objectives are met. Even following this guide there is no clear hierarchy of characteristics and no measure of how much more important one characteristic is than the other is. Thus there is (a likely endless) debate going on about which accounting treatment is better as not everybody ranks and values the desired characteristics differently.

### 1. Overall accounting objective US GAAP and IFRS<sup>15</sup>

The IASB and FASB have spent considerable effort in trying to rework their respective frameworks into a common document. The frameworks for both accounting systems contain the objective statements for the preparation of financial statements.

The overall objective is to provide information “that is useful to a wide range of users in making economic decisions” (IFRS Framework.12, also Statement of Financial Accounting Concepts No. 1). As not all users can obtain additional financial information, the preparation of financial statements targets the needs of external users (cf. IFRS Framework.6). The IFRS framework identifies investors as such users that have the most overlap in needs with other users (cf. IFRS Framework.10). This information need includes the ability to judge the usage of the capital (provided by investors) by the management of the company. The IASB (and FASB in a similar way) has identified a number of characteristics that are judged necessary so that the overall objective of decision-usefulness can be met. It is not the point to illustrate all of those characteristics here, but rather highlight a select few showing tradeoffs when considering different measurements and accounting approaches.

### 2. Relevance

In the paragraphs 26 to 28 of the framework, the IASB specifically points out that information presented in the financial statements has to be relevant to users of the

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<sup>15</sup> The list of qualitative characteristics is based on the original framework

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statements in making economic decisions. For future stakeholders however, it is not important how successful the company has been in the past, but rather how it will perform in the future. The same is true for current stakeholders, though investors might be interested in the stewardship aspect of performance, to evaluate current management. From a logical point though, again, it is irrelevant how they performed in the past, their future performance is what investors are really interested in. The past performance is used as a proxy for the future and because most business decisions have consequences that reach into the future. The IASB has recognized this in paragraph 28, acknowledging that information about the current financial position and past performance are used to forecast the financial position at a future time and the performance of the company. They also clearly state that the quality of such forecasts can be improved by the way the information is presented (cf. IFRS Framework.28). Many argue now that historical cost accounting for the most part does not deliver relevant information, as most of them are sunk cost. There are write-downs and some other adjustments to lessen the impact, but the core problem stays the same; is the cash an entity paid 50 years ago for an asset relevant to its future performance?

### 3. Reliability<sup>16</sup>

In paragraphs 31 and 32 of the framework, the IASB states that the information presented has to be reliable in order to be useful for decision-making. Information is considered reliable when it is free from material error and bias. Another aspect of reliability is verifiability (cf. Johnson 2005). Historical numbers are easily verified as one can check the cash paid while fair value (and other) estimates are not as easy to verify. Just looking at brand valuation even experts hardly ever agree. As reliability is an important characteristic, IFRS even goes so far that information that is unreliable “in nature or representation” (IFRS Framework.32) and could be misleading might not be recognized but (if appropriate) disclosed in the notes.

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<sup>16</sup> The term reliability is not an explicit characteristic anymore in the updated framework yet to be finalized by the IASB, as it was difficult to agree on a precise definition of the word (cf. FASB 2005).

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Reliability is a major argument against FV accounting (cf. Laux and Leuz 2009a), in particular for illiquid assets. It is true that historical cost can be measured reliably. However, this does not mean that accounting based on historical cost as a measurement basis cannot be manipulated or is free from bias as is the case with FV and any other measurement basis.

If for example financial assets were held at historical cost, one could easily manipulate the balance sheet and earnings by selling and rebuying assets that have appreciated or depreciated since their initial purchase. The cost involved might only be a small transaction fee, though management would have the ability to adjust earnings up to the accumulated profit and loss of (liquid) financial assets held (the same is obviously true for financial liabilities such as a short position in a stock).

Secondly, it has been established in SFAS 157 and IFRS 13 fair value accounting rules that prices should be taken from an orderly transaction, not a sale under distress (SFAS No. 157, paragraph 7). If historical cost were used, the buyer of an item of a distress sale would recognize the item at a biased price.

Fair value on the other hand is not free from bias or manipulation either. Companies so far rarely use the stipulation of the fair value standard allowing deviating from market prices due to distress sales. Further, not all assets are actively traded in liquid markets. Neither is it possible to observe similar assets in the market for all items reported in a balance sheet. Thus fair value is an estimation, sometimes with easily observable inputs in a well-proven model, while other times the model is quite new and the input variables are subject to considerable uncertainty.

Further, this leads to very complicated accounting rules, as we need many different ways to account for financial assets to reduce manipulation, however criteria based on the intent of management are as difficult to audit using current rules (held to maturity etc.) as they are with new rules.

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### 4. Substance over form

Substance over form means that the economic reality is to be accounted for rather than the legal situation or even as the reporting company would like to represent it. With this desired characteristic, the standard setters cover the risk of preparers following standards to the letter rather than to the intent. Nevertheless, both IASB and FASB have issued a number of criteria to judge the economic reality of a lease, seemingly not satisfied to leave it up to the preparer of financial reports to judge the transaction on their own.

### 5. Prudence

As a number of estimates have to be included in financial statements, the standard setters ask for prudence when exercising judgment during the preparation. Unlike other standards, they qualify this request by not allowing deliberate hidden reserves and the preservation of neutral financial statements.

Not including speculative parts of assets is actually more prudent than current rules call for. Valuing higher (see CHAPTER V on new rules) would need to be separated so that the reader can see that this part might never be realized.

### 6. Comparability

A major advantage for stakeholders is the comparability not only between financial statements at different points in time, but also between companies. Many economic decisions are not so much a question whether to do a transaction (e.g. buy inventory) but rather to pick from a large number of choices (which vendor to use). Comparative information about the financial stability can ease the process of evaluating business partners as well as potential investments and thus facilitate economic exchange.

### 7. Other (Financial stability, tax)

As stated in the overall goal accounting information is not only tailored to meet the needs of one particular group but is intended for a wide range of users. Thus other

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institutions use accounting numbers either directly or as a basis for adjustments e.g. for regulatory capital or for tax accounting. Governments also control accounting rules in order to influence the economy. Finally, because accounting most likely produced a global financial crisis, standard setters (should) also consider goals that are not clearly stated in the current framework, i.e. financial and economic stability and to make tax income a reliable source of funds for governments. The fact that researchers investigate and discuss whether accounting is to blame (or partially blame) for the financial crises, indicates the broader role of accounting besides the pure communication function.

**CHAPTER V****CONSERVED VALUE BASED ACCOUNTING PRINCIPLES****1 Introduction**

In the previous chapter, the author presented a number of definitions and assumptions that motivate and influence the current accounting practice as well as the development of accounting rules. In this chapter, the idea of conserved quantities in the form of Functional Value is introduced to accounting. Any comparison is using full fair value accounting as the counterpart unless otherwise stated, with all changes immediately flowing through PnL. We will revisit a number of assumptions presented earlier and see how the existence of Functional Value as an alternative measurement might affect accounting principles. When introducing a new aspect into an already existing well-established system one has to consider how to integrate the two. We will introduce different approaches on how to deal with the challenges of Functional Value as a valuation base for each part of financial statements. Next, the conserved value based accounting principles (CVBAP) for selected items from each statement are presented showing the central idea.

Before going into details it is important to note that CVBAP in some sense are already the rule in most countries. Buying something for a price which will (for sure) not create an accounting cash flow is considered tax fraud and/or a criminal offence (“Scheingeschäft”, cf. the cases of Enron and round-trip transactions of AOL Time Warner). The same is true if the price for transactions within a company (e.g. between countries) are too high or too low and profits are manipulated. However, if the price is determined by an active and liquid market, such as financial markets, it is assumed that the pricing of the transaction is correct. Because of the current legal environment, even the subsequent proof of market prices being overpriced for a long time (cf. Appel’s (2012)

SAP analysis and the downwards adjustments during the burst of bubbles, e.g. the credit market in the US), does not have any legal or accounting consequences.

## **2 Assumptions and Goals of CVBAP**

### **2.1 General Assumptions**

The accrual basis of accounting as discussed in the previous chapter is used in CVBAP just as in US GAAP, IFRS, and German GAAP. The accrual basis of accounting requires transactions to be recorded when they take place rather than when the cash flow occurs. The distinction between cash basis and accrual basis however is not enough for CVBA. One can already see this idea in the accounting treatment of financial assets. The income associated with these assets can be treated as normal income flowing through the PnL. Another possible treatment is to recognize any gains and losses, but book them into equity directly without showing them in the PnL. In CVBAP the current two-step separation will be complemented by a third, the recognition of changes in Functional Value. So far, as can be seen in the example with the financial asset, any such changes cannot be shown properly. They are currently only visible in the statement of changes in equity. The other two levels of recognition are shown in a separate statement. In order to show clearly changes in Functional Value, the statement of changes in equity has to distinguish clearly between changes because of varying Functional Value and changes due to the interactions with shareholders.

Typically, the journal entries related to the recognition of revenue follows the following steps. First, the order is placed and the goods are delivered (this principle also holds for services rendered). This is the time when usually revenue is recognized. At this point allowances for warranty liabilities and sales returns will be booked. When the customer pays, the revenue will be recognized as a cash inflow. Any booked allowances will be adjusted to actual figures (this is usually not done on an individual sale basis, but

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for a larger group as a whole). Given time, all recognized revenue eventually flows through the cash flow statement. Any differences between the estimate and the final figures will be adjusted in the current PnL thus adjusting accumulated figures to the latest estimate or the final number as the case may be. In the long-run total revenue<sup>17</sup> will equal total collected cash. The only difference between the two is the timing. Assuming that the price paid by the customer is the Functional Value of the product, and thus a conserved quantity, CVBAP include an additional step. The increase in Functional Value of the firm (the difference between the Functional Value of the goods and their purchase price) is actually recorded when the inventory is bought and not only when it is sold. Thus any income will be accounted for in three steps: change in Functional Value, revenue, and cash flow.

The cash flow statement shows the changes in liquidity and flows of actual (including electronic) cash and cash equivalent. Typically that would be the latest point on the revenue side. There are exceptions though, as the actual cash flows might differ from the recognized revenue or expenses. This problem is remedied by adjusting PnL, so that the cumulated numbers are correct. As long as there are no significant discrepancies, such adjustments are not considered accounting errors, as recognized adjustments are an estimate to begin with. In summary, the cash flow statement shows the cash effect in the current period of current and prior business decisions and transactions.

The income statement shows the income when it is earned, i.e. when the framework's definition of an asset and income is met. There are some differences depending on the GAAP and on the type of the product and contract, but in general, recognition takes place when the sale has happened and the goods are delivered or services were rendered. That is the time when the income has been earned. You can also see any adjustments made, such as estimated warranty expense and allowances for bad debt. Thus the income statement shows the effect of business decisions of the current (and past) accounting period. Reported numbers are an estimate and subsequent corrections are shown in the current period (which prevents the correct numbers to be easily visible. As

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<sup>17</sup> Adjusted for bad debt and returns

long as such adjustments are small and the reported numbers are estimates, this is unlikely to hinder proper interpretation and forecasting).

The statement of changes in owners' equity provides the necessary data to reconcile equity numbers from one balance sheet date to the next. The largest change is typically explained in the income statement. Further changes are explained by interactions with the owners, such as dividends and additionally raised capital. There are also some other adjustments visible here, such as the effects of changes in accounting treatment.

When adding the recognition of changes in Functional Value to the statement of changes in owners' equity it will have a further section: changes in equity due to changes in Functional Value. As is the case with the recognition of revenue and expenses, the reported figure is an estimate and subject to later changes. Typically, the estimate of revenue and expenses will be more precise. Thus changes can be seen in the income statement. There does not have to be an adjustment in the current period in the changes of equity though, as the income is booked into equity as well.

## **2.2 The Balance Sheet, Income Statement, and Valuation**

The trade-off between the reliability of the numbers from the balance sheet and the income statement is still the case in CVBA. The measurement of Functional Value though is easier when looking at differences and changes as opposed to absolute figures. You can compare the problem to estimating the amount of oil in a particular oil reservoir. It is a lot more difficult to estimate the total of available oil as compared to the yearly (or monthly) extracted volume of oil. Thus normally the focus in CVBA is on the Functional Value income and cash flows.

The question as to how to measure value can clearly be answered to be Functional Value for any kind of asset. This makes CVBAP a lot more consistent and with less exceptions compared to conventional GAAP. Functional Value numbers are also more comparable than historical cost, more suitable to forecast than both fair value and historical

cost and more robust against bubbles than fair value. A clear disadvantage is that Functional Value is harder to estimate than fair value. It is also harder to justify and audit just as assets currently falling into level three of fair value measurement (maybe even level two). This estimation and verification problem makes a real world implementation of CVBAP very difficult.

## **2.3 Accounting Goals and Desired Characteristics of Financial Reports**

### **1. General**

The goal of CVBA is very similar to the goal stated in the IFRS and US GAAP framework, i.e. to provide useful information to users of financial statements. The difference is what is deemed useful. Therefore, Functional Value is used as a measurement base, unlike conventional GAAP, which uses a mix of various bases. CVBA also assumes that a sound business strategy aims to increase Functional Value and thus accounting should measure the progress achieved towards that goal. If a company chooses (or has to) engage in other activities that are at least partially speculative, accounting also has to be able to represent this fact. Thus it includes the fact that parts of past profits have been generated in a non-conserved way as well as the extent to which the company is exposed now. The distinction in each statement is important to facilitate forecasting, as the user can clearly see the difference between conserved and non-conserved numbers. Finally, CVBAP do not allow reporting companies to inflate their numbers during bubbles. This is not a separate goal of CVBA but rather a necessity for readers to base their economic decisions on the numbers reported.

### **2. Relevance**

Relevance is still an important qualitative characteristic of accounting numbers. Due to its forward-looking nature, Functional Value is relevant information for decision-making. One of the (more backwards looking) uses of financial reporting is the evaluation of the performance of management. Users usually do not want to evaluate the past performance, but rather they would like to know how the manager will perform in the

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future and they just use the past as a proxy. If the investors were to know that a manager will perform perfectly in the future, but had some issues before that would be like a sunk cost. For this objective there is no issue with the relevance of Functional Value. In the case that accounting is actually used to just judge the past performance, without explicitly considering future performance, e.g. to base management compensation or taxes on, Functional Value still gives relevant information. Functional Value recognizes growth as it occurs and not only when the profit is realized. Thus a strategic decision, e.g. investment in research and development as well as in the brand value, show in accounting as an asset (or part of another asset) and do not lower the income number as it does in conventional GAAP. This instills a long-term focus in evaluating management.

### 3. Reliability

The characteristic reliability has a number of different parts to it. One is verifiability and another is faithful representation. While some measures like fair value (if it is an observable market value) are easily verifiable, it is not as easy to ascertain a faithful representation of what is actually represented. Functional Value, like fair value of the third level (and to some extent the second level), is not as easily verifiable. A number of experts will most likely not agree on any one number, though they should be able to agree on an acceptable interval. Functional Value should by definition give a faithful representation of what it intends to represent. As CVBA currently is a thought experiment, any measurement and verifiability issue is not a major problem, as we assume that Functional Value exists and can be estimated.

### 4. Substance over form

Using the Functional Value as a measurement base, CVBAP automatically consider substance over form, as Functional Value evaluates the financial implications of any transaction or agreement. The legal side of agreements is taken into account when estimating the conserved cash flow, both in terms of the amount and the risk (and thus the discount rate).

## 5. Prudence

Functional Value, if estimated correctly, is a prudent number. The definition of Functional Value removes any part of speculative valuation (e.g. as can be seen in bubbles). Any impact through unpredictable market movements is eliminated. These movements are typically upwards, thus the Functional Value removes the part of the valuation that is not dependable. This is not only done in the case of risky investments, but also in the case of regular business activity.

## 6. Comparability

In the previous sections a number of problems with comparability have been mentioned when using historical cost accounting. The problem of comparability among companies (including the non-constant monetary unit problem in HC accounting) does not arise when either fair value or Functional Value is used as each financial report uses the current unit. Comparability year over years stays somewhat problematic.

## 7. Other (Financial stability, tax)

Financial reports using CVBAP have a number of desired characteristics because of the conserved nature of Functional Value (cf. CHAPTER III3). Conserved values do not change without a corresponding change in another variable and thus cannot change spontaneously. Thus reported equity in CVBAP financial reports does not change without corresponding change in the “real world”. This means that prices, inflated through speculation, cannot increase equity and enable companies to report (sufficiently) large equity if it is only that large because of inflated prices on the asset side of the balance sheet. This should facilitate the job of regulators.

Another group of accounting number users is national revenue services. Currently, tax income is estimated, though especially during crises the tax income falls short of expectations. Given the long-term nature of a lot of government planning and spending plans, it is often not possible to react in time when a crisis hits (usually unexpectedly). If

CVBAP are used to base taxation on, the income and thus the taxes are not subject to such large fluctuations (cf. CHAPTER VII).

### **3 General Approaches to Integrating Functional Value into Financial Reports**

There are a number of options on how to present the information on the balance sheet. First, the Functional Value could be presented as additional information in the notes to the financial statements. This option is less than ideal as the idea behind using Functional Value is to present it clearly on the face of the statements and not only in the notes. Though users can refer to information in the notes, it requires a lot more effort to incorporate them into the given figures as compared to presenting the numbers directly.

A second option is to present the numbers as they are now and then adjust total assets, liabilities and equity in a lump sum each. This option would present the main reports quite similar to how they are not using Functional Value. Nevertheless, the users of financial statements would have to guess or rely on additional information to judge how much of the difference is caused by what balance sheet position. Additionally, this option would violate the principle of comparability and the current rules regarding materiality and aggregation. At different points in time and across companies, the impact on various balance sheet accounts of the lump sum adjustment would differ and thus hinder comparability. Further, balance sheet analysis requires the use of accounts with various levels of liquidity and thus any lump sum adjustment could potentially obscure material information from the readers.

The next more granular level would be to present each line item on the balance sheet at both fair value and Functional Value. This would make any balance sheet difficult to read and thus it would be better just to have two sets of financial statements essentially

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stating each item on the reports just using Functional Value. Obviously, the balance sheet aggregates these numbers; however, each transaction would have to be booked into the ledger at Functional Value. The problem here is that it is hard to estimate a separate Functional Value. Further, this option does not directly relate or link the two different values, making the comparison less obvious.

Finally, the financial statements can show the fair value as well as the Functional Value by using adjustments. This principle is already used in US GAAP when presenting PP&E and trade receivables. The gross amount is shown with an adjustment resulting in the net figure. For PP&E this is important as the users can estimate the age of the equipment due to the level of depreciation already accumulated. In the case of trade receivables one can see how well a company collects on its revenue.

The same arguments about only presenting fair value numbers or Functional Value numbers made for the balance sheet are valid for the other statements: income statement, cash flow statement, and statement of changes in owners' equity. The income shows the recognized earnings when using fair value or what is called earned income. The definition of what is earned under Functional Value is different though. Thus there needs to be another adjustment to equity in order for both figures to match what is shown on the balance sheet.

The cash flow statement is particularly interesting when using Functional Value. IAS 7 (IAS 7.5) clearly states the importance of cash flow information as an input to forecasting: "Historical cash flow information is often used as an indicator of the amount, timing and certainty of future cash flows." Thus the characteristic of Functional Value as a conserved quantity is particularly desirable.

In the long-run every transaction (short off returning to barter transactions) in accounting leads to cash (at the latest when the company ceases to exist). The asset side is first recognized on the balance sheet. Then, the item is either sold or used, which either in one go or gradually lets the cost flow through the income statement. Depending on the item,

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the cash flow occurred before recognition in the income statements (typically PP&E) or close to the transaction or after (inventory). Whatever the valuation before the asset is retired or sold, any difference to the cash flow cancels out by that time. The total depreciation equals the amount paid for the asset and the value of receivables is adjusted to fit the amount of cash received. Some items are never shown on the balance sheet, such as rent expense, however that is assuming we received the economic benefit in the same period as we paid the expense, otherwise we have accruals on the balance sheet. When using Functional Value and the definition of business activity based on the creation of Functional Value we will have different total assets as well as income, i.e. different interim valuations. Nevertheless, once the transaction is finished and everything is converted to cash, the cash flow stays the same. This is also true in the short-run, as cash flow is the difference between the cash (and cash equivalent) balance between reporting dates. The cash balance's value however is straight forward. The reason for this consistency is quite simple; cash is fungible. Once cash is earned one cannot distinguish anymore how it was earned (though one can remember how it was earned and book accordingly). When a non-business transaction, such as a gambling bet, is won, the cash does not differ from the cash earned through the production and sale of a product. Though the total of the cash flow stays the same notwithstanding the measurement basis, the information contained in the cash flow statement differs significantly. Currently the cash flow is separated into three categories: operating, investing and financing cash flow (cf. IAS 7.10). The objective of the CFS is stated in the objective section of IAS 7:

*“The economic decisions that are taken by users require an evaluation of the ability of an entity to generate cash and cash equivalents and the timing and certainty of their generation.”*

The separation of investing and financing cash flows allows readers to better assess the use and generation of liquidity. However, without any further information readers of financial statements cannot assess the certainty of the cash flows, particularly in the operating section, as there is no information whether they were generated by the realization of an increase in Functional Value, the realization of Functional Value itself or even by

luck. In order for financial statements to provide the necessary information to accomplish what is stated as the objective of the Cash Flow standard according to IFRS, additional information has to be provided, the cash flows additionally have to be divided into conserved cash flows and non-conserved.

When the three categories are further split into a conserved and a non-conserved part, the additional information will facilitate the predictability of future cash flows especially in the operating section. One can clearly see the amount of cash flow generated through business activity as compared to speculative influences. Though one can argue that companies cannot always buy input factors and investments at a non-inflated price, a company not speculating actively should be able to generate a positive functional cash flow with fluctuations caused by the non-conserved fluctuations of both the buy and sell prices (which ideally cancel out).

## **4 Selected Balance Sheet and Income Statement Items**

### **4.1 Equity**

Equity is defined in the IFRS framework as the residual value, when subtracting all recognized liabilities from all recognized assets (cf. IFRS Framework.49). The same can be said for CVBAP. Equity though, is not only a residual, it obviously also results from changes to the equity accounts because of transactions and revaluations. CVBAP use different equity accounts to classify equity, this includes the typical distinction between paid-in capital, additional paid-in capital and retained earnings. Retained earnings (R/E) are further divided into retained earnings from Functional Value profit and the remainder to conventional GAAP retained earnings as shown in Table 1.

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Balance Sheet			
Cash	8,845	Paid in Capital	10,000
Inventory	1,090	Equity Reserve	-250
Inventory Adj./Contra	-250	Functional Value Retained Earnings	630
PP&E	1,000	Retained Earnings	305
10,685		10,685	

**Table 1: Equity: Example Balance Sheet**

As equity (besides cash) is of particular interest to users the differences from year to year there is also a reconciliation in the form of a statement of changes in owners' equity. The changes in positive and negative equity reserve are presented in the reconciliation. Any significant changes in the reserve that result from one single balance sheet position or even one single transaction have to be presented separately with any necessary additional information in the notes. An example for a statement of changes in owners' equity is shown in CHAPTER VI5.

## 4.2 Inventory

Besides financial assets, current assets mainly contain inventory and accounts receivables. We will look at both in turn. Currently, inventory is held at cost or in many cases at lower of cost and market. In order to report conservative numbers an increase in price of the inventory (beyond the initial cost) is usually not recognized in the financial statements, while a decrease below the initial cost is reported.

In order to value the inventory the conserved cash price for the product has to be estimated. The PESTEL framework can help estimate the conserved part. If there is no significant change to any of the PESTEL characteristics, the estimate should not change. The easiest form of inventory is in a trading company. The Functional Value added is the service provided to customers, be it convenience or some of various support opportunities. The base example is a trading company purchasing an item (widget) at a price of 30 and

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selling it at a price of 35. The Functional Value of the widget when purchased was 20 and increased to 22 due to the additional value to the customer. Below are the facts as well as the journal entries for the purchase.<sup>18</sup>

	Purchase	Sale
Price	30	35
Functional Value	20	22

**Table 2: Inventory Example 1: Price and Functional Value**

Purchase			
	Inventory	30	
			Cash
			30
	Equity Reserve	10	Asset Contra Account
			10

**Table 3: Inventory Example 1: Journal Entries Recording the Purchase of Inventory**

The Inventory is booked with the corresponding amount of cash (assuming immediate payment for simplicity). The Inventory balance is then adjusted to Functional Value using the Asset Contra Account. Additionally, the equity has to be adjusted down, also using a contra account but with a debit balance. The beginning balance sheet and the balance sheet after the purchase are shown below.

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<sup>18</sup> The first example presented is shown in more detail as an introduction.

## Conserved Value Based Accounting Principles

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Balance Sheet			
Cash	100	Equity	100
100		100	
Balance Sheet (after Purchase)			
Cash	70	Equity	100
Inventory	30	Equity Reserve	-10
Asset Contra Account	-10		
90		90	

**Table 4: Inventory Example 1: Balance Sheet before and after the Purchase**

When the widget is sold, the inventory account as well as the adjustment accounts have to be cleared. The following journals will be posted.

Sale			
	Cash	35	
	CoGS	30	Sales
	Asset Contra		35
	Account	10	Inventory
	Sales Adjustment	13=35-22	30
			CoGS Adjustment
			10=30-20
			Equity Reserve
			10
			Comprehensive Income
			Adjustment
			3=13-10

**Table 5: Inventory Example 1: Journal Entries to Record the Sale**

The income statement and cash flow statement can be prepared next, followed by the closing entries, the ending balance sheet and the statement of changes in owners' equity, reconciling the equity (including retained earnings) balances before and after the transactions.

Conserved Value Based Accounting Principles

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<b>Income Statement</b>	
(1) Sales	35
(2) Sales Adjustment	-13
<hr/>	
Functional Value	
(3)=(1)+(2) Sales	22
(4) CoGS	-30
(5) CoGS Adj.	10
<hr/>	
Functional Value	
(6)=(4)+(5) CoGS	-20
<hr/> <hr/>	
Functional Value	
(7)=(3)+(6) Profit	2
Comprehensive	
(8) Income Adj.	3
<hr/>	
Comprehensive	
(9)=(7)+(8) Income	5
<hr/> <hr/>	

**Table 6: Inventory Example 1: Income Statement**

**Cash Flow Statement**

Functional Value	
Profit	2
<hr/>	
Operational Cash	
Flow (Functional	
Value)	2
Comprehensive	
Income Adj.	3
<hr/>	
Operational Cash	
Flow (other)	3
Cash Flow from	
Operations	5
<hr/> <hr/>	

**Table 7: Inventory Example 1: Cash Flow Statement**

## Conserved Value Based Accounting Principles

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<b>Closing Entries</b>		
PnL	2 Function Value R/E	2
Comprehensive Income Adj.	3 R/E	3

**Table 8: Inventory Example 1: Closing Entries**

### Statement of Changes in Owners' Equity

Opening Balance	100
Functional Value Profit	2
Comprehensive Income Adj.	3
<b>Closing Balance</b>	<b>105</b>

**Table 9: Inventory Example 1: Statement of Changes in Owners' Equity**

Balance Sheet (after Sale)			
Cash	105	Equity	100
Inventory	0	R/E	3
Asset Contra Account	0	Functional Value R/E	2
	105		105

**Table 10: Inventory Example 1: Balance Sheet after Sale**

One can see in the balance sheet that both fair value and Functional Value are presented. The retained earnings in the balance sheet are separated because it is also relevant to users how the company has performed in the past. In comparison the final conventional GAAP balance sheet does not show the split in retained earnings but looks the same otherwise. The Functional Value retained earnings show the Functional Value profit realized in the past. The conventional retained earnings are the sum of both retained earnings accounts in Table 10. The three reconciles the retained earnings with the fair

## Conserved Value Based Accounting Principles

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value retained earnings. Separately it can be interpreted as realized non-Functional-Value profit<sup>19</sup>. Next, the interim balance sheet and the income statement using the conventional presentation are shown below for comparison.

Balance Sheet (after Purchase)			
Cash	70	Equity	100
Inventory	30		
	100		100

**Table 11:** Inventory Example 1: Interim Balance Sheet using Conventional GAAP

Income Statement	
(1) Sales	35
(2) CoGS	-30
(3)=(1)+(2) Profit	5

**Table 12:** Inventory Example 1: Income Statement Conventional GAAP

Expanding the previous example we consider a tanker truck of crude oil next. In order to visualize the effect of large fluctuations we let the market price of the oil vary throughout the considered time period. The truck loads the oil and transports it to the destination within a week. Within this time the price and Functional Value of crude oil changes as follows:

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<sup>19</sup> These can be speculative profits, however they do not have to be.

Conserved Value Based Accounting Principles

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	Market Price	Functional Value
Purchase	100	60
T <sub>1</sub>	120	60
T <sub>2</sub>	80	60
Sale	100	60

**Table 13: Inventory Example 2: Market Price and Functional Value**

As a basis for these numbers, we took the crude oil prices (Datastream) of the last 25 years and looked at the maximum and minimum daily return<sup>20</sup>. We found the largest drop in January of 1991 with a loss of 33% followed by a price increase of 14% not even a week later. The largest increase in the sample was 21% in August of 1986 following a 17% drop about 2 weeks earlier. Given these numbers, the example does not appear quite as unrealistic.

As the example has a very simple income stream and cash flow, only the balance sheets are compared below. Although nothing really happened, but the rather uneventful transport of some commodity, the equity of the company using conventional GAAP has moved each time period, letting the company appear a lot more volatile than might be expected looking at the actual activities. CVBAP also show a change in equity, however the users can clearly distinguish the change caused by the purchase from other income recorded at the time. It is also known to the reader that the decrease in value might not be permanent, but the company entered into a transaction exposing the stated amount of equity to unpredictable variations in the market. Although the change can be larger than the reserve, this should rarely be the case as one can expect to generate a conserved cash flow in the future worth the Functional Value reported in the balance sheet.

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<sup>20</sup> Standard return (not log-return)

Conserved Value Based Accounting Principles

**CVBAP**

Balance Sheet			
Cash	250	Equity	250
250		250	

Balance Sheet (after Purchase)			
Cash	150	Equity	250
Inventory	100	Equity Reserve	-40
Asset Contra Account	-40		
210		210	

Balance Sheet (T <sub>1</sub> )			
Cash	150	Equity	250
Inventory	120	Equity Reserve	-60
Asset Contra Account	-60	R/E	20
210		210	

Balance Sheet (T <sub>2</sub> )			
Cash	150	Equity	250
Inventory	80	Equity Reserve	-20
Asset Contra Account	-20	R/E	-20
210		210	

Balance Sheet (after Sale)			
Cash	250	Equity	250
Inventory	0	R/E	0
Asset Contra Account	0	Function Value R/E	0
250		250	

**Conventional GAAP**

Balance Sheet			
Cash	250	Equity	250
250		250	

Balance Sheet (after Purchase)			
Cash	150	Equity	250
Inventory	100		
250		250	

Balance Sheet (T <sub>1</sub> )			
Cash	150	Equity	250
Inventory	120	R/E	20
270		270	

Balance Sheet (T <sub>2</sub> )			
Cash	150	Equity	250
Inventory	80	R/E	-20
230		230	

Balance Sheet (after Sale)			
Cash	250	Equity	250
Inventory	0	R/E	0
250		250	

**Table 14: Inventory Example 2: CVBAP and Conventional GAAP Balance Sheet Comparison**

When the inventory is sold and then used in a different company there should be very little difference in value, as it is conserved. If the product is perishable (e.g., milk, fruits, and vegetables) the extra storage time and transport will likely destroy value (besides the unnecessary transport) as the product usability decreases with time of storage and there is a higher chance of damaging the products. Non-perishable goods would have the same Functional Value in other companies as the Functional Value is defined as the conserved part of the value, meaning the part that is constant.

### **4.3 Accounts Receivable and Accounts Payable**

Accounts receivable are similar to financial assets as they are legal claims to future cash flows. Under conventional GAAP, sales are booked at the price that is charged to the customer. Before the reporting date, adjusting entries are booked, to lower the receivables to include expected default as not all receivables are paid in full and on time. As there is a legal claim to the future cash flows, they are conserved (barring extreme changes in the legal environment). Consequently, the Functional Value is calculated using the expected payments and the timing of these payments. Usually this would already be considered when the sale is actually made. Thus the receivable recognized is already adjusted to the Functional Value. If there are any changes in the estimates, as with any other valuation, the changes are recognized as bad debt expense, which is a normal expense of doing business or as a gain. There typically is also a Functional Value profit, as the non-discounted value should be received at the due date. The profits and losses impact part of the Functional Value profit and flow into regular retained earnings. If the time between the recording of the sale and the payment date is short, one can consider ignoring the discount because of the timing. As there already is an estimation error when forecasting the expected cash flow, the small valuation difference because of timing difference might be immaterial. If there is a reason to doubt this assumption, though, one has to report the Functional Value as is.

Finally, one has to consider how to present the cash flows in the cash flow statement. This is somewhat tricky, as cash is fungible. One cannot tell from the cash that is received, if it was for a conserved value or not. There are several options on how to deal with this problem (cf. section CHAPTER V5).

## Conserved Value Based Accounting Principles

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Accounts payable are accounted for using the same principle. The money to be paid out is recorded on the balance sheet using the Functional Value. If there is a difference between the Functional Value of the product purchased and the amount due, the difference is realized as the initial transaction is recorded and thus, the accounts payable already reflect the profit or loss. To illustrate this with an example, we can look at the three possible scenarios: the reporting entity pays less, the same or more than the Functional Value of the acquired object.

If we pay less, the accounts payable are also valued lower. The difference is booked into the equity reserve, i.e. an account addition to the Functional Value equity or reducing it, depending on the circumstances. When the cash is rendered, accounts payable are debited and cash is credited. In case we pay the same as the Functional Value, there is no difference to regular GAAP accounting. Finally, in case we paid more than Functional Value, the reduction in Functional Value equity has already taken place (as can be seen in the following balance sheet).

Opening Balance Sheet			
Cash	1,000	Equity	1,000
Inventory	0	Equity Reserve	0
Inventory Contra Account	0	Accounts Payable	0
	1,000		1,000
Balance Sheet (buying at a lower price than Functional Value)			
Cash	1,000	Equity	1,000
Inventory	400	Equity Reserve	100
Inventory Contra Account	100	Accounts Payable	400
	1,500		1,500
Balance Sheet (buying at the same price as Functional Value)			
Cash	1,000	Equity	1,000
Inventory	500	Equity Reserve	0
Inventory Contra Account	0	Accounts Payable	500
	1,500		1,500
Balance Sheet (buying at a higher price than Functional Value)			
Cash	1,000	Equity	1,000
Inventory	600	Equity Reserve	-100
Inventory Contra Account	-100	Accounts Payable	600
	1,500		1,500

**Table 15: Accounts Payable: Balance Sheets**

#### 4.4 Financial Assets and Liabilities

Currently, there are four major methods used to account for financial assets. They differ in the form they treat changes in fair value of the investment. Depending on the set of rules being followed, financial assets are classified into three categories: held-to-maturity, available-for-sale, and trading securities. The fourth method deals with equity investment that exceeds a certain threshold, the other company is considered a subsidiary, and their financials are consolidated rather than treated like a limited investment. The treatment of market price fluctuations depends on the classification of the asset. The classification in return depends in some parts on the nature of the asset (e.g. fixed income products have a maturity, stocks do not) as well as the intentions on what management plans to do with the assets (e.g. held-to-maturity or for hedging purposes). Although there is a trend towards using fair value (cf. Ball 2006, Bertoni et.al 2005), the different treatment methods already indicate that standard setters realize the problem with marking all positions to market. This is particularly obvious in the additional rules concerning accounting for hedges, to avoid misrepresentation of the economic substance of certain combinations of financial assets.

Additionally, including market prices in financial reporting also introduces the undesired behavior of the variability into financial statements resulting in a pro-cyclical effect, facilitating bubbles and accelerating crises (cf. Laux and Leuz 2009b). The compromise to treat financial assets depending on management's intentions however, has two major disadvantages: the possibility of manipulation (Wallison 2008a) and the inconsistency in the accounting treatment (and then still some financial assets are marked to market).

Other non-derivative investments, such as bonds and equity, are also accounted for using their Functional Value. The Functional Value is estimated using the definition of Functional Value, thus might considerably differ from the market price especially in the case of equity products. Fixed-income products on the other hand will typically show Functional Value closer to the market price. Cash and cash equivalent are the extreme examples here, as the Functional Value of cash and the price are the same.

## Conserved Value Based Accounting Principles

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The above-mentioned difference in use is important when estimating the Functional Value. Otherwise, the journal entries and recognition works the same as the accounting for inventories.

Derivatives in particular can have a large gap between market value and Functional Value. Many derivatives with no business need are a very leveraged form of speculation and thus have no Functional Value. E.g., a long call option on a stock would typically have the strike price close to the market price and thus higher than the Functional Value of the stock. With the market price fluctuating randomly, there is no way of forecasting the cash flow and it can change without a corresponding change in any other variable. Thus there is no expected conserved cash flow and consequently the call has a Functional Value of zero. The same is true for a short position, however, the difference to the current market price is at risk and thus, though still part of equity, at a lower tier.

The following example shows the accounting for a naked call position. The market price of the calls is 100 at the purchase date and fluctuates from 50 to 200 until the call expires worthless. This is not an unusual scenario, especially for at the money and out of the money options, as the below real life example of the BMW stock and some options in Figure 6 shows. The call with strike 100 is out of the money and has a very small price. Any changes though are a large percentage change.

First, the calls are recorded at their purchase price. The next step is to revalue to Functional Value. Then each time the market price changes, the Asset Contra Account is adjusted. As mentioned before, the contra account, unlike regular contra accounts, can have a debit balance. Any “profit” that is unrealized is booked into retained earnings after flowing through PnL. As there has not been any gain in Functional Value, the profit or loss is not booked into the Functional Value retained earnings. Depending on the nature of the typical business of the company, the profit and loss from financial instruments would be shown in varying degrees of detail. Below the journal entries for the example are given.

## Conserved Value Based Accounting Principles

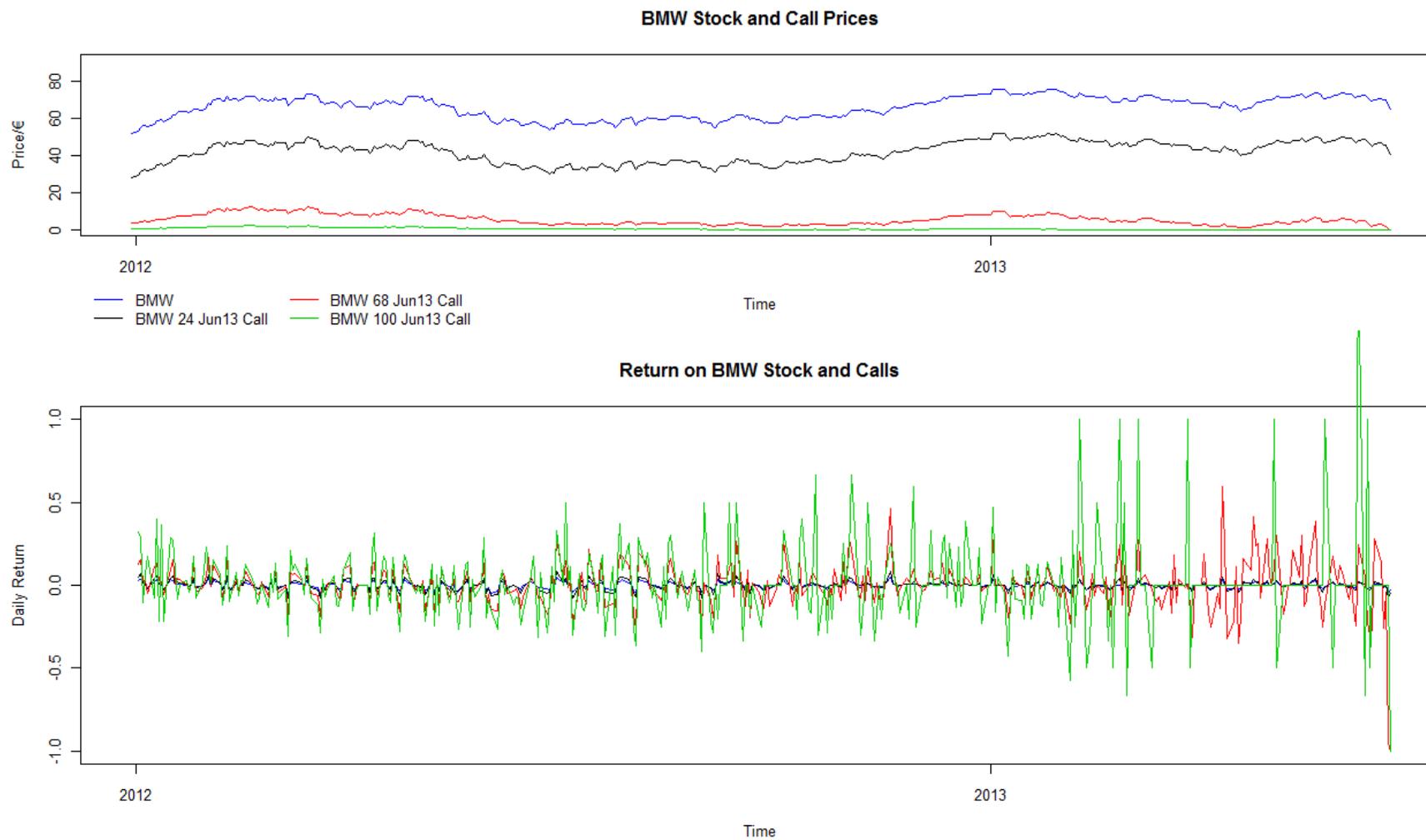


Figure 6: BMW Stock and Call Option Prices<sup>21</sup>

<sup>21</sup> Source: Datastream

Conserved Value Based Accounting Principles

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Financial Assets	100	Cash	100
Equity Reserve	100	Asset Contra Account	100
Equity (PnL)	50	Financial Asset	50
Asset Contra	50	Equity Reserve	50
Financial Asset	150	Equity (PnL)	150
Equity Reserve	150	Asset Contra	150
Asset Contra	200	Financial Asset	200
Equity (PnL)	200	Equity Reserve	200

**Table 16: Financial Assets: Journal Entries**

The effect on the equity though can best be seen when comparing the balance sheets of conventional GAAP and CVBAP for the example above. The equity under conventional GAAP as depicted on the right hand side is fluctuating between reporting periods. The valuation of the financial asset fluctuates with the price, which fluctuates chaotically. This also means that the equity fluctuates. Depending on the size of the position(s) in comparison with the amount of equity and debt the entity is financed with, the percentage change of the equity rate can be quite substantial. This is particularly dangerous when we look at  $T_2$ , as the company seems to have a sufficient amount of equity. In the real world, this would be the case when looking at financial institutions holding a large number of financial instruments during a bubble in financial markets. When the bubble bursts and there are large losses on most assets and even total losses on many derivatives, the once promising equity rate might just not be enough.

CVBA on the other hand does not show this inflated amount of equity. Actually, it does not show much change. When the asset is bought, we recognize that we just spent an amount of 100 on something without Functional Value and show this in our equity. We still show that according to conventional GAAP, we have a higher equity, but we present the amount of equity that is in danger because of the contract we have entered into.

### Conserved Value Based Accounting Principles

#### CVBAP

Balance Sheet			
Cash	250	Equity	250
	250		250

Balance Sheet (after Purchase)			
Cash	150	Equity	250
Financial Asset	100	Equity Reserve	-100
Asset Contra Account	-100		
	150		150

Balance Sheet (T <sub>1</sub> )			
Cash	150	Equity	200
Financial Asset	50	Equity Reserve	-50
Asset Contra Account	-50		
	150		150

Balance Sheet (T <sub>2</sub> )			
Cash	150	Equity	350
Financial Asset	200	Equity Reserve	-200
Asset Contra Account	-200		
	150		150

Balance Sheet (T <sub>2</sub> , after Sale)			
Cash	150	Equity	150
Financial Asset	0	Equity Reserve	0
Asset Contra Account	0		
	150		150

#### Conventional GAAP

Balance Sheet			
Cash	250	Equity	250
	250		250

Balance Sheet (after Purchase)			
Cash	150	Equity	250
Inventory	100		
	250		250

Balance Sheet (T <sub>1</sub> )			
Cash	150	Equity	250
Inventory	50	R/E	-50
	200		200

Balance Sheet (T <sub>2</sub> )			
Cash	150	Equity	200
Inventory	200	R/E	150
	350		350

Balance Sheet (T <sub>2</sub> , after Sale)			
Cash	150	Equity	150
Inventory	0	Equity Reserve	0
	150		150

**Table 17: Financial Assets: CVBAP and Conventional GAAP Balance Sheet Comparison**

If the financial instrument has a Functional Value in combination with another asset, such as a receivable in a foreign currency plus a hedge to reduce the risk of the expected cash flow, the profit or loss from the instrument is part of the expected cash flow of a particular asset. It is accounted for with the asset, similar to hedge accounting now. The composition of the asset is then disclosed in the notes. If there are multiple significant parts to assets that are not financial instruments, they are disclosed in the notes as well. See section 4.6 for more details on accounting for fixed assets.

## 4.5 Personnel Expense

When a company hires somebody they can expect to get as much value or more in future periods than they pay the employee (if not it was a bad hiring decision). Usually, the two values should be close. Thus the Functional Value should be close to zero, as the expected cash outflows and inflows are nearly the same. If the person were to quit and start working at a different company, they should be able to create a similar value as in the initial company, leaving the Functional Value (overall) constant.

Sometimes however, these assumptions are not true. A highly specialized person could create less value in a different position or might not even find a new job when let go. From a global perspective, this decision would destroy value, as the person (asset) is not put to optimal use. It is the same as if one were to use money to heat instead of buying firewood. The Functional Value of the money would be the same, but the use one gets out of it is a lot lower. One is in this case literally *burning money*.

There is also the possibility that the expected cash inflows greatly exceed the expected cash outflows. The expected surplus can be separated into cash flow generated within the existing operations and additional cash flows. For example, a new Chief Executive Officer (CEO) could increase the Functional Value of existing assets by increasing sales and making the process more efficient. They can further create (or instigate the creation) of additional products, (e.g. a computer company starting to sell phones or video games). The first will be part of the valuation of the existing operations while the latter should be shown as part of goodwill, namely human capital on the balance

sheet, i.e. a reduction of the “value” of the CEO because the value (idea) was “in” the CEO before. As valuing future ideas is close to impossible it should be limited to actually existing developments. There are plenty of examples showing that ventures into additional markets and new leadership do not always succeed. When additional operations start, there will obviously be an increase in Functional Value in the financial statements, though in reality there was just an exchange between unrecognized human capital and the new operations. Despite this apparent jump in Functional Value, financial statements from all relevant companies should in total be relatively constant as the other companies can expect to receive a smaller share of the conserved cash flow generated in the market.

## **4.6 Fixed Assets**

### 4.6.1 Tangible (PP&E) and Intangible Acquired Assets

Tangible assets are typically recorded at cost and then depending on their nature depreciated (land is not depreciated). If the price of the asset increases, some reporting rules allow for the asset to be shown at the higher value, sometimes though limited to the initial cost of the asset. Full fair value accounting would have the value of the asset fluctuate up and down with the price of the asset while calculating a yearly depreciation expense (though not equal to the change in reported value).

Both ways of accounting have some disadvantages. The following example shows the problem with using historical cost to value fixed assets. Two companies buy similar assets, though one pays more than the other company. In comparison, the company that paid more can show a higher value of fixed assets, giving the impression that their fixed assets are worth more. In the following years they “pay” for the additional purchase price by having higher depreciation and smaller net income, which is somewhat mitigated by lower taxes. Cash flow (besides the tax effect) is not affected after the asset has been paid. Thus they skew the picture the financial statements draw that they invest more and have more or maybe better assets. Using fair value has disadvantages too. Paying more initially will not lead to a higher reported value of the asset. However, if the asset is one with frequently changing prices both the reported value and expense will have little to do with

## Conserved Value Based Accounting Principles

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the actual use during production and the generation of value. Further, the value of the equity will fluctuate with the value of the asset. The revaluation will affect the income directly or in the form of comprehensive income. The company would appear more volatile than their business actually is.

When using Functional Value the asset is valued using the estimated conserved cash flows. The depreciation expense is the decrease in Functional Value from one reporting date to the next. The actual cash flow in each reporting period will differ from the estimate (unless by coincidence). This does not however have to impact the estimates of the subsequent years and thus the depreciation would be the expected loss in value. If there is new information that indicates that the initial estimate was incorrect, changes are booked in the year they occur. Typically, though, this should not be the case. If there are any changes in the significant influence factors however, there has to be an adjustment to the Functional Value. As before, the difference to the traditional valuation is booked into an asset contra account, which in the case of a higher Functional Value can have a debit balance, and in an equity reserve account, which also can have either a debit or a credit balance.

Land is a special kind of property as it potentially has an indefinite useful life. It is also special in the sense that bubbles occur frequently in the land and housing market (Japan, the US and Spain just to name a few examples). This can be seen when there are sharp increases in prices when there are no other significant changes. Prices for example can change when the number of people and business in an area takes an unexpected turn, or when the available area changes due to new land or floor space or the destruction thereof. Obviously, there are other potential changes, such as political or social changes. When these occur, one has to analyze the impact on the expected conserved cash flows in terms of value, timing and risk, and then adjust the Functional Value accordingly. Though, as mentioned before, this should not happen frequently.

The below example shows the estimated conserved cash flows generated by a machine that produces widgets. The expected conserved value of sales is 1,000 EUR per

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year, for 5 years, starting from year 1. The value of the machinery includes other necessary equipment that is used to operate it, e.g. the power supply. In order to value the machine you have to consider the conserved cash flow generated by operating the machine. Besides the generation of sales, there are also additional cash outflows such as direct costs of material and labor and indirect costs such as managers' salaries and administrative expenses. Typically though, this does not cover all of the cash flow associated with an asset. There are also costs for the general administration such as invoicing and sales representatives. Traditionally selling costs are not included in the valuation of inventory and thus not in the cost of goods sold (CoGS) and gross margin. In order to value the equipment correctly, one has to consider these costs though. Otherwise, one would recognize the asset (a future cash inflow) but not the liability side, i.e. the expected cash outflow to generate the revenue and cash flow in the first place. If possible, one can do so by analyzing the processes involved with the asset, however it is more likely that there are going to be expected margins either as a percentage of gross margin, revenue, or of some other value. If the company employs activity based costing, the information can be used for the cash flow estimate. In this example, we assume that there are additional costs of 15% on the gross margin.

Further, we assume a discount rate of 10%. Summing up the discounted cash flow gives us a Functional Value of 1,289. As the initial cost of the equipment was 1,000, we immediately recognize a Functional Value profit of 289. Using normal straight-line depreciation would result in yearly expenses of 200. CVBA does not however use a schedule to simulate the decrease in value over time. Assuming there are no changes to the estimates of conserved cash flows, the same schedule can be used to calculate Functional Value for each of the five years of the life of the asset. The change of the value is due to two opposing effects. First, Functional Value increases over time as we reduce uncertainty. Secondly, the Functional Value decreases as estimated cash flows are realized and the asset is "used-up". The first effect is decreasing in nature while the second is (in this example) linear, resulting in an acceleration of the value reduction over time. Below the Functional Value estimates of the asset are shown for the purchase as well as each of the following five years.

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Year	0	1	2	3	4	5
Expected Conserved -						
Sales		1,000	1,000	1,000	1,000	1,000
Material		-250	-250	-250	-250	-250
Labor		-200	-200	-200	-200	-200
Other		-150	-150	-150	-150	-150
Gross margin		400	400	400	400	400
Admin and other expenses	15%	-60	-60	-60	-60	-60
Expected Additional Conserved Cash Flow		340	340	340	340	340
Discount factor		0.9091	0.8264	0.7513	0.6830	0.6209
Dicounted Conserved Cash Flows	1,289	309	281	255	232	211

**Table 18: PP&E: Functional Value Estimate**

Initial Investment	1,000					
Book Value conventional GAAP	1,000	800	600	400	200	0
Depreciation conventional GAAP		-200	-200	-200	-200	-200
Functional Value of the Asset	1,289	1,078	846	590	309	0
Depriciation CVBAP	289	-211	-232	-255	-281	-309
Expected Additional Conserved Cash Flow	0	340	340	340	340	340
Expected CVBA Profit		129	108	85	59	31

**Table 19: PP&E: Expected Income**

The income statement is grouped as in the previous examples. The increase in value in the first year, the Functional Value as compared to the purchase price, does not flow through the income statement, just like in the inventory example. Although there is a local increase in Functional Value (i.e. a bargain purchase), it is because of the price difference and thus not conserved. In the second year, the conventional GAAP sales are stated first and then adjusted to reflect Functional Value. The same is done for CoGS. Depreciation is shown as a Functional Value though both components are also presented separately. The expenses that were included in the 15% of gross margin are shown separately in the income statement. If there is a difference between the actual values and the estimate the difference will just be part of normal PnL as is done in conventional GAAP too. If the differences indicate incorrect assumptions or a change in circumstances, the new Functional Value of the equipment will be calculated using the updated numbers. Finally, the Functional Value income is adjusted to conventional GAAP income.

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<b>Income Statement Year 1</b>	
(1) Sales	1,200
(2) Sales Adjustment	-200
<hr/>	
(3)=(1)+(2) Functional Value Sales	1,000
(4) CoGS	-545
(5) CoGS Adj.	-55
<hr/>	
(6)=(4)+(5) Functional Value CoGS	-600
<hr/>	
(7)=(3)+(6) Functional Value Gross Profit	400
(8) Depreciation	-211
Expense	-200
Adjustment	-11
(9) Marketing Expense	-35
Expense	-25
Adjustment	-10
(10) Other Operating Expenses	-25
Expense	-40
Adjustment	15
(11)=(8)+(9)+(10) Operating Expenses	-271
Expense	-265
Adjustment	-6
<hr/>	
(12) Comprehensive FV Income	129
<hr/>	
(13) Comprehensive Income Adj.	261
<hr/>	
(14)=(12)+(13) Comprehensive Income	390
<hr/>	

**Table 20: PP&E: Income Statement Year 1**

Below the balance sheets for the entity before any transaction, after the purchase of the equipment, after the production of widgets and finally after the sale of the produced widgets are given.

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Balance Sheet			
Cash	10,000	Paid in Capital	10,000
10,000		10,000	
Balance Sheet after PP&E Purchase			
Cash	9,000	Paid in Capital	10,000
PP&E	1,000	Equity Reserve	289
PP&E Adj./Contra	289		
10,289		10,289	
Balance Sheet with Inventory			
Cash	8,390	Paid in Capital	10,000
Inventory	545	Equity Reserve	344
Inventory Adj./Contra	55	Functional Value Retained Earning	-60
PP&E	1,000	Retained Earnings	-5
PP&E Adj./Contra	289		
10,279		10,279	
Balance Sheet End of Year 1			
Cash	9,590	Paid in Capital	10,000
Inventory	0	Equity Reserve	278
Inventory Adj./Contra	0	Functional Value Retained Earning	129
PP&E	1,000	Retained Earnings	261
PP&E Adj./Contra	289		
Accumulated Drepreciation	-200		
Accumulated Drepreciation Adj.	-11		
10,668		10,668	

**Table 21: PP&E: Balance Sheets**

The statement of changes in equity splits the impact on equity into Functional Value and other retained earnings as the balance sheet also distinguishes the two.

**Statement of Changes in Owners' Equity**

Opening Balance	10,289
Functional Value Retained Earnings	129
Other Retained Earnings	261
Closing Balance	10,679

**Table 22: PP&E: Statement of Changes in Owners' Equity**

## Conserved Value Based Accounting Principles

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Finally, the journal entries for the transactions are presented.

PP&E	1,000	Cash	1,000
PP&E Adj./Contra	289	Equity Reserve	289
Material			
Inventory	300	Cash	300
Equity Reserve	50	Inventory Adj./Contra	50
Labor			
Inventory	170	Cash	170
Inventory Adj./Contra	30	Equity Reserve	30
Other			
Inventory	75	Cash	75
Inventory Adj./Contra	75	Equity Reserve	75
Marketing Expense	25	Cash	25
Marketing Expense FV Adj.	10	CI Adjustment	10
Admin Expense	40	Cash	40
CI Adjustment	15	Admin Expense Adj.	15
Cash	1,200	Sales	1,200
Sales Adj.	200	Inventory Adj./Contra	55
CoGS	545	Inventory	545
CoGS Adj.	55	CI Adj.	255
Equity Reserve	55		
Depreciation Expense	200	Accumulated Depreciation	200
Depreciation Expense Adj.	11	Accumulated FV Depreciation	11
Equity Reserve	11	Comprehensive Income Adj.	11

**Table 23: PP&E: Journal Entries**

The following two overviews show the changes in the Functional Value of the equipment were the conserved cash flows estimates to change downward after the first year and upward again after the third. This scenario is highly unlikely, as it is the point of

Conserved Value Based Accounting Principles

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conserved estimates not to fluctuate wildly. The presentation is for illustrative purposes only.

	Year	1	2	3	4	5
Expected Conserved -						
Sales			800	800	800	800
Material			-200	-200	-200	-200
Labor			-160	-160	-160	-160
Other			-120	-120	-120	-120
Gross margin			320	320	320	320
Admin and other expenses	20%		-48	-48	-48	-48
Expected Additional Conserved Cash Flow			272	272	272	272
Discount factor						
			0.9091	0.8264	0.7513	0.6830
Dicounted Conserved Cash Flows		862	247	225	204	186
Initial Investment						
Book Value conventional GAAP		800	600	400	200	0
Depreciation conventional GAAP			-200	-200	-200	-200
Functional Value of the Asset		862	676	472	247	0
Depriciation CVBAP		-427	-186	-204	-225	-247
Expected Additional Conserved Cash Flow		0	272	272	272	272
Expected CVBA Profit			86	68	47	25

**Table 24: PP&E: Revised Functional Value Estimate 1**

The initial estimate for the Functional Value at the end of year 1 was 1,078 with a “scheduled” depreciation of 211 (cf. Table 19). The new Functional Value is 862, increasing the depreciation to a total of 427. All of the Functional Value loss is immediately recognized. The consequent depreciation is then following the new pattern of the discounted expected additional cash flows.

Conserved Value Based Accounting Principles

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	Year	3	4	5
Expected Conserved -				
Sales			1,000	1,000
Material			-250	-250
Labor			-200	-200
Other			-150	-150
Gross margin			400	400
<hr/>				
Admin and other expenses		12%	-60	-60
<hr/>				
Expected Additional Conserved Cash Flow			340	340
<hr/>				
Discount factor			0.9091	0.8264
Dicounted Conserved Cash Flows		590	309	281
<hr/>				
Initial Investment				
Book Value conventional GAAP		400	200	0
Depreciation conventional GAAP			-200	-200
<hr/>				
Functional Value of the Asset		590	309	0
Depriciation CVBAP		118	-281	-309
Expected Additional Conserved Cash Flow		0	340	340
Expected CVBA Profit			59	31

**Table 25: PP&E: Revised Functional Value Estimate 2**

After the first adjustment, the expected Functional Value of the PP&E was 472 at the end of year 3, with a depreciation of 204. Due to the upward adjustment of the conserved cash flows, the new Functional Value is 590 which is the same as in the initial scenario. The depreciation in this case is actually negative, i.e. the recognized Functional Value increase by 118.

As a slight modification of this example, we assume that twice as much inventory was purchased and produced though sales stayed the same. There were no other changes. Assuming a rather low risk and time frame for the additional inventory there is no additional discounting and thus the inventory is reported at the estimated Functional Value on the balance sheet. Below the relevant balance sheets and cash flow statement are presented. The income statement did not change.

## Conserved Value Based Accounting Principles

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Balance Sheet with Inventory			
Cash	7,845	Paid in Capital	10,000
Inventory	1,090	Equity Reserve	399
Inventory Adj./Contra	110	Functional Value Retained Earning	-60
PP&E	1,000	Retained Earnings	-5
PP&E Adj./Contra	289		
	10,334		10,334
Balance Sheet End of Year 1			
Cash	9,045	Paid in Capital	10,000
Inventory	545	Equity Reserve	333
Inventory Adj./Contra	55	Functional Value Retained Earning	129
PP&E	1,000	Retained Earnings	261
PP&E Adj./Contra	289		
Accumulated Drepreciation	-200		
Accumulated Drepreciation Adj.	-11		
	10,723		10,723

**Table 26: PP&E: Revised Balance Sheets**

### Cash Flow Statement

Functional Value Profit	129
Functional Value Depreciation	211
Increase in Inventory	-600
<u>Operational Cash Flow (conserved)</u>	<u>-260</u>
Comprehensive Income Adj.	261
Depreciation adjustment	-11
<u>Increase in Inventory Adj.</u>	<u>55</u>
<u>Operational Cash Flow (other)</u>	<u>305</u>
<u>Cash Flow from Operations</u>	<u>45</u>

**Table 27: PP&E: Revised Cash Flow Statement**

In the cash flow statement one can see a large adjustment in the non-conserved section. This large adjustment can be explained mostly by the sales adjustment of 200 and

the lower increase in inventory valued at historical cost. For a detailed discussion of the cash flow statement see CHAPTER V5.

#### 4.6.2 Intangible and Self-Generated Assets

Cash flows associated with marketing are expensed immediately under conventional GAAP though companies clearly believe marketing activities to yield a future benefit to the company and thus are an asset. One can see that e.g. in Forbes' The World's Most Valuable Brands list (Forbes 2013) with estimates of the value of the top 100 brands. The brand names are clearly assets and were costly to create and are costly to maintain, nevertheless one will rarely see them in any balance sheet. Recognition is limited, as one cannot reliably measure the value of the asset, though there are estimation methods. One can however see the impact in the income statement (cf. Penman 2009a). Analyzing financial reports will clearly lead to a biased picture. Functional Value accounting however includes such assets, though not necessarily as a separate line item. While a brand name does have a value in and of itself, an order book though requires the ability to provide the product or service that was ordered. The brand name further allows companies to charge a higher price and/or sell more units. This value is already included in the valuations of the PPE of the company; the estimate of the conserved cash flows takes the brand name and market situation into account. Depending on the actual situation at the reporting entity, there might be additional value in those intangible items that are not yet recognized on the balance sheet. This portion is then stated as an additional line item.

Research and development (R&D) expense is treated similarly to marketing expense. They are in investments with an uncertain future. In a way, one should recognize the discovery/invention as soon as the inventor is hired, as this is not possible, the Functional Value is recognized as soon as it is discovered. In the meantime some amount of the development costs can be put onto the balance sheet, as even with failed attempts, there is an increase in knowledge and experience of the research staff. One has to take the raises and other compensation into account though.

## 4.7 Other Liabilities

### 4.7.1 Current Financial Liabilities

In many companies, the majority of short-term liabilities are typically accounts payable. There are however other short term liabilities, such as bank overdrafts, bank loans due in the near future and financial instruments with an expected cash outflow (e.g., short positions in stock, swaps with a negative value, and other short positions in derivatives).

The accounting treatment in traditional GAAP depends a lot on the nature of the liability. The applicable rules vary depending on whether certain conditions are met. Depending on the jurisdiction; the liabilities are recorded at fair value and then revalued over the holding period. Alternatively, the liabilities are presented at a discounted value or even the amount due (as is the case with accounts payable).

### 4.7.2 Non-Current Liabilities

Currently non-current liabilities are recorded at fair value or some form of adjusted fair value. The fair value of a liability depends a lot on the discount factor, which in turn is determined in a market and thus subject to the same fluctuations as other instruments. The changes in the interest rate can cause peculiar changes in the balance sheet, when a company faces financial challenges. E.g. when the credit rating of the company is lowered, the required return on the debt rises, consequently lowering the fair value of the debt and thus the liabilities reported in the financial statements. So the company would profit from lowering its credit rating. Functional Value does not change like that. If there were new developments that indicate a revision of the expected cash flows and their risk, the company would recognize it as it occurs. The following example shows the journal entries for a simplified bond with annual interest payments for 2 years. The bond is sold below par and adjusted up at the end of the first year. When using adjusted historical cost this happens in a scheduled manner using the implied interest rate. When using fair value accounting, the new value is determined using the current interest rate. The example assumes the following values for the bond.

Conserved Value Based Accounting Principles

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Sale of the Bond	Cash	950	Bonds Payable	950
	Equity Reserve	50	Bonds Payable Adj.	50
End of Year 1	Interest Expense	75	Cash	50
	Bonds Payable Adj.	25	Bonds Payable	25
			Equity Reserve	25
	CI Adjustment	25	Interest Expense Adjus	25
End of Year 2	Interest Expense	75	Cash	50
	Bonds Payable Adj.	25	Bonds Payable	25
			Equity Reserve	25
	CI Adjustment	25	Interest Expense Adjus	25
	Bonds Payable	1,000	Cash	1,000

**Table 28: Non-Current Liabilities: Journal Entries**

At the end of the first year the Functional Value of the interest expense is 50 while the conventional GAAP expense is 75. Thus the expense is adjusted in the income statement and the difference is booked into comprehensive income adjustment.

## 5 Cash Flow Statement

The cash flow statement is not a required statement in all GAAP. It is, however, an important piece of the picture painting the financial situation of an entity for outsiders. Under US GAAP and IFRS the cash flow statement explains the difference of the cash (and cash equivalent if chosen under US GAAP) balance between two balance sheet dates (cf. FAS 95 and IAS 7). The cash flow of a period equals to the difference, and thus the cash flow statement is a reconciliation between the two reported numbers. Though there are some differences in the details, the cash flow both in US GAAP and IFRS is divided into three segments: operating activities, investing activities, financing activities. These

three categories are used to separate the different kind of business transactions in order to be more useful to the readers. Though cash is fungible, it is important to know the source of the cash flow to judge past performance and to forecast future performance. E.g., two companies with the same positive cash flow might at first glance look equally likely to generate the cash needed to cover the interest payments of a new loan/bond. With the cash flow statement, it would be readily visible that one company has generated the cash through their business activities (or reducing cash bound in working capital), while the other sold off fixed assets. With the cash flow statement information for multiple years, it is easier to spot if a company is keeping liquid with other means than their general business<sup>22</sup>. As this format gives a good structure to the cash flow, CVBAP will also feature these categories. Additionally, there will be a sort of distinction between conserved cash flows and other cash flows. The details of the challenges and issues with the different categories are presented below.

## **5.1 Cash Flow from Operating Activities**

The cash flow from operating activities is probably the most challenging of the three parts of the cash flow statement. While we can assign Functional Values to the non-cash part of transactions, we cannot tell from looking at money, whether it is a conserved cash flow or not. Using the indirect method to prepare the operating section of the cash flow statement we have to derive the cash flow from the change in working capital on the balance sheet to the nature of the cash flow. Unless all payments were always made in full, this is not possible. For example, there is a balance in accounts payable of 600, resulting from a purchase of inventory with a Functional Value of 500. The entity pays half of the due amount before the balance sheet date. Which part was paid? Just by looking at the check (or wire transfer), it is impossible to tell. Now there are several different ways to deal with the problem. The easiest and least constructive is to ignore the problem. The operating cash flow would then just be stated the same way as under conventional GAAP. This “solution” can obviously not be considered part of CVBAP. The next easiest is to separate the operating activities category into two sections. First, the entity starts with the

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<sup>22</sup> This is not necessarily a bad thing. Companies often use other sources of cash than their operating activities. New and quickly growing companies are just some examples.

### Conserved Value Based Accounting Principles

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Functional Value profit. Second, all the adjustments for changes in the working capital are added and the conserved cash flow is estimated. This method is simple and will yield good estimates if there are only small changes to the working capital. Below an example is shown for this method. In the example, the entity has an opening balance of 500 fair value inventory and 400 Functional Value inventory. In a first step, the entity sells the inventory for 600 at a Functional Value of 450. In addition, they incur fair value expenses of 50 with a Functional Value of 30. First the balance sheets and the income statement for this transaction are shown.

Balance Sheet			
Cash	1,000	Equity	1,500
Inventory	500	Equity Reserve	-100
Inventory Contra Account	-100		
	1,400		1,400
Balance Sheet (after Sale)			
Cash	1,000	Equity	1,500
Accounts Receivables	600	Equity Reserve	0
		Functional Value	
Inventory	0	Retained Earnings	150
Asset Contra Account	0	Retained Earnings	-50
	1,600		1,600

**Table 29: Cash Flow Statement: Balance Sheets**

## Conserved Value Based Accounting Principles

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<b>Income Statement</b>		
(1) Sales		600
(2) Sales Adjustment		-150
(3)=(1)+(2) Functional Value Sales		450
(4) CoGS		-500
(5) CoGS Adj.		100
(6)=(4)+(5) Functional Value CoGS		-400
(7) Other		-30
Expenses		-50
Adjustment		20
(8)=(3)+(6) Functional Value Profit		20
(9) Comprehensive Income Adj.		30
(10)=(8)+(9) Comprehensive Income		50

**Table 30: Cash Flow Statement: Income Statement**

The only cash flow in this example is -50 for expenses with -30 and -20 as conserved and other cash flow respectively. If the distinction is ignored when adjusting for working capital changes, the cash flow statement will look as below:

<b>Cash Flow Statement</b>		
Functional Value Profit	20	
Increase in A/R	-600	
Decrease in Inventory	500	
Operational Cash Flow (Functional Value)		-80
Comprehensive Income Adj.	30	
Operational Cash Flow (other)		30
Cash Flow from Operations		-50

**Table 31: Cash Flow Statement: Cash Flow Statement Example 1**

## Conserved Value Based Accounting Principles

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It is quite obvious that the cash flows are not at all as calculated before. If the above mentioned condition were met, the adjustments for accounts receivables and inventory were close to zero and thus cash flow would be close to the income numbers. As this method does not yield appropriate results, it is not part of CVBAP.

Next, the cash flow statement taking the Functional Value of the inventory and the source of the accounts receivables is presented.

<b>Cash Flow Statement</b>	
Functional Value Profit	20
Increase in A/R	-450
Decrease in Inventory	400
<hr/>	
Operational Cash Flow (Functional Value)	-30
Comprehensive Income Adj.	30
Increase in A/R	-150
Decrease in Inventory	100
<hr/>	
Operational Cash Flow (other)	-20
Cash Flow from Operations	-50
<hr/> <hr/>	

**Table 32: Cash Flow Statement: Cash Flow Statement Example 2**

The accounts receivables increase is split into two parts. First, the increase due to Functional Value sales is adjusted in the upper part of the statements. The remainder is adjusted in the lower part. In accounting systems, this split can be achieved by e.g. using two different accounts for the A/R, though they are aggregated when presented in a balance sheet. In the above case, the separation is easy, as there is just one transaction. To extend this example, we assume that 500 of the receivables were paid, leading to a total cash flow of 450. As mentioned before, cash is fungible, so we cannot calculate how much of each part of the receivable was paid. To solve this issue one can adopt the principles from inventory accounting for the split between conserved and non-conserved cash flow. Inventory accounting uses methods such as LIFO, FIFO and the weighted average method

## Conserved Value Based Accounting Principles

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to assign a value to the CoGS and the remaining inventory. For this purpose, inventory is also treated as fungible. The actual flow of goods does not have to follow the assumed flow in valuation. These characteristics also make the methods suitable for assigning cash flows. The possible adaptations are as follows:

- The non-conserved part is realized first, when the cash flow is realized
- The conserved part is realized first, when the cash flow is realized
- The conserved and non-conserved parts are realized in the proportion as the accounts receivable (payable) result from different transactions (weighted average method)

As in inventory accounting, these methods can be used for each transaction or for a reporting period. There is another parallel to inventory accounting, as different items can be grouped together or reported separately. In accounts receivable accounting, this can be an overall approach or reporting by counterparty. Most companies with IT based accounting systems should have the capacity for continuous accounting by transaction or at least by counterparty.

We will look at the three methods in turn. Assuming the non-conserved part was realized first, this would mean that 150 of the received cash were from the non-conserved part and 350 from the conserved. The ending balances are zero and 100 for non-conserved and conserved, respectively. The balanced of the inventory and inventory contra account can be taken directly from the balance sheet.

## Conserved Value Based Accounting Principles

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<b>Cash Flow Statement</b>	
Functional Value Profit	20
Increase in A/R	-100
Decrease in Inventory	400
Operational Cash Flow (Functional Value)	320
Comprehensive Income Adj.	30
Increase in A/R	0
Decrease in Inventory	100
Operational Cash Flow (other)	130
Cash Flow from Operations	450

**Table 33: Cash Flow Statement: Cash Flow Statement Example 3**

Next, the conserved part is realized first. As there is only a beginning balance of 450, and we receive 500 in cash, the ending balance is 0 and we reduce the non-conserved part by 50, leaving an ending balance of 100.

<b>Cash Flow Statement</b>	
Functional Value Profit	20
Increase in A/R	0
Decrease in Inventory	400
Operational Cash Flow (Functional Value)	420
Comprehensive Income Adj.	30
Increase in A/R	-100
Decrease in Inventory	100
Operational Cash Flow (other)	30
Cash Flow from Operations	450

**Table 34: Cash Flow Statement: Cash Flow Statement Example 4**

The difference is exactly a move of the remaining A/R balance from the Functional Value cash flow adjustment to the other. Both methods use an extreme to model reality.

## Conserved Value Based Accounting Principles

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The remaining cash inflow will be booked into the opposite category than the cash before. This leads to an up and down between the categories over time. If there are many transactions, this can cancel out, but is still not ideal. The third introduced method distributes the cash inflow into the categories equally over time and thus does not lead to ups and downs between the categories. Consequently, it is the method to apply in CVBAP. The weighted average is the percentage of the two parts of the receivables. In this case, conserved are  $450/600=75\%$  and non-conserved are  $150/500=25\%$ . Of the cash inflow 75% are then reducing the conserved account and 25% the non-conserved accordingly. The ending balances are  $450-0.75 \cdot 500=75$  and  $150-0.25 \cdot 500=25$ , respectively.

<b>Cash Flow Statement</b>	
Functional Value Profit	20
Increase in A/R	-75
Decrease in Inventory	400
Operational Cash Flow (Functional Value)	345
Comprehensive Income Adj.	30
Increase in A/R	-25
Decrease in Inventory	100
Operational Cash Flow (other)	105
Cash Flow from Operations	450

**Table 35: Cash Flow Statement: Cash Flow Statement Example 5**

The same principles shown for accounts receivable can be applied to other receivables and payables. If there is a difference in valuations, such as the inventory, the balances are already available in the balance sheet.

There are two other types of adjustments typically found in an indirect cash flow statement. First, there are adjustments for non-cash expenses<sup>23</sup>, such as depreciation and amortization. As the income statement distinguishes the Functional Value part of those

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<sup>23</sup> that do not appear in a balance sheet account, e.g. pension accruals are shown on the balance sheet

expenses, the adjustments can be made accordingly. Secondly, there are adjustments for PnL impact of cash flows that belong into either the investing or the financing section. When e.g., there is a Functional Value profit because of the sale of equipment above book value, the profit has to be taken out of the operating section and the cash flow has to be moved to the investing section.

## **5.2 Cash Flow from Investing and Financing Activities**

Irrespective of the use of the direct or indirect method, the latter two parts of the cash flow statement are rather straightforward. It is the same for the CVBAP cash flow statement. The cash flow from investing activities is generated by looking at the transactions that happened during the reporting period.

The payment schedule for investments into PP&E might not follow the easy cycle as with A/R and A/P. If this is the case, each transaction has to be looked at separately. If the cash flow is higher than the Functional Value of the asset, the payments can be classified the same way as was presented in the operating section. If cash rendered or received is lower than Functional Value, there can be a negative percentage in the non-conserved cash flow. It should however be rare to sell items (both in the operating section and the investing section) for less than Functional Value. If, for example, a company expects to generate more cash by using an asset than by selling it, the question would be why sell it in the first place. If such a transaction happened anyway, the cash flow is considered conserved up to the Functional Value. The loss is a non-conserved cash flow that offsets part of the received cash. Further the income effect of the sale has to be considered in the operating section, while in this section the actual cash flow is taken into account.

Another part of the cash flow in the investing section is generated from investments in financial products. The same principles as in the operating section with the purchase and sale of inventory apply. If the product has been bought or sold, the Functional Value of the payable or receivable will show on the balance sheet and the classification of cash flows

for partial payments follows the principles for payables and receivables in the operating section.

## 6 Notes/Disclosure

The notes to CVBAP statements are in principle similar to the information required from conventional GAAP (cf. IASB 2010). The principles applied and accounting choices have to be disclosed to the reader. Further, the major sources of uncertainty regarding valuation have to be disclosed. This will include information on all material Functional Value estimates. The general section of the notes also has to contain the major assumptions made when preparing the statements.

This section also includes an explanation of the classification method used in the cash flow statement. If the classification is not estimated uniformly, the reasoning behind this choice is elaborated on.

In the more specific part of the notes, management has to address all relevant issues that are not clear from the financial statements without additional information. This includes disclosure of material adjustments to Functional Value estimates from the reporting period. Small adjustments and differences between estimates and realized numbers are normal and to be expected, thus management has to judge whether disclosure is required. In particular, besides the changes in the reported numbers and the disclosure of the change, management has to provide narrative as to the reason for the change. If the calculation of the Functional Value has been mostly correct, the predominant reasons given in the notes should relate to changes in the PESTEL framework of the reporting entity.

Finally, management goes into detail on the various levels of equity. The statement of changes in owners' equity is explained. While the balance sheet presents the net of the reserve for items purchased below Functional Value and those purchased above, the narrative presents the details of the balance in the account and the expected holding period.

### Conserved Value Based Accounting Principles

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E.g., the equity reserve because of the purchase of a piece of equipment is expected to remain on the balance sheet longer than that of inventory. Particularly interesting to the readers are items with additional risk. These are among others, financial positions that can be called early or are contingent on the entity meeting margin conditions.

## CHAPTER VI

### EXAMPLE APPLICATION OF CVBAP

#### 1 General Considerations

The following chapter shows the estimated CVBAP statements of Porsche Group for 2008 with comparative numbers for 2007<sup>24</sup>. As there is no internal data of Porsche available all Functional Value numbers were calculated using estimates. The assumptions for the individual positions are explained in the appropriate sections. Often the information of the notes was used in addition to the figures on the face of the statements.

Even without specific data and some estimates, the example of Porsche shows the difference between IFRS and CVBAP quite well. The Porsche Group for this particular year was chosen as they engaged in a lot of speculative behavior in the equities market. Porsche happened to create a large profit that year (~6 bn EUR) followed by a loss of roughly 3.5 bn the following year, which also led to its current association with Volkswagen.

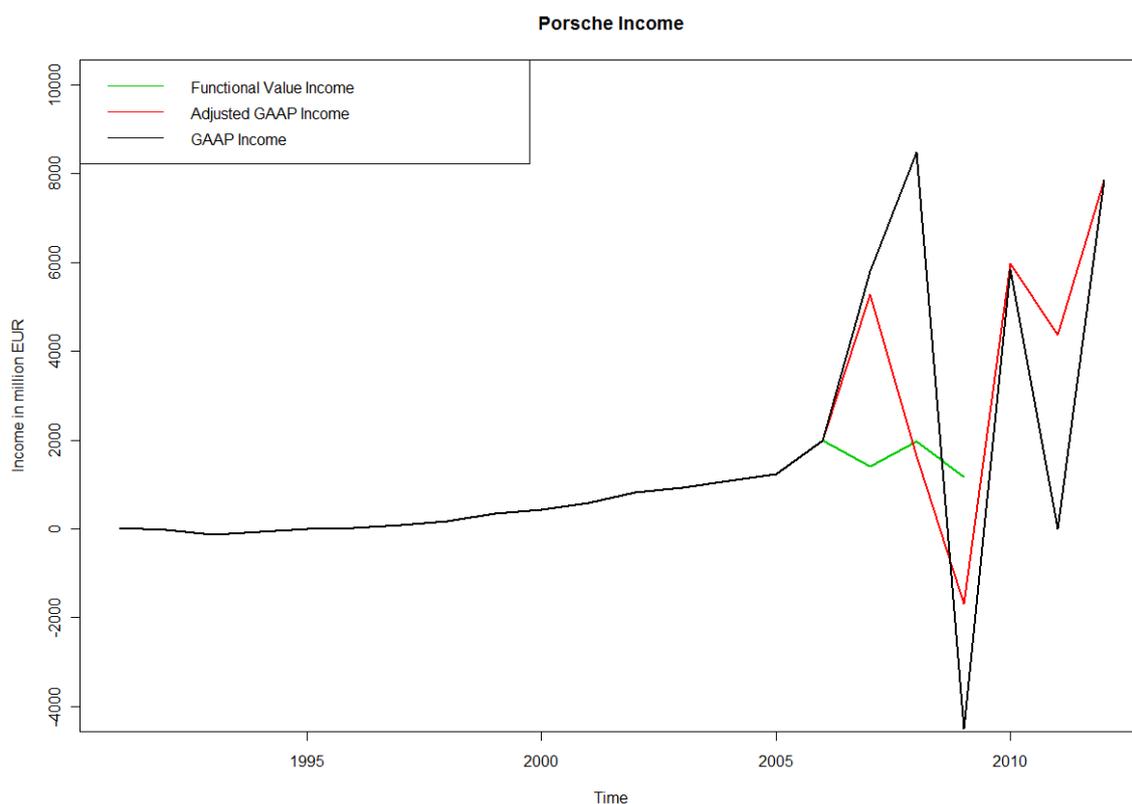
Just to highlight the extend of the influence of these non-car-related activities a few comparative numbers are given. Porsche had a total operating performance of 7.8 bn. Their other operating income totaled nearly 20 bn, or more than 250% of the operating performance. Profit before taxes was 110% of the total operating performance and earnings after taxes was 82%. In comparison, Volkswagen had about 6% profit before taxes and 4% after taxes with other operating income and expenses of less than 8% (cf. Volkswagen 2009) each.

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<sup>24</sup> All data for this chapter, unless otherwise noted, was taken from the 2008 Porsche Annual Report (Porsche 2008)

## Example Application of CVBAP

The following figure shows the income using traditional GAAP, in this case IFRS, the GAAP income adjusted for extraordinary charges and profits, as well as the CVBAP income calculated in this chapter. The CVBAP income figure for 2009 is a rough estimate using the Porsche financial statements for 2009 and the same principles described later this chapter. The IFRS income starts fluctuating in 2006 and fluctuates wildly until the end of the shown time. Adjusted income does not swing as much, but is still a lot more volatile than the preceding 15 years. CVBAP income on the other hand is very much in line with the income reported earlier, i.e. in the years without reported extraordinary income and expenses. This is what we expect and desire from using CVBAP, predictable, non-chaotic income numbers.



**Figure 7: Porsche Income Comparison<sup>25</sup>**

<sup>25</sup> Source Datastream and Porsche (2008, 2009)

## Example Application of CVBAP

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Porsche has shown a positive Functional Value income for the analyzed time. They can “afford” to engage in speculative behavior. The CVBAP balance sheet however shows the magnitude of the risks, negative total equity. If the market had moved against Porsche, as it has happened to the late Adolf Merkle (cf. Dorries 2010) it would probably not face as dire consequences though. The business is generating profits and with the help of Volkswagen, Porsche is able to continue operations, as was seen in 2009 when reported income plummeted. The same though is not true for all companies. Many banks also engage in speculative behavior, such as the Hypo Real Estate Holding, a bank in Germany. Banks typically have lower equity rates and few material assets (i.e. PP&E). A downward swing of income in the magnitude seen at Porsche could not be compensated by a number of banks during the financial crisis. The consequence where a number of government interventions to save banks that were considered too big to fail (others though did fail). The use of CVBAP would clearly show the risks these banks (companies) are taking and the subsequent failure would not be attributed to the crises but rather the management decision to run such high risks as trading in financial markets a lot of time is like gambling (cf. Klinkova et al. 2013). It would also show that whether the previous successful years were due to providing Functional Value to customers or rather a lucky streak. Here it is important to note that for some time everybody can “win“ in financial markets, unlike in a casino, and then many loose at once.

## 2 Balance Sheet

The Analysis of the balance sheet follows the structure used by Porsche. Total Assets nearly doubled from 2007 to 2008. Their mix of current and non-current assets moved in favor of current assets mostly because of an increase in other assets, i.e. financial assets of 14 bn. There was also a large increase in non-current securities and cash.

### Example Application of CVBAP

Porsche Group Balance Sheet in EUR '000	2008	2007	2008	2007
	IFRS			
Intangible Assets	359,062	263,526	0.8%	1.1%
PP&E	1,668,365	1,378,435	3.7%	5.9%
Investment in Associates	8,129,849	7,059,333	17.8%	30.3%
Other Financial Assets	63,722	67,584	0.1%	0.3%
Leased Assets	947,119	990,979	2.1%	4.2%
Current Trade Receivables	2,679	20,772	0.0%	0.1%
Current Receivables from Financial Services	1,301,256	1,321,635	2.9%	5.7%
Current Other Receivables and Assets	732,104	285,662	1.6%	1.2%
Current Income Tax Asset	57,360	63,598	0.1%	0.3%
Current Securities	1,020,716	1,014,573	2.2%	4.3%
Deferred Tax Asset	94,657	75,114	0.2%	0.3%
<b>Non-Current Assets</b>	<b>14,376,889</b>	<b>12,541,211</b>	<b>31.5%</b>	<b>53.8%</b>
Inventories	757,004	625,209	1.7%	2.7%
Non-Current Trade Receivables	264,775	245,136	0.6%	1.1%
Non-Current Receivables from Financial Services	471,845	459,879	1.0%	2.0%
Non-Current Other Receivables and Assets	19,299,524	5,604,442	42.3%	24.0%
Non-Current Income Tax Asset	34,522	27,262	0.1%	0.1%
Non-Current Securities	3,383,226	1,419,185	7.4%	6.1%
Cash and Cash Equivalent	6,989,501	2,410,066	15.3%	10.3%
<b>Current Assets</b>	<b>31,200,397</b>	<b>10,791,179</b>	<b>68.5%</b>	<b>46.2%</b>
<b>Total Assets</b>	<b>45,577,286</b>	<b>23,332,390</b>	<b>100.0%</b>	<b>100.0%</b>

**Table 36: Porsche: IFRS Assets**

The Functional Value of intangible assets is estimated at 150% of current book value. While the value of the brand, customers, processes, and expertise is very likely a lot higher, they are mostly reflected in the value of fixed assets. Therefore, PP&E is estimated at 250% of its current book value. The book value is historical cost and thus “too old”, further, the cost of PP&E is typically lower than the Functional Value of the same equipment.

The investment in associates are shares of Volkswagen: Appel (2012) has shown a wide range of multiples for the Functional Value of SAP and its market value from around 2 to just above 7. The median was around 4, so here the assumption of a multiple of 4 is used and the asset is lowered by 75%. The same assumption was used for any other equity investments as shown below.

## Example Application of CVBAP

	IFRS	% Functional Value	Functional Value
<b>Securities</b>			
Shares	138,146	25%	34,537
Investment Shares	212,354	25%	53,089
Fixed-Interest Securities	3,586,601	95%	3,407,271
Other Securities	466,841	25%	116,710
<b>Total</b>	<b>4,403,942</b>		<b>3,611,606</b>
<b>Non-Current Securities</b>	<b>1,020,716</b>		<b>541,741</b>
<b>Current Securities</b>	<b>3,383,226</b>		<b>3,069,865</b>

**Table 37: Porsche: Securities**

Other receivables and assets were cut more drastically. As described earlier, Porsche invested in equity derivatives. These have no Functional Value without base transaction that they can hedge. Because of the large investment of Porsche in derivatives, their total assets valued at Functional Value are significantly below the currently reported number. The below schedule shows the details of the changes of the other receivables and assets.

	IFRS	% Functional Value	Functional Value
<b>Other Receivables and Assets</b>			
Derivative Financial Instruments	18,329,815	0%	0
Other Financial Receivables	1,455,674	100%	1,455,674
Other Receivables	230,161	100%	230,161
Prepaid Expenses	15,978	100%	15,978
<b>Total</b>	<b>20,031,628</b>		<b>1,701,813</b>
<b>Non-Current Other Receivables and Assets</b>	<b>732,104</b>		<b>680,725</b>
<b>Current Other Receivables and Assets</b>	<b>19,299,524</b>		<b>2,166,964</b>

**Table 38: Porsche: Other Receivables and Assets**

Most other assets were valued at 100%. Without any additional data, their Functional Value could be higher or lower than the book value, thus the current reported value is a good estimate. Receivables were also valued at 100% though they were not

### Example Application of CVBAP

created by 100% Functional Value sales. The difference has to be considered in the cash flow statement (cf. CHAPTER VI4). Positions related to tax were also left assuming no change to local tax laws.

Porsche Group Balance Sheet in EUR '000	2008	2007	2008	2007
	IFRS			
Subscribed Capital	175,000	45,500	0.4%	0.2%
Capital Reserves	121,969	121,969	0.3%	0.5%
Retained Earnings	14,829,941	8,545,785	32.5%	36.6%
Currency Translation	-60,627	-42,205	-0.1%	-0.2%
<b>Equity before Minority Interests</b>	<b>15,066,283</b>	<b>8,671,049</b>	<b>33.1%</b>	<b>37.2%</b>
Hybrid Capital	1,779,763	809,977	3.9%	3.5%
<b>Equity</b>	<b>16,846,046</b>	<b>9,481,026</b>	<b>37.0%</b>	<b>40.6%</b>
Pension Provisions	776,553	719,476	1.7%	3.1%
Non-Current Other Provisions	650,036	624,234	1.4%	2.7%
Non-Current Deferred Tax Liabilities	1,014,973	612,826	2.2%	2.6%
Non-Current Financial Liabilities	3,488,699	3,539,237	7.7%	15.2%
Non-Current Trade Payables	5,556	7,480	0.0%	0.0%
Non-Current Other Liabilities	47,368	67,007	0.1%	0.3%
<b>Non-Current Provisions and Liabilities</b>	<b>5,983,185</b>	<b>5,570,260</b>	<b>13.1%</b>	<b>23.9%</b>
Tax provisions	2,007,629	896,643	4.4%	3.8%
Current Other Provisions	1,190,200	1,161,098	2.6%	5.0%
Current Financial Liabilities	12,897,337	3,010,024	28.3%	12.9%
Current Trade Payables	581,318	505,183	1.3%	2.2%
Current Other Liabilities	6,071,571	2,708,156	13.3%	11.6%
<b>Current Provisions and Liabilities</b>	<b>22,748,055</b>	<b>8,281,104</b>	<b>49.9%</b>	<b>35.5%</b>
<b>Total Equity and Liabilities</b>	<b>45,577,286</b>	<b>23,332,390</b>	<b>100.0%</b>	<b>100.0%</b>

**Table 39: Porsche: IFRS Liabilities and Equity**

On the liabilities and equity side of the balance sheet there was a large increase in retained earnings due to the large profit of the year and a large increase in current financial liabilities, caused by an additional 10 bn in liabilities to banks.

For the most part, liabilities were estimated at 100% of current book value. The Functional Value of pension provisions is probably slightly above the present value reported, as the Functional Value uses a different discount rate. The risk premium should be lower, as Functional Value calculations would not apply the market estimate of the default rate and not apply the market the risk premium.

Example Application of CVBAP

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Porsche Group Balance Sheet in EUR '000	2008			2007		
	IFRS	Contra Accounts/ Adjustments	CVBAP	IFRS	Contra Accounts/ Adjustments	CVBAP
Intangible Assets	359,062	179,531	538,593	263,526	131,763	395,289
PP&E	1,668,365	2,502,548	4,170,913	1,378,435	2,067,653	3,446,088
Investment in Associates	8,129,849	-6,097,387	2,032,462	7,059,333	-5,294,500	1,764,833
Other Financial Assets	63,722	-47,792	15,931	67,584	-50,688	16,896
Leased Assets	947,119	473,560	1,420,679	990,979	495,490	1,486,469
Current Trade Receivables	2,679	0	2,679	20,772	-2,077	18,695
Current Receivables from Financial Services	1,301,256	0	1,301,256	1,321,635	0	1,321,635
Current Other Receivables and Assets	732,104	1,434,860	2,166,964	285,662	469,906	755,568
Current Income Tax Asset	57,360	0	57,360	63,598	0	63,598
Current Securities	1,020,716	2,049,149	3,069,865	1,014,573	55,816	1,070,389
Deferred Tax Asset	94,657	0	94,657	75,114	0	75,114
<b>Non-Current Assets</b>	<b>14,376,889</b>	<b>494,469</b>	<b>14,871,358</b>	<b>12,541,211</b>	<b>-2,126,638</b>	<b>10,414,573</b>
Inventories	757,004	151,401	908,405	625,209	125,042	750,251
Non-Current Trade Receivables	264,775	0	264,775	245,136	-24,514	220,622
Non-Current Receivables from Financial Services	471,845	0	471,845	459,879	0	459,879
Non-Current Other Receivables and Assets	19,299,524	-18,618,799	680,725	5,604,442	-5,470,996	133,446
Non-Current Income Tax Asset	34,522	0	34,522	27,262	0	27,262
Non-Current Securities	3,383,226	-2,841,485	541,741	1,419,185	-1,230,293	188,892
Cash and Cash Equivalent	6,989,501	0	6,989,501	2,410,066	0	2,410,066
<b>Current Assets</b>	<b>31,200,397</b>	<b>-21,308,883</b>	<b>9,891,514</b>	<b>10,791,179</b>	<b>-6,600,761</b>	<b>4,190,418</b>
<b>Total Assets</b>	<b>45,577,286</b>	<b>-20,814,414</b>	<b>24,762,872</b>	<b>23,332,390</b>	<b>-8,727,399</b>	<b>14,604,991</b>

Table 40: Porsche: CVBAP Assets

### Example Application of CVBAP

Porsche Group Balance Sheet in EUR '000	2008			2007		
	IFRS	Contra Accounts/ Adjustments	CVBAP	IFRS	Contra Accounts/ Adjustments	CVBAP
Subscribed Capital	175.000	0	175.000	45.500	0	45.500
Capital Reserves	121.969	0	121.969	121.969	0	121.969
Functional Value Retained Earnings	0	5.349.274	5.349.274	0	4.800.000	4.800.000
Retained Earnings	14.829.941	-5.409.901	9.420.040	8.545.785	-4.842.205	3.703.580
Equity Reserve	0	-20.885.744	-20.885.744	0	-8.767.994	-8.767.994
Currency Translation	-60.627	60.627	0	-42.205	42.205	0
<b>Equity before Minority Interests</b>	<b>15.066.283</b>	<b>-20.885.744</b>	<b>-5.819.461</b>	<b>8.671.049</b>	<b>-8.767.994</b>	<b>-96.945</b>
	0					
Hybrid Capital	1.779.763	0	1.779.763	809.977	0	809.977
<b>Equity</b>	<b>16.846.046</b>	<b>-20.885.744</b>	<b>-4.039.698</b>	<b>9.481.026</b>	<b>-8.767.994</b>	<b>713.032</b>
Pension Provisions	776.553	38.828	815.381	719.476	35.974	755.450
Non-Current Other Provisions	650.036	32.502	682.538	624.234	31.212	655.446
Non-Current Deferred Tax Liabilities	1.014.973	0	1.014.973	612.826	0	612.826
Non-Current Financial Liabilities	3.488.699	0	3.488.699	3.539.237	0	3.539.237
Non-Current Trade Payables	5.556	0	5.556	7.480	0	7.480
Non-Current Other Liabilities	47.368	0	47.368	67.007	0	67.007
<b>Non-Current Provisions and Liabilities</b>	<b>5.983.185</b>	<b>71.329</b>	<b>6.054.514</b>	<b>5.570.260</b>	<b>67.186</b>	<b>5.637.446</b>
Tax provisions	2.007.629	0	2.007.629	896.643	0	896.643
Current Other Provisions	1.190.200	0	1.190.200	1.161.098	0	1.161.098
Current Financial Liabilities	12.897.337	0	12.897.337	3.010.024	0	3.010.024
Current Trade Payables	581.318	0	581.318	505.183	0	505.183
Current Other Liabilities	6.071.571	0	6.071.571	2.708.156	0	2.708.156
<b>Current Provisions and Liabilities</b>	<b>22.748.055</b>	<b>0</b>	<b>22.748.055</b>	<b>8.281.104</b>	<b>0</b>	<b>8.281.104</b>
<b>Total Equity and Liabilities</b>	<b>45.577.286</b>	<b>-20.814.414</b>	<b>24.762.872</b>	<b>23.332.390</b>	<b>-8.700.808</b>	<b>14.631.582</b>

**Table 41: Porsche: CVBAP Liabilities and Equity**

## Example Application of CVBAP

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To simplify the statement, currency translation is regrouped back into retained earnings, as previously done by Porsche. Retained earnings are further split into Functional Value retained earnings and other retained earnings. As there is no data available, Functional Value retained earnings were estimated as the income from the past 20 years adjusted for any extraordinary charges (data available at Worldscope Datastream). The amount is assumed to be 4.8 bn in 2007. Equity will be explained further in the statement of changes in owners' equity. The final balance sheet can be seen in Table 40 and Table 41

### 3 Income Statement

Porsche's income statement as mentioned before shows a number of oddities in 2008, mostly because of the large amount of other comprehensive income that is only partially offset by large other operating expenses. The same is true for 2007, though not to the same extend.

Porsche IFRS Income Statement in EUR '000	2008	2007		
Revenue	7,466,403	7,367,876		
Changes in Inventory and own Work Capitalized	311,285	162,217		
<b>Total Operating Performance</b>	<b>7,777,688</b>	<b>7,530,093</b>	<b>100%</b>	<b>100%</b>
Other Operating Income	19,773,026	7,264,416	254%	96%
Cost of Materials	-4,169,561	-3,659,520	-54%	-49%
Employee Benefits Expense	-1,358,473	-1,264,325	-17%	-17%
Amortization and Depreciation	-569,372	-531,712	-7%	-7%
Other Operating Expenses	-13,743,695	-4,600,099	-177%	-61%
<b>Profit before Finance Revenue</b>	<b>7,709,613</b>	<b>4,738,853</b>	<b>99%</b>	<b>63%</b>
Share of Profit of Associates	1,007,266	1,223,164	13%	16%
Finance Cost	-548,308	-272,232	-7%	-4%
Other Finance Revenue	400,429	167,215	5%	2%
<b>Finance Revenue</b>	<b>859,387</b>	<b>1,118,147</b>	<b>11%</b>	<b>15%</b>
<b>Profit before Taxes</b>	<b>8,569,000</b>	<b>5,857,000</b>	<b>110%</b>	<b>78%</b>
Income Tax Expense	-2,177,000	-1,615,000	-28%	-21%
<b>Profit for the Year</b>	<b>6,392,000</b>	<b>4,242,000</b>	<b>82%</b>	<b>56%</b>

**Table 42: Porsche: IFRS Income Statement**

### Example Application of CVBAP

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In order to estimate the CVBAP income statement each line item is looked at individually. CVBAP revenue is estimated to be 90% of regular revenue. This value might be even lower in reality. The same percentage is assumed for inventory purchases and cost of materials. Sundry income and expenses are assumed 50% Functional Value, as there is no additional information about the nature of the aggregated items. Overall, the impact of this estimate is rather low, as net sundry expenses are less than 5% of total operating performance.

Other operating income and expenses due to equity derivatives have no Functional Value, thus there is no Functional Value income associated with them. As the real estate industry also tends to bubbles, rent and lease expense was reduced by 15% with all other expenses at 100%. Each of those expenses might be higher or lower, thus the same level is a good estimate. Although advertising can have a higher Functional Value, the impact would be mostly visible in PP&E.

Depreciation and amortization are estimated based on the estimated Functional Value of PP&E on the balance sheet and thus are also 250% of the current level of depreciation. Finally, Porsche stated that the relevant tax rate is 30% and thus the income tax expense is 30% of the Functional Value income.

## Example Application of CVBAP

Porsche CVBAP Income Statement in EUR '000	2008	2007
Revenue	7,466,403	7,367,876
Changes in Inventory and own Work Capitalized	311,285	162,217
Revenue Adjustment	-777,769	-753,009
<b>Total Functional Value Operating Performance</b>	<b>6,999,919</b>	<b>6,777,084</b>
Other Operating Income	178,278	128,794
Income	19,773,026	7,264,416
Adjustment	-19,594,749	-7,135,623
Cost of Materials	-3,752,605	-3,293,568
Expense	-4,169,561	-3,659,520
Adjustment	416,956	365,952
Employee Benefits Expense	-1,358,473	-1,264,325
Expense	-1,358,473	-1,264,325
Adjustment	0	0
Amortization and Depreciation	-1,423,430	-1,329,280
Expense	-569,372	-531,712
Adjustment	-854,058	-797,568
Other Operating Expenses	-411,657	-390,200
Expense	-13,743,695	-4,600,099
Adjustment	13,332,038	4,209,899
<b>Profit before Finance Revenue</b>	<b>232,032</b>	<b>628,504</b>

**Table 43: Porsche: CVBAP Income Statement Part 1**

One can clearly see the reduction in profit before finance revenue, mostly through the reduction in other operating income and expenses. Relatively the amount has decreased from around 99% of total operating performance to less than 3.5%. Profit before taxes and profit for the year after taxes have fallen to 12% and 8%, respectively.

### Example Application of CVBAP

<b>Profit before Finance Revenue</b>	<b>232,032</b>	<b>628,504</b>
Share of Profit of Associates	755,450	917,373
Profit	1,007,266	1,223,164
Adjustment	-251,817	-305,791
Finance Cost	-548,308	-272,232
Expense	-548,308	-272,232
Adjustment	0	0
Other Finance Revenue	400,429	167,215
Revenue	400,429	167,215
Adjustment	0	0
<b>Finance Revenue</b>	<b>607,571</b>	<b>812,356</b>
<b>Profit before Taxes</b>	<b>839,603</b>	<b>1,440,860</b>
	30%	39%
Income Tax Expense	-251,881	-561,935
Expense	-2,177,000	-1,615,000
Adjustment	1,925,119	1,053,065
<b>Profit for the Year (Comprehensive Functional Value Income)</b>	<b>587,722</b>	<b>878,925</b>
<b>Comprehensive Income Adjustment</b>	<b>5,804,278</b>	<b>3,363,075</b>
<b>Comprehensive Income</b>	<b>6,392,000</b>	<b>4,242,000</b>

**Table 44: Porsche: CVBAP Income Statement Part 2**

## 4 Cash Flow Statement

The estimated cash flow statement follows from the CVBAP balance sheet and income statement. As only one comparative CVBAP balance sheet has been created it is not possible to estimate two cash flow statements from the information and thus only the cash flow statement for 2008 is presented below.

## Example Application of CVBAP

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Porsche Cash Flow Statement in EUR '000	2008 IFRS
Profit after Taxes	6,392,000
Amortization and Depreciation	569,372
Change in Pension Provisions	59,265
Change in Tax Provisions and other Provisions	1,177,693
Change in Deferred Taxes	236,456
Other Non-Cash expenses and Income	-3,841,515
Gain/Loss from Disposal of Assets	-78,517
Dividend Received from Investment in Associate	160,411
Changes in Inventory, Receivables and other Ass	-12,497,372
Changes in Current Liabilities	4,945,785
<b>Total Cash Flow from Operating Activities</b>	<b>-2,876,422</b>
Cash Received from Disposal of Assets	428,134
Cash Paid for Investments in Assets	-1,358,104
Cash Paid for Investments in Financial Assets	-21,854
Cash Paid for the Acquisition of Subsidiaries	90,449
Change in Receivables from Financial Services	-122,239
Change in Investments in Securities	-2,076,222
<b>Total Cash Flow from Investing Activities</b>	<b>-3,059,836</b>
Cash Paid to Shareholders	-384,475
Cash Paid to Minority Interests	-1,260
Cash Paid for Loans	-2,131,833
Cash Paid for Bonds	0
Cash Paid to Hybrid Capital Investors	-79,016
Cash Paid for Stock Options	-410,865
Capital Contributions	958,810
Cash Received for Loans Borrowed	12,083,623
Cash Received from Stock Options	392,451
Cash Received from Other Financial Liabilities	99,403
<b>Total Cash Flow from Financing Activity</b>	<b>10,526,838</b>
<b>Total Cash Flow</b>	<b>4,590,580</b>

**Table 45: Porsche: IFRS Cash Flow Statement**

Porsche shows a negative operating cash flow using IFRS in 2008. The profit after taxes corrected for depreciation, provisions and other non-cash expenses and income, and changes in current liabilities result in quite a large cash flow which is used up through

### Example Application of CVBAP

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changes in inventory, receivables and other assets. Referring back to the balance sheet, one can easily see that the balance sheet position with the biggest change was the holding of financial assets (including derivatives) which caused this large cash outflow. The same pattern can be seen in the investing activities, the majority of the negative cash flow was caused by investments in securities. Nevertheless, there was also investment in regular PP&E and intangible assets. A large increase in net debt of about 10 bn in the financing section of the cash flow statement brings the total cash flow to a positive 4.5 bn. Thus, Porsche financed the investment in financial assets with new debt.

Porsche Cash Flow Statement in EUR '000	2008 CVBAP
Profit after Taxes	587.722
Amortization and Depreciation	1.423.430
Change in Pension Provisions	59.931
Change in Tax Provisions and other Provisions	1.225.539
Change in Deferred Taxes	382.604
Other Non-Cash expenses and Income	-3.841.515
Gain/Loss from Disposal of Assets	0
Dividend Received from Investment in Associate	40.103
Changes in Inventory, Receivables and other Assets	-1.906.537
Changes in Current Liabilities	4.101.584
<b>Functional Value Cash Flow from Operating Activities</b>	<b>2.072.860</b>
<b>Other Cash Flow from Operating Activities</b>	<b>-4.949.282</b>
<b>Total Cash Flow from Operating Activities</b>	<b>-2.876.422</b>

**Table 46: Porsche: CVBAP Cash Flow Statement Operating Activities**

The CVBAP cash flow statement in comparison looks quite different; the cash flow from operating activities is about 5 bn higher and thus a positive 2 bn. Though CVBAP profit after taxes is considerably lower, cash tied up in inventory and other assets is considerable lower due to the exclusion of the non-essential derivatives. Another

### Example Application of CVBAP

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difference is the cash flow from changes in liabilities and receivables. While Functional Value is very close to the valuation used in IFRS, the cash flow statement does not use the aggregated amounts shown on the balance sheet. The weighted average method, described in CHAPTER V5.1 is estimated by adjusting the reported amounts from the balance sheet with the percentages used in the income statement to approximate revenue and inventory (and CoGS). Finally, the gain or loss on disposal of assets was set to zero, as profits or losses would be not be attributed to Functional Value income.

Cash Received from Disposal of Assets	428.134
Cash Paid for Investments in Assets	-3.055.734
Cash Paid for Investments in Financial Assets	0
Cash Paid for the Acquisition of Subsidiaries	90.449
Change in Receivables from Financial Services	8.413
Change in Investments in Securities	0
<b>Cash Flow from Investing Activity</b>	<b>-2.528.738</b>
<b>Other Cash Flow from Investing Activities</b>	<b>-531.098</b>
<b>Total Cash Flow from Investing Activities</b>	<b>-3.059.836</b>

**Table 47: Porsche: CVBAP Cash Flow Statement Investing Activities**

The investing activities section also shows a few adjustments. The largest impact in the change is the exclusion of cash paid for investments in securities and financial assets. Cash paid for investments in assets has been adjusted up in line with the Functional Value adjustment on the balance sheet. Finally, the changes in receivables from financial services have been adjusted to match the balance sheet data, as no additional information is available.

The cash flow from financing activities is the same in CVBAP and IFRS except for a difference of the attribution of dividends. They have been split between Functional Value and other cash flow in about the same proportion as comprehensive income is distributed.

### Example Application of CVBAP

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Cash Paid to Shareholders	-38.448
Cash Paid to Minority Interests	-1.260
Cash Paid for Loans	-2.131.833
Cash Paid for Bonds	0
Cash Paid to Hybrid Capital Investors	-79.016
Cash Paid for Stock Options	-410.865
Capital Contributions	958.810
Cash Received for Loans Borrowed	12.083.623
Cash Received from Stock Options	392.451
Cash Received from Other Financial Liabilities	99.403
<b>Cash Flow from Financing Activity</b>	<b>10.872.866</b>
<b>Other Cash Flow from Financing Activity</b>	<b>-346.028</b>
<b>Total Cash Flow from Financing Activity</b>	<b>10.526.838</b>
<b>Total Cash Flow</b>	<b>4.590.580</b>

Table 48: Porsche: CVBAP Cash Flow Statement Financing Activities

## 5 Statement of Changes in Owners' Equity

The statement of changes in owners' equity reconciles the beginning balances and ending balances of all equity accounts. In addition to the positions already described in the other statement, Porsche has decided to reclassify parts of retained earnings into subscribed capital. Other adjustments in retained earnings are items that were directly recognized in equity without flowing through the income statement. As all Functional Value income is recognized in the income statement, all of these adjustments are booked into regular retained earnings. Noteworthy is also the large adjustment in the equity reserve. It is obvious that Porsche has acquired a lot of assets above its Functional Value in 2008 with the potential of significant losses. Because the change is mostly caused by one change on the balance sheet, the change in the reserve account for this balance sheet position is shown separately. This brings total equity to a negative 4 bn in 2008 while it was still positive at

## Example Application of CVBAP

0.7 bn in 2007. A negative Functional Value equity does not mean that a company is in financial trouble, but it indicates that a large part of equity is at risk and if the market price does revert to Functional Value.

Statement of Changes in Owners' Equity 2008 in EUR '000

	Subscribed		Functional Value		Equity Reserve	Hybrid Capital
	Capital	Capital Reserves	Retained Earnings	Retained Earnings		
Opening Balance 2007	45.500	121.969	4.800.000	3.703.580	-8.767.994	809.977
Capital Increase from Corporate Funds	129.500			-129.500		
Functional Value Profit			587.722			
Other Comprehensive Income Adjustment				5.804.278		
Change in Reserve for Non-Current Other Receivables and Assets					-13.147.802	
Other Changes in Total of Contra Accounts					1.030.053	
Addition to Hybrid Capital						1.000.000
Dividends Paid			-38.448	-346.028		-30.214
Other Adjustments				387.709		
<b>Closing Balance 2008</b>	<b>175.000</b>	<b>121.969</b>	<b>5.349.274</b>	<b>9.420.040</b>	<b>-20.885.744</b>	<b>1.779.763</b>

**Table 49: Porsche: CVBAP Statement of Changes in Owners' Equity**

**CHAPTER VII****EXCURSUS: TAX ACCOUNTING CONSIDERATIONS****1 Introduction**

When talking about taxes one has to keep in mind that there typically are two different reasons to impose taxes. For one, governments want to generate revenue, but they also use taxes to influence behavior. This chapter looks at the influence of the use of Functional Value as a measurement base on both of these aspects.

There are several aspects to consider when looking at the revenue objective of taxes besides the overall amount collected. The timing of the cash flow can differ as can the predictability. Most governments plan their budget way ahead of time and are often faced with proceeds plummeting unforeseen.

Governments also often use taxes to influence behavior. E.g. the German government introduced a tax (cf. Alkopopsteuergesetz) on certain mixed alcohol drinks to make them less attractive to young people to get drunk on (with somewhat doubtful success, as people can avoid the tax by drinking hard liquor instead). On the other hand, most states tax company profits, but it is highly doubtful they want to influence companies to make less profit or to be less successful. For this discussion, the goal of taxation is to bring fair value closer to Functional Value.

As currently there is no homogeneous tax law, it is impossible to say what the impact of changing the measurement basis to Functional Value in tax accounting would be in general. For this discussion, the term financial market or financial transaction includes the trading in commodity derivatives as well as any other derivatives (such as weather derivatives) in both exchanges and the OTC (over the counter) market. Depositing and

withdrawing money from a bank account on the other hand is not considered a transaction in the financial markets.

## 2 Reduce Fluctuations in Tax Revenue

One possibility to deal with the new definition of business activity is to change the rate at which non-business activity is taxed. In the most extreme case, any non-Functional Value income would not be taxed at all. On the one hand, there would be less income to be taxed, but companies could not actually claim their speculative losses as a tax deduction either.

To start we assume all counterparties are businesses within one tax legislation. The profit and loss from all speculative (on both sides) derivatives would cancel out, as the amounts received and paid would offset each other. If the contract is long-term, they might be some differences throughout the life of the derivative depending on the valuation on the opposite sides. The valuation differences however, should be rather small as compared to the overall PnL impact of the contract and cancel out by the time the contract ends.

Any derivative that is bought and sold for non-speculative reasons, such as hedging or in the case of banks to provide a service for its customers would be subject to normal taxes. In a hedge with a forward or future, the profit or loss from the underlying would roughly cancel with the profit or loss from the hedge, thus it would cancel both the up and the downside. There would be no change to how these transactions are taxed compared to the status quo. On the banks' side, they would try to hedge the risk and make a profit from the day-1 PnL. The hedge would then cancel out any further PnL. If the hedge is not perfect, the subsequent gains and losses should more or less average out.

As stock (and many commodity) prices tend to rise, speculative gains from stock trading would in total probably be positive (for most periods). Even with a reversion of the price to be closer to Functional Value, which generally is referred to as the burst of a

### Excursus: Tax Accounting Considerations

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bubble, prices and thus profits tend to outweigh the losses. Excluding these losses would affect tax revenue positively. On the other hand, the increase of market prices would be excluded from profits as well, thus excluding them from being taxed. Even if prices were to revert to Functional Value in the long-run, tax revenue would be postponed<sup>26</sup>. Moreover, as Keynes stated, “[t]he market can stay irrational longer than you can stay solvent” (Hall 2012 Hall.2012.52), this could postpone tax revenue for a rather long time.

An advantage though would be that tax income is a lot more predictable. There would be less fluctuation and uncertainty about the tax revenue mitigating that particular problem faced by many governments today.

If this tax rule were to be implemented locally, it would encourage speculators to move their profit to local subsidiaries and leave speculation losses to other countries, benefitting both from the tax-free profit and the tax deduction from the loss. With this strategy, one could benefit even if the speculation is not profitable. Another side effect would be that companies would try to classify trades they expect to be profitable as speculation while expected losses would be more likely to be classified as hedging activities. There is a similar problem today with companies transferring profits to low tax countries. Most tax legislations consider this tax avoidance illegal; though fraud is easy and therefore common.

One reason to have such a tax law would be to treat speculative income from financial markets the same way as gambling in a casino (though not all tax regimes actually exclude gambling gains from taxable income cf. IRS (Internal Revenue Service) rule on gambling income IRS 2013).

Another possible approach to dealing with non-business activity is to tax it at a higher rate compared to business income. In a way, this is the opposite approach to the first discussed scenario. Instead of exempting speculative income from taxes, tax authorities

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<sup>26</sup> Any profits currently recorded would not be taxed. When prices fall to revert to Functional Value, the loss would not be tax deductible and tax revenue would rise as compared to the status quo.

### Excursus: Tax Accounting Considerations

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could tax the income at a fixed but higher than usual rate. The objective would be to clearly discourage any non-business transactions in the financial (and commodity) markets. Any loss above the gains from the financial speculation would be deductible from current income, though only saving taxes at the lower regular tax rate. Any gains however, would be subject to a higher tax rate. Though the total tax revenue would probably rise (save illegal tax avoidance impacts) the tax would fluctuate even more. The potential for tax avoidance would be the same as before though the incentive would be even higher.

Tax authorities could counteract the additional swings by limiting the loss deductible to the non-Functional Value income in the same year. This would allow for the increase during the time of bubble creating but would limit the decrease during downturns.

Another possibility is to not tax income at all, but raise the necessary money just through value added tax. The tax rate would have to be higher than today. Opponents of such a tax change argue that low-income households suffer disproportionately. In the short-run this is true. Low-income households spend a higher percentage of their income on daily necessities. Thus they would pay a high percentage of their income on the additional VAT (value-added tax). The higher expense is not offset with their lower income tax as they typically do not pay a lot of income taxes (if any at all). There would need to be an adjustment in the distribution of income. Low-income households would need a disproportionate raise.

The tax revenue would be rather constant, as the need for products and services of daily use does not change much. There is however some fluctuation in the spending for consumer goods and luxury goods.

### 3 Reduce the Gap between Fair Value and Functional Value

Before discussing two possibilities to reduce the gap between fair value and Functional value, one has to ask, why that is an objective besides the predictability of prices. The problem is that most prices, though only for “paper” in the financial markets have an impact in the real world (Tran 2014, Ghosh 2010). The discussion about speculation on agricultural products, i.e. food, became more heated during the last financial crisis. Many studies were looking into the reason for an increase in prices (up to 300% for some products in some countries in less than two years cf. Segueda 2012). Besides bad harvests and the increased demand, financial speculation was found to be a problem. As many people in poor countries spend a large percentage of their income on food, an increase in prices hits them hard. But not only end consumers are affected. Companies are also at risk if they are exposed to large commodity price fluctuations.

One suggestion to curb speculation is to introduce a Tobin tax. The tax named after Nobel-laureate James Tobin is a financial transaction tax (FTT) initially suggested after the end of the Bretton Woods system. The initial suggestion was to tax currency transactions in the spot market (Tobin 1996, Erturk 2006). For this discussion, we will go even further and assume there is a tax on financial transaction in other markets, too. This will include selling and buying equity, derivatives<sup>27</sup>, and fixed income products on exchanges as well as over the counter (OTC). There would be no tax however when you deposit or withdraw money from a regular savings or checking account. The tax would be set as a fixed percentage of the notional depending on the product type.

The objective of Tobin's suggestion was to discourage short-term speculative trading by increasing the threshold of spreads for arbitrage opportunities. In this case, the objective is to discourage any transactions that are not considered business transactions in general. One could also emphasize this objective by giving a tax break i.e. an exemption

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<sup>27</sup> Including commodity derivatives such as futures and options

### Excursus: Tax Accounting Considerations

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for business activity. An entity would have to prove that they are planning to increase Functional Value with the transaction. The proof could be similar to the one required for hedge accounting now, i.e. when a certain transaction (such as buying steel for a car manufacturer) occurs frequently, one can reuse documentation for similar transactions as long as there are no fundamental changes to the business objective. The link to hedging should be quite strong as a typical use for financial instruments outside the financial industry lies in hedging. Other taxable transactions would be in the foreign exchange spot market, which can be clearly linked to business activity.

There are a number of estimates on how much revenue such as tax would generate (cf. dpa 2011a). Some of these estimates however do not take into consideration one very important side effect when raising the price of any transaction, i.e. the anticipated decrease in the number of transactions (cf. Hanke et al. 2010). Nonetheless, estimates are that tax revenue would be around 57 bn € for the European Union (cf. Heath 2011). Consequently, the central predictable effect would be an increase in tax revenue. On the other hand many argue against an FTT as they expect a decrease in the employment in the financial industry due to the decreased number of transactions (cf. Heath 2011) which at least in part (if not more) probably cancel the effect of the tax revenue due to decreases in other taxes. However, as Woolley (cf. Turner 2009) pointed out the financial sector (in the UK) has grown beyond what is socially optimal; this reduction can be a desired side effect.

The effect of reduced trading could be quite significant. Tradeworkx estimated the market share of high frequency trading (HFT)<sup>28</sup> at around 40%<sup>29</sup> (cf. Narang 2010). The average expected net profit is estimated at around 0.2 cents per share. With average stock prices between 50 and 100 USD that is between 0.1 and 0.2 basis points (bps). Given discussed tax rates around 0.01% and 0.1%, (cf. Heath.2011.57) the tax would eliminate all but the most extreme opportunities in HFT.

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<sup>28</sup> HFT trading involves short-term strategies exploiting small price differences, usually with no overnight positions and holding times in the minute ranges.

<sup>29</sup> According to Narang other industry estimates place the market share as high as 60%.

### Excursus: Tax Accounting Considerations

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The discussion about the introduction of a Tobin tax has clearly pointed out one major problem with the local introduction of a transaction tax. The UK in particular sees a competitive disadvantage in the tax, as it would entice financial institutions to move to other locations without such a tax. In particular, non-location specific transactions such as foreign exchange transactions could move elsewhere as an easy way of avoiding the tax. Trades in local equity are harder to move, as the tax rule could include all transactions involving locally issued debt and equity products. It would be mute however to believe it were possible to capture all transactions involving these locally issued products, e.g. OTC contracts for difference<sup>30</sup> between two parties in a less regulated country would be hard to tax though the payoff would replicate the payoff of investing in the stock. If such a tax were introduced it is likely that more products are introduced to enable interested parties in emulating the payoff of an existing taxed transaction though outside of the reach of the respective tax authorities. Thus there would be some change in behavior, though a lot of the change would most likely be in the form of tax avoidance and the relocation to other financial centers. It would not only move the profits abroad but also the losses and the potential bailout that follows the next financial crisis.

Finally tax authorities could change the treatment of derivatives in taxing derivatives. Most services are taxable using regular VAT-rates or in some cases some special tax rate, such as e.g. insurance tax in Germany. Many people argue that derivatives should not be limited as they are used as insurance for e.g. farmers. Unlike other insurance services derivatives are not subject to the regular insurance tax (currently 19% in Germany). If such a tax is introduced, speculative derivative trading would not be profitable in most cases. As the tax is not a VAT companies cannot offset paid insurance tax payments with collected VAT.

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<sup>30</sup> Contracts for difference have similar payouts to investing in equity directly, though without the initial investment.

**CHAPTER VIII****CONCLUSION AND FUTURE RESEARCH**

Many have blamed financial reporting for its role in the recent financial crisis. While accounting only represent and reports about finances, it is meant to influence behavior and most likely encouraged the speculative behavior that led to a bubble and its subsequent bursting, by giving companies the opportunity to report the unrealized (and unreasonable) increase in the prices of assets.

The presented concepts of using conserved quantities in accounting are a theoretical foundation to counteract this problem. The next logical step is to look further into measurement of conserved cash flows and Functional Value. There is also the need for additional research in the area of the discount factor when estimating Functional Value. The discount factor can have a major impact on the final estimate and is hard to calculate in particular in light of the recent LIBOR manipulation scandal (cf. EC 2013).

Similar to other accounting rules, there is a lot of potential of future research when looking at specific complex cases that were not covered in this thesis. Similar to research dealing with regular GAAP, there is a need for rules dealing with leases, consolidation, and the potential of manipulation among other topics.

With improvements in measurement, future empirical research can also look at similar questions dealing with the information communicated through financial reporting (which is also investigated with traditional GAAP now): which CVBA numbers can be best used to forecast future company Functional Value, how to predict financial distress, and the achievement of the commonly stated objectives in accounting. Finally, one can also look at the effect on internal users using conserved quantities financial information, such as mid- and top-level managers. CVBAP figures can also be used to base incentives on, and the short and long-term success of companies with different incentives can be researched including the difference to GAAP based numbers.

## Conclusion and Future Research

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Further research can look at accounting numbers on a larger scale. By definition, Functional Value is conserved, so researchers can investigate aggregated accounting numbers for economies and also bridge the gap to economics and look at macroeconomic implications.

Finally, the impact on behavior of external users can be investigated. External users are not only business partners of the reporting entity but also regulatory organizations. New capital requirements or guidelines can be based on CVBAP and there are a lot of potential research questions in the area of design and effectiveness of such regulation.

External users also include tax authorities. The excursus has touched upon potential implications of using the creation (or attempted creation) of Functional Value as a definition of business activity. Combined with any insights gained in conserved values and Functional Value in macroeconomics the impact on tax revenue and the behavior of managers are important topics to be considered.

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