# Analytische, Empirische und Experimentelle Beiträge zur Rechnungslegung und Wirtschaftsprüfung

Der Wirtschaftswissenschaftlichen Fakultät der
Gottfried Wilhelm Leibniz Universität Hannover
zur Erlangung des akademischen Grades

Doktor der Wirtschaftswissenschaften
- Doctor rerum politicarum -

genehmigte Dissertation

von

M. Sc. Marcel Haak

geboren am 21.02.1986 in Gifhorn

2018

| | |
|---|---|
| Betreuer und Gutachter: | Prof. Dr. Stefan Wielenberg |
| Weiterer Gutachter: | Prof. Dr. Jens Robert Schöndube |
| Vorsitzender der Prüfungskommission: | Prof. Dr. Kay Blaufuß |
| Weiteres Mitglied (beratend): | Dr. Karola Bätje |
| Tag der Promotion: | 12.02.2018 |

## Zusammenfassung

Verschiedene supranationale Organisationen nehmen durch ihre Arbeit Einfluss auf die Gestaltung der Rechnungslegung und Wirtschaftsprüfung. Die Organisation für wirtschaftliche Zusammenarbeit und Entwicklung (OECD) verfolgt derzeit das Base Erosion and Profit Shifting (BEPS) Projekt, das sich in einem Viertel aller Aktionspunkte der Thematik der Verrechnungspreise widmet. Weiterhin hat die EU-Kommission im Jahr 2010 ein Grünbuch mit Reformvorschlägen zum Prüfungsmarkt vorgelegt. Darin thematisiert die Kommission, u. a. die Struktur des Prüfungsmarktes, verpflichtende Joint Audits oder Wege zur Erhöhung der Anzahl der Marktteilnehmer auf dem Prüfungsmarkt. Die EU-Kommission beschäftigt sich neben dem Markt für Prüfungsleistungen auch mit der Harmonisierung der öffentlichen Rechnungslegung in den Mitgliedstaaten. Die folgenden Beiträge untersuchen ausgewählte Themen zu den genannten Bereichen der Rechnungslegung und Wirtschaftsprüfung. Analysiert wird dabei insbesondere,

- der Einfluss eines strategisch agierenden Betriebsprüfers auf die Entscheidung eines multinationalen Unternehmens. Ein besonderer Fokus liegt dabei auf der Wahl des Unternehmens hinsichtlich eines oder zweier Verrechnungspreise für unterschiedliche Ziele. Außerdem wird untersucht, welchen Einfluss ein strategischer Betriebsprüfer auf die Bereitschaft des Unternehmens zur Gewinnverlagerung in Niedrigsteuerländer hat.
- wie sich große und kleine Prüfungsgesellschaften im Wettbewerb um Mandate zueinander verhalten und welche geplante Prüfungsqualität angeboten wird.
- wie die Aufteilung der Prüfungsarbeit in einem Joint Audit das Prüfungshonorar und die Prüfungsqualität beeinflusst.
- wie konzentriert der Prüfungsmarkt für kommunale Unternehmen in privater Rechtsform ist und ob sich auf diesem Teilmarkt für Prüfungsleistungen Prüfungsgesellschaften als Branchenspezialisten positionieren können.
- welche Auswirkungen sich für bestimmte Bilanzpositionen bei der Umrechnung von kommunalen Jahresabschlüssen vom Neuen Kommunalen Finanzmanagement (NKF) auf die internationalen Rechnungslegungsstandards für öffentliche Einheiten (IPSAS) ergeben.

## Abstract

Different supranational organizations influence the area of accounting and auditing. For example, the Organization for Economic Co-operation and Development (OECD) started the Base Erosion and Profit Shifting (BEPS) project which deals in one-fourth of the action points with transfer pricing. The European Commission releases a green paper in 2010 which considers different topics of the audit market, for example the market structure, mandatory joint audits or increasing the number of market participants. Besides these question on audit policy, the European Commission explores options to harmonize the accounting system in the public sector in the member states. The following articles investigate specific topics in these fields of accounting and auditing. In particular, the papers analyze especially the following research questions:

- How does a strategic tax auditor influence the decision of a multinational company to choose one set of books or two set of books? Furthermore, it is investigated how a strategic tax auditor influences profit shifting incentives to a low-tax jurisdiction.
- What is the difference in the behavior of big and small audit firms in acquiring audit clients? Moreover, the offered audit quality is considered.
- How does the audit work allocation in a joint audit setting influence the audit fees and the audit quality?
- How concentrated is the audit market of municipal entities in privately organized legal structures? Additionally, it is investigated whether industry specialized audit firms exist in this audit market.
- How does the conversion of annual accounts of municipalities from the North Rhine-Westphalian municipal accounting (NKF) to the International Public Sector Accounting Standards (IPSAS) affect specific balance sheet items of those annual accounts?

## Stichwörter / Keywords


- Transferpreise, Zweikreissystem, Einkreissystem, Strategischer Steuerprüfer, Ausschreibungsprozess, strategisches Verhalten von Prüfungsgesellschaften, Prüfungsqualität, Verhaltensforschung in der Wirtschaftsprüfung, Verteilung der Prüfungsarbeit, Prüfungshonorare, Prüfungsqualität, Bilanzpolitik, ökonomische Regulierung, Joint Audits, Branchenspezialisierung, kommunale Abschlussprüfung, kommunale Unternehmen, Konzentrationsmessung, Marktkonzentration, Prüfungsmarkt, EPSAS, IPSAS, Neues Kommunales Finanzmanagement (NKF), kommunale Rechnungslegung, internationale Rechnungslegung, Umrechnung von Jahresabschlüssen

- Transfer pricing, two sets of books, one set of books, strategic tax auditor, tendering process, strategic behavior of audit firms, audit quality, behavioral accounting, allocation of audit work, audit fees, audit quality, earnings management, economic regulation, joint audit, audit market, industry specialization, market concentration, measures of concentration, municipal audit, municipal entities, EPSAS, IPSAS, North Rhine-Westphalian municipal accounting, municipal accounting, international accounting, conversion of annual accounts

## Inhaltsverzeichnis

# Vorwort

Die vorliegende kumulative Dissertation beschäftigt sich mit ausgewählten Forschungsfeldern der Rechnungslegung und Wirtschaftsprüfung. Meine Interessen in diesem Bereich sind sowohl inhaltlich als auch methodisch vielfältig, sodass diese Dissertation sowohl analytische, experimentelle als auch empirische Beiträge enthält. Die einzelnen Beiträge spiegeln durch ihre interessanten und vielfältigen Fragestellungen das breite Themenspektrum aus den Bereichen der Rechnungslegung und Wirtschaftsprüfung wider. Im Folgenden wird ein Überblick über diese Beiträge gegeben.

Die Organisation für wirtschaftliche Zusammenarbeit und Entwicklung (OECD) forciert seit Oktober 2015 ein Projekt zur Sicherung der Besteuerungsgrundlagen in ihren Mitgliedsländern. Dieses Projekt zur Sicherung des Steuersubstrats, Base Erosion and Profit Shifting (BEPS), widmet sich dabei u. a. in einem Viertel aller Aktionspunkte der Thematik von Verrechnungs- bzw. Transferpreisen (OECD, 2015). In der Vergangenheit sind mit der Hilfe von Verrechnungspreisen Gewinne in Niedrigsteuerländer transferiert worden. Dies ist nicht im Interesse der Finanzverwaltungen. Insbesondere zwischen multinationalen Unternehmen und staatlichen Behörden führen Fragen der Verrechnungspreisgestaltung häufig zu Unstimmigkeiten (EY, 2013). Verrechnungspreisinformationen erhalten Prüfungsinstanzen aus der Rechnungslegung des Unternehmens. Dabei stehen Unternehmen vor der Wahl, ob sie einen Verrechnungspreis sowohl für interne und externe Zwecke verwenden wollen (One Set of Books (OSB)) oder alternativ dafür entscheiden, zwei Verrechnungspreise für die möglicherweise divergierenden internen und externen Zwecke zu verwenden (Two Sets of Books (TSB)). Allerdings kann die Verwendung von zwei unterschiedlichen Verrechnungspreisen im Falle einer Betriebsprüfung als missbräuchliche Steuergestaltung interpretiert werden (EY, 2003). Bisherige Forschungsbeiträge gehen davon aus, dass die Steuerbehörde jeden Verrechnungspreis akzeptiert, solange dieser das *arm's length Prinzip* erfüllt (z. B. Baldenius et al., 2004). Allerdings ist davon auszugehen, dass die Finanzverwaltungen strategisch handeln, da der Fiskus ein Interesse an den möglicherweise entzogenen Steuereinnahmen hat. Der Betriebsprüfer muss deshalb zwischen seinen persönlichen Prüfungskosten und dem zusätzlichen möglichen

Steueraufkommen abwägen, anhand derer er evaluiert wird. Dieses zusätzliche Steueraufkommen wird durch die Anpassung des externen Verrechnungspreises nach Entdeckung einer Nichteinhaltung des *arm's length Prinzips* erzielt. Ein multinationales Unternehmen wird bei der Entscheidung zwischen OSB oder TSB das strategische Verhalten des Betriebsprüfers berücksichtigen. In diesem Zusammenhang stellt sich die Frage, in welchen Situationen die Verwendung eines einzelnen Verrechnungspreises optimal ist und wann durch TSB bessere Ergebnisse erzielt werden können.

**Beitrag I** untersucht diese Fragestellungen mittels eines dynamischen Spiels unter unvollständiger Information. Es existieren in diesem Spiel zwei Spieler, die strategisch interagieren. Zum einen wird ein dezentralisiertes Unternehmen betrachtet, das eine Produktionseinheit im Niedrigsteuerland und einer Verkaufseinheit im Hochsteuerland betreibt. Aus Unternehmenssicht besteht das Interesse, mit Hilfe des Verrechnungspreises Gewinne in das Niedrigsteuerland zu verlagern, um die eigene Steuerlast zu minimieren. Bei der Wahl von TSB kann das multinationale Unternehmen sowohl intern als auch extern eine genauere Optimierung im Vergleich zu OSB vornehmen. Allerdings verschlechtert sich bei TSB die Verhandlungsposition des multinationalen Unternehmens, wenn eine Prüfung durch die Steuerbehörden erfolgt und ein Regelverstoß festgestellt wird. Wenn ein externer Verrechnungspreis gewählt wird, der das *arm's length Prinzip* erfüllt, erfolgt im Falle einer Betriebsprüfung keinerlei Anpassung des Verrechnungspreises. Im Gegensatz zur bisherigen Forschung werden in diesem Modell zwei verschiedene Typen von multinationalen Unternehmen betrachtet. Ein multinationales Unternehmen mit niedrigen Grenzkosten hat einen anderen Bereich für den *arm's length* Preis als ein multinationales Unternehmen mit hohen Grenzkosten. Zum anderen wird ein Betriebsprüfer betrachtet. Dieser kennt vorab weder die Grenzkosten noch weiß er, ob das multinationale Unternehmen die Vorschriften zur Besteuerung einhält. Dementsprechend hat ein multinationales Unternehmen mit niedrigen Grenzkosten einen Anreiz ein multinationales Unternehmen mit hohen Grenzkosten zu imitieren. Bei Abweichung des Verrechnungspreises vom *arm's length Prinzip* und der Entdeckung durch den Betriebsprüfer verhandeln der Betriebsprüfer und das multinationale Unternehmen einen angemessenen Verrechnungspreis. Die Ergebnisse des Modells zeigen, dass die Wahl von OSB oder TSB von der Verhandlungsmacht des Betriebsprüfers abhängt. Bei hoher Verhandlungsmacht des

Betriebsprüfers, ist OSB keine gleichgewichtige Lösung. Sofern die Verhandlungsmacht des Betriebsprüfers hoch ist, ist TSB gegenüber OSB zu präferieren, da der Vorteil einer verbesserten Verhandlungsposition konterkariert wird. Dann wird TSB aufgrund der höheren Flexibilität in der Verrechnungspreisgestaltung gewählt. Des Weiteren beeinflussen auch die persönlichen Prüfungskosten das Ergebnis. Bei niedrigen Prüfungskosten erhöht sich die Wahrscheinlichkeit für eine Prüfung durch den Betriebsprüfer, sodass ein Verrechnungspreises zur Steuervermeidung seltener gewählt wird. Außerdem kann gezeigt werden, dass eine hohe Steuersatzdifferenz der partizipierenden Länder zu einer weniger aggressiven Gestaltung des Verrechnungspreises führt, da der strategisch agierende Betriebsprüfer den hohen Anreiz zur Gewinnverlagerung erkennt und deshalb seine Prüfwahrscheinlichkeit anpasst.

Die EU-Kommission als supranationale Institution entwickelt viele Gesetzgebungsverfahren, die in den Mitgliedsstaaten umgesetzt werden müssen. Im Bereich der Rechnungslegung und Wirtschaftsprüfung hat Deutschland im Jahr 2016 das Abschlussprüferreformgesetz (AReG) erlassen, welches die EU-Richtlinie 2014/56/EU der EU-Kommission umsetzt. Diese Richtlinie ist das Endresultat eines mehrjährigen Diskussions- und Beratungsprozesses zur Reform des Abschlussprüfermarktes in der Europäischen Union, der durch das Grünbuch der Europäischen Union im Jahr 2010 begonnen wurde (Europäische Kommission, 2010). Das Ziel dieses Grünbuches ist durch Reformen auf dem Abschlussprüfermarkt die Finanzmarktstabilität zu sichern (Europäische Kommission, 2010, S. 3). In ihren Befunden zum Abschlussprüfermarkt stellt die EU-Kommission fest, dass sich auf dem Prüfungsmarkt eine immer stärkere Konsolidierung der Prüfungsgesellschaften abzeichnet. Der EU-Kommission ist es ein Anliegen, dass kleinere Prüfungsgesellschaften bessere Chancen haben in den Markt einzutreten und Mandate zu gewinnen (Europäische Kommission, 2010, S. 4f.). Die Qualität sollte in jeder Ausschreibung entscheidendes Kriterium sein (Europäische Kommission, 2010, S. 19). Im Zusammenhang mit dem Ausschreibungsprozess stellt sich die Frage, wie sich Prüfungsgesellschaften im Wettbewerb um Mandate zueinander verhalten, welche Strategien sie zur Mandatsgewinnung verwenden könnten und welche Prüfungsqualität im Ausschreibungsprozess geboten wird.

**Beitrag II** beschäftigt sich mit der Frage nach dem Verhalten von Prüfungsgesellschaften, wenn diese sich um ausgeschriebene Mandate bewerben. Dafür wird ein Experiment am Computer im Labor durchgeführt. In diesem Experiment agieren die Teilnehmer als Manager einer Prüfungsgesellschaft. Dabei werden verschiedene Marktsituationen betrachtet. Zum einen konkurrieren zwei gleichgroße Prüfungsgesellschaften miteinander. Zum anderen stehen eine große und eine kleine Prüfungsgesellschaft im Wettbewerb zueinander. Die Anzahl der ausgeschriebenen Mandate wird variiert. Die Ergebnisse des Experiments zeigen, dass sich zwei große Prüfungsgesellschaften den Markt der ausgeschriebenen Mandate teilen. Wenn eine große und eine kleine Prüfungsgesellschaft im Wettbewerb zueinander stehen, versucht die große Prüfungsgesellschaft alle ausgeschriebenen Mandate zu erwerben. Die kleine Prüfungsgesellschaft wählt eine Guerilla-Strategie, d. h. sie konzentriert sich auf einige wenige ausgeschriebene Mandate und ignoriert die restlichen. Weiter kann gezeigt werden, dass die kleine Prüfungsgesellschaft eine höhere Prüfungsqualität im Ausschreibungsprozess anbietet. Ein absichtliches Überbieten bei der Prüfungsqualität zur Erlangung von Mandaten könnte eine Strategie zur Erreichung des Markteintrittes für kleine Prüfungsgesellschaften sein. Kleine Prüfungsgesellschaften haben ebenfalls größere Erfolgschancen Mandanten zu gewinnen, wenn mehr Mandate gleichzeitig ausgeschrieben sind. Außerdem kann in einem zweiten Teilexperiment gezeigt werden, dass kleine Prüfungsgesellschaften, selbst bei überproportionalen Wachstum des Wettbewerbsvorteils für große Prüfungsgesellschaft, nicht aus dem Markt gedrängt werden.

Es wurde bereits erwähnt, dass ein Teil des Grünbuchs zur Abschlussprüfung der EU die Frage nach der zunehmenden Konsolidierung von Prüfungsgesellschaften auf dem Prüfungsmarkt für kapitalmarktorientierte Unternehmen diskutiert (Europäische Kommission, 2010, S. 17f.). Ein Vorschlag der EU-Kommission zur Reduzierung der Markteintrittsbarrieren für kleinere Prüfungsgesellschaften ist die Durchführung von verpflichtenden Joint Audits, d. h. mindestens zwei oder mehrere Prüfungsgesellschaften führen die Abschlussprüfung durch und unterzeichnen den Bestätigungsvermerk gemeinsam. Die wechselseitige Kontrolle zwischen den Prüfungsgesellschatten soll zu einer höheren Prüfungsqualität führen und die Unabhängigkeit der Prüfenden erhöhen

(Europäische Kommission, 2010, S. 18). Es stellt sich in diesem Zusammenhang die Frage, ob die Prüfungsqualität unabhängig von der Aufteilung der Prüfungsarbeit gleich ist und welchen Einfluss diese Aufteilung der Prüfungsarbeit auf das Gesamthonorar für das Joint Audit hat.

In der empirischen Forschung zu Joint Audits wird häufig der französische Prüfungsmarkt als Datengrundlage herangezogen, da börsennotierte Unternehmen in Frankreich seit 1966 gemäß Artikel L823-2 des French Code of Commerce verpflichtet sind, ihre Jahresabschlüsse durch ein Joint Audit prüfen zu lassen.

**Beitrag III** untersucht diese Fragestellung nach dem Einfluss der Aufteilung der Prüfungsarbeit in einem Joint Audit auf das Prüfungshonorar und die Prüfungsqualität. Dazu wird der französische Prüfungsmarkt von börsennotierten Unternehmen als Datenbasis verwendet. Mit Hilfe von multivariaten Regressionen kann gezeigt werden, dass bei einer höheren Ungleichverteilung in der Aufteilung der Prüfungsarbeit das Prüfungshonorar für den Mandanten des Joint Audits niedriger ist als wenn die Prüfungsarbeit gleichverteilter ist. Weiterhin zeigen die Ergebnisse, dass bei einer höheren Ungleichverteilung in der Aufteilung der Prüfungsarbeit die gemessene Prüfungsqualität steigt. Dieser Beitrag untersucht, wie viele empirische Studien, die Prüfungsqualität mit dem Konzept der *diskretionären Periodenabgrenzungen*, d. h. es wird die buchmäßige Bilanzpolitik verwendet. Dieses Konzept steht häufig aufgrund der Probleme bei der Trennung der normalen von den *diskretionären Periodenabgrenzungen* in der Kritik. Deshalb wird mit Hilfe des *Cosmetic Earnings Management* (CEM) die Robustheit der Ergebnisse untersucht. Beim CEM handelt es sich um ein Konzept, dass das Auf- und Abrunden über bzw. unter bestimmte Schwellenwerte betrachtet. Die CEM-Analyse bestätigt die Ergebnisse der Analyse zu den *diskretionären Periodenabgrenzungen*. Ergebniserhöhende Bilanzpolitik kommt bei einer Annäherung an gleichverteilte Prüfungsarbeit häufiger vor als bei weniger gleichverteilter Prüfungsarbeit. Die Prüfungsqualität steigt, wenn eine Prüfungsgesellschaft einen Großteil der Prüfungsarbeit übernimmt.

Die EU-Kommission moniert in ihrem Grünbuch zum Abschlussprüfermarkt, dass der Prüfungsmarkt von börsennotierten Unternehmen stark konzentriert ist (Europäische

Kommission, 2010, S. 17f.). Für diesen Befund gibt es zahlreiche empirische Belege (Bigus und Zimmermann, 2008, S. 171-173; Möller und Höllbacher, 2009, S. 657-662). Es stellt sich die Frage, ob auch andere Teilmärkte für Prüfungsleistungen stark konzentriert sind. Aufgrund der erschwerten Datenbeschaffung sind andere Teilmärkte im Gegensatz zum Teilmarkt für Prüfungsleistungen von börsennotierten Unternehmen deutlich weniger intensiv erforscht. Für den Teilmarkt von Prüfungsleistungen für kommunale Unternehmen liegt nach aktuellem Kenntnisstand noch keine Analyse der Marktkonzentration von Prüfungsgesellschaften vor.

Im Zusammenhang mit der Konzentrationsmessung kann gleichzeitig auch die Frage nach der Branchenspezialisierung der Prüfungsgesellschaften gestellt werden (De Beelde, 1997). Deshalb beschäftigt sich der nächste Beitrag mit dem Prüfungsmarkt von kommunalen Unternehmen und analysiert für diesen Teilmarkt die Marktkonzentration von Prüfungsgesellschaften. Des Weiteren wird untersucht, ob sich Prüfungsgesellschaften auf diesem Teilmarkt als Branchenspezialisten positionieren können.

**Beitrag IV** betrachtet deskriptiv-empirisch die Marktkonzentration und die Branchenspezialisierung von Prüfungsgesellschaften auf dem Prüfungsmarkt für kommunale Unternehmen in privater Rechtsform für den Zeitraum von 2005 bis 2013. Diese Analyse zieht insgesamt 9.276 Beobachtungen kommunaler Unternehmen in privater Rechtsform von deutschen Groß- und Mittelstädten heran. Mit Hilfe der Marktanteilsmethode wird die Branchenspezialisierung der Prüfungsgesellschaften untersucht. Die Marktanteile werden zur Berechnung der Konzentrationsrate und des Herfindahl-Indexes verwendet. Zur Beurteilung der Ergebnisse der Konzentrationsrate wird das Gesetz gegen Wettbewerbsbeschränkungen (GWB) herangezogen. Auf Basis der Konzentrationsraten $CR_3$ und $CR_5$ kann keine marktbeherrschende Stellung von Prüfungsgesellschaften auf diesem Teilmarkt für Prüfungsleistungen festgestellt werden. Es liegen stattdessen überwiegend Ergebnisse mit niedriger bis maximal mittlerer Marktkonzentration vor. Der Herfindahl-Index bestätigt diese Ergebnisse. Trotz fehlender hoher Marktkonzentration können auf diesem Teilmarkt von Prüfungsleistungen anhand der Marktanteilsmethode zwei Branchenspezialisten identifiziert werden. Der Verbund PwC/Wibera sowie KPMG erfüllen einen Großteil der untersuchten Kriterien zur Ermittlung der Branchenspezialisierung. Dieser Beitrag liefert

somit die ersten Erkenntnisse zur Marktkonzentration und Branchenspezialisierung von Prüfungsgesellschaften für den Prüfungsmarkt von kommunalen Unternehmen in privater Rechtsform.

Ein weiteres Forschungsfeld neben dem Prüfungsmarkt von öffentlichen Unternehmen in privater Rechtsform ist die öffentliche Rechnungslegung von Gebietskörperschaften im Allgemeinen. Die Europäische Union stellt ihren Abschluss bereits nach den International Public Sector Accounting Standards (IPSAS) auf (Europäische Kommission, 2014). Seit 2013 bearbeitet die EU-Kommission ein Projekt zur Harmonisierung der heterogenen öffentlichen Rechnungslegung in den Mitgliedstaaten der Europäischen Union (Lorson et al., 2017, S. 578). Zur Erreichung einer harmonisierten öffentlichen Rechnungslegung plant die EU-Kommission die Einführung von European Public Sector Accounting Standards (EPSAS), die auf den IPSAS basieren sollen (Europäische Kommission, 2013, S. 10). Eine Umstellung von der aktuellen öffentlichen Rechnungslegung, die in Deutschland weitgehend auf dem HGB basiert, auf internationale öffentliche Rechnungslegungsstandards wird in den Jahresabschlüssen der Kommunen zu Veränderungen führen. Der Umfang des Umstellungseffektes sollte bei der Umsetzung der Reform Berücksichtigung finden. Der folgende Beitrag beschäftigt sich daher mit der Umrechnung von kommunalen Jahresabschlüssen auf die IPSAS.

**Beitrag V** untersucht für 20 Städte aus Nordrhein-Westfalen die Auswirkungen, die sich für die Jahresabschlüsse 2013 ergeben hätten, wenn zu diesem Zeitpunkt bereits internationale Rechnungslegungsstandards statt dem Neuen Kommunalen Finanzmanagement (NKF) anzuwenden gewesen wären. Eine Umrechnung auf die IPSAS macht für die Abschätzung der Effekte einer EPSAS-Einführung insofern Sinn, da die EPSAS auf Basis der IPSAS entwickelt werden und Wahlrechte und Auslegungsspielräume in den IPSAS konkretisiert und eliminiert werden sollen. Die bisherige Forschung zeigt, dass die Bilanzpositionen *Sonderposten, Instandhaltungsrückstellungen und Pensionsrückstellungen* besonders stark von einer Umstellung von NKF auf IPSAS / EPSAS betroffen sein sollten. Wäre die Umstellung der Bilanzierung dieser Abschlusspositionen bereits im Jahresabschluss 2013 erfolgt, hätte dies umfassende Auswirkungen u. a. auf Rückstellungen, Bilanzsumme,

Jahresergebnis und Eigenkapital gehabt. Eine Analyse der Auswirkungen zeigt, dass die Rückstellungen im Durchschnitte 36,33% höher ausgefallen wären. Das Jahresergebnis würde um durchschnittlich 39,71% bis 47,89% sinken. Die Veränderung des Eigenkapitals wäre ebenfalls gravierend ausgefallen. Diese Veränderung hängt im Besonderen vom Anteil der aufzulösenden Sonderposten für Zuwendungen ab. Hingegen wäre die durchschnittliche Veränderung der Bilanzsumme gering. Die Eigenkapitalquote 2 würde sich um durchschnittlich ca. 26% bei einer Umstellung von NKF auf IPSAS verringern. Aufgrund der starken bilanziellen Auswirkungen sollte trotz der Vorteile einer homogenen öffentlichen Rechnungslegung in der Europäischen Union die Einführung der EPSAS genau vorbereitet werden. Dabei sollte für bestimmte Übergangsregeln gesorgt sein, damit die Umstellungseffekte nicht zu gravierend die öffentlichen Jahresabschlüsse im Jahr der Umstellung belasten.

Diese fünf Beiträge liefern somit neue Erkenntnisse auf den verschiedenen Gebieten der Rechnungslegung und Wirtschaftsprüfung:

1. Die Berücksichtigung eines strategischen Betriebsprüfers führt dazu, dass OSB für multinationale Unternehmen eine gleichgewichtige Strategie sein kann. Dieses Ergebnis ist bisher in der analytischen Literatur nicht zu finden. Außerdem führt die Berücksichtigung des strategischen Betriebsprüfers dazu, dass bei steigenden Steuersatzdifferenzen der Länder die Wahrscheinlichkeit für die Verlagerung von Gewinnen bei multinationalen Unternehmen sinkt.
2. Kleine Prüfungsgesellschaften wählen eine Guerilla-Strategie im Wettbewerb mit großen Prüfungsgesellschaften, um Mandate zu gewinnen. Dabei ist die geplante Prüfungsqualität von kleinen Prüfungsgesellschaften größer als von großen Prüfungsgesellschaften. Das Überbieten bei der Prüfungsqualität im Ausschreibungsprozess kann für kleine Prüfungsgesellschaften eine Strategie zur Gewinnung von Mandanten sein.
3. Die Prüfungsqualität von Joint Audits unterscheidet sich je nach Aufteilung der Prüfungsarbeit. Wenn die Aufteilung der Prüfungsarbeit gleichmäßiger erfolgt, ist die Prüfungsqualität schlechter als im Fall einer dominierenden

Prüfungsgesellschaft. Ebenfalls steigt das Gesamthonorar für das Joint Audit, wenn die Verteilung der Prüfungsarbeit gleichmäßiger ist.

4. Auf dem Teilmarkt für Prüfungsleistungen von kommunalen Unternehmen in privater Rechtsform herrscht keine marktbeherrschende Marktkonzentration. Stattdessen weist dieser Prüfungsmarkt eine niedrige bis mittlere Marktkonzentration auf. Auf diesem Teilmarkt für Prüfungsleistungen können der Verbund PwC/Wibera sowie KPMG als Branchenspezialisten identifiziert werden.
5. Eine Umstellung der kommunalen Rechnungslegung vom NKF auf internationale Rechnungslegungsstandards würde in den Jahresabschlüssen von nordrhein-westfälischen Städten gravierende Veränderungen hervorrufen. Die größten Veränderungen treten bei den Rückstellungen, dem Jahresergebnis und den Eigenkapitalquoten auf.

**Literaturverzeichnis zum Vorwort**

Baldenius, T., Melumad, N. D., und Reichelstein, S. (2004). Integrating managerial and tax objectives in transfer pricing. *The Accounting Review*, 79(3): 591-615.

Bigus, J. und Zimmermann, R.-C. (2008). Non-Audit Fees, Market Leaders and Concentration in the German Audit Market: A Descriptive Analysis. *International Journal of Auditing*, 12: 159-179.

De Beelde, I. (1997). An Exploratory Investigation of Industry Specialization of Large Audit Firms. *The International Journal of Accounting*, 32(3): 337-355.

Europäische Kommission (2010). Grünbuch: Weiteres Vorgehen im Bereich der Abschlussprüfung: Lehren aus der Krise, Brüssel, Internet: http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52010DC0561 (14.08.2017).

Europäische Kommission (2013). Bericht an den Rat und das Europäische Parlament – Die angestrebte Umsetzung harmonisierter Rechnungsführungsgrundsätze für den öffentlichen Sektor in den Mitgliedsstaaten – Die Eignung der IPSAS für die Mitgliedstaaten, Internet: http://eur-lex.europa.eu/legal-content/DE/ALL/?uri=celex%3A52013DC0114 (16.08.2017).

Europäische Kommission (2014). Consolidated annual accounts of the European Union, Internet:http://ec.europa.eu/budget/library/biblio/documents/2013/2013_annual_accounts_en.pdf (16.09.2016).

EY (2003). Transfer Pricing 2003 Global Survey, Internet: http://webcache.googleusercontent.com/search?q=cache:JIPqK6JWVSUJ:webapp01.ey.

com.pl/EYP/WEB/eycom_download.nsf/resources/Transfer%2520Pricing%2520Survey%2520Report_2003.pdf/%24FILE/Transfer%2520Pricing%2520Survey%2520Report_2003.pdf+&cd=1&hl=de&ct=clnk&gl=de (20.09.2016).

EY (2013). 2013 Global Transfer Pricing Survey, Internet: http://webcache.googleusercontent.com/search?q=cache:CsR7BN89vGYJ:www.ey.com/Publication/vwLUAssets/EY-2013_Global_Transfer_Pricing_Survey/%24FILE/EY-2013-GTP-Survey.pdf+&cd=2&hl=de&ct=clnk&gl=de (20.09. 2016).

Lorson, P. C., Haustein, E., und Wigger, C. (2017). Europäische Harmonisierung des öffentlichen Rechnungswesens – Wesentliche Unterschiede zwischen Standards staatlicher Doppik und IPSAS. *Die Wirtschaftsprüfung*, 70(10): 576-584.

Möller, M. und Höllbacher, A. (2009). Die deutsche Börsen- und Indexlandschaft und der Markt für Abschlussprüfungen. *Die Betriebswirtschaft (DBW)*, 69(6): 647-677.

OECD (2015). OECD/G20 Base Erosion and Profit Shifting Project - Transfer Pricing Documentation and Country-by-Country Reporting, Action 13 - 2015 Final Report.

# Beitrag I

## Titel

One Set or Two Sets of Books: The Impact of a Strategic Tax Auditor

Einkreis- oder Zweikreissystem: Der Einfluss eines strategischen Betriebsprüfers

## Koautoren

M.Sc. Rebecca Reineke, Dr. Katrin Weiskirchner-Merten, Prof. Dr. Stefan Wielenberg

# One Set or Two Sets of Books: The Impact of a Strategic Tax Auditor


## ABSTRACT

Using a game theoretic setting, this paper studies how a multinational company's (MNC's) choice of using one set (OSB) or two sets of books (TSB) is affected by a strategic tax auditor (TA). First, a divisionalized MNC with a production division in a low-tax country and a sales division in a high-tax country chooses either OSB or TSB. With OSB, the unique transfer price coordinates the quantity decision and determines the tax payments. With TSB, two transfer prices are used for both tasks. Second, a TA may audit the MNC's transfer prices.

It turns out that the TA's bargaining power and his personal audit costs critically influence the MNC's transfer pricing decision. Given low bargaining power and low audit costs, the MNC keeps OSB with positive probability. When the TA's bargaining power is high, the negotiation benefits from using a single transfer price are outweighed by the costs of reduced flexibility. Then, the MNC keeps TSB with either tax aggressive or compliant reported transfer prices. In addition, an increase in the tax difference induces less tax aggressive behavior. Intuitively, tax aggressiveness should be even more attractive in this case. This intuition is not true in our setting since the TA's audit probability increases and, thus, makes profit shifting less attractive.



***Acknowledgement:*** We gratefully acknowledge helpful comments provided by Christian Riegler, Clemens Löffler and Reinhard Schrank. Furthermore, we would like to thank Michael Ebert, Joachim Gassen, Andreas Scholze and other participants in the 2017 Analytical Research in Financial Accounting (ARFA) workshop in Osnabrück and participants in the research seminar at the Leibniz Universität Hannover. Moreover, Eva Eberhartinger, Harald Amberger and other participants in the research seminar at the Vienna University of Economics and Business provided helpful comments. We acknowledge Ulrich Schäfer, Robert Ullmann and other participants in the 2017 EAA Annual Congress and participants in the 2017 annual VHB conference. We thank Oliver Dürr for the discussion of our paper and Alfred Wagenhofer and other participants for helpful comments at the 2017 Accounting Research Workshop.

# 1 Introduction

The prevailing use of profit shifting devices such as debt financing structures or transfer prices is non-controversial. This is not in the interest of governments and tax authorities. To prevent unintended tax savings, tax authorities and governments have begun to consider how tax regulation and enforcement affect taxpayers' behavior. According to EY's Global Transfer Pricing Survey 2013, transfer pricing remains a central disagreement between MNCs and tax authorities. The importance of addressing the unintended use of transfer pricing mechanisms for tax saving reasons is also highlighted by the Base Erosion and Profit Shifting (BEPS) project of the OECD. One-fourth of the BEPS action areas specifically concern transfer pricing topics. Several parts of the other action areas also affect transfer prices. One goal of the OECD's efforts concerning the documentation of transfer pricing and country-by-country reporting is to help tax authorities to most effectively deploy their audit resources (OECD, 2015, p. 9). The transfer price information stems from the MNC's accounting system. Previous research has illustrated that an MNC may either keep one set of books (OSB) or two sets of books (TSB). An accounting system comprising only OSB uses one transfer price both internally and externally (Göx and Schiller, 2006; Nielsen and Raimondos-Møller, 2012). With TSB, the MNC uses two separate transfer prices, one for internal and the other for tax purposes. Springsteel (1999) finds that 77 percent of a best-practice group of large companies choose TSB. The detection of differing internal and tax transfer prices by the tax auditor (TA) may, if sufficiently different, undermine economic credibility, hence leading to costly regulatory intervention (Narayanan and Smith, 2000, p. 507). Given two separate transfer prices, comprehensive disclosure requirements impose additional costs on firms for concealing the second set of books from the tax authority (Martini, 2015, p. 873). Moreover, a second set of books implies higher costs due to additional documentation, and hence, administrative expenses rise (EY, 2013; Nielsen and Raimondos-Møller, 2012). In addition to the additional administrative and documentation costs of keeping a second set of books, the possibility of detection and intervention by the TA might further reduce the value of TSB (Smith, 2002b, p. 224). Companies argue that implementing TSB will invite increased scrutiny by tax authorities (EY, 2003). Mills (1998) notes that book-tax differences create red flags for the IRS. She finds empirical evidence that the audit adjustments proposed by the IRS increase when the book-tax

difference increases. Finding TSB in a tax audit has similar implications. If an audit takes place, the TA learns that internal income might exist due to the use of an internal transfer price. Previous research has regularly assumed that the TA accepts any transfer price as long as it lies within a specific range that complies with the arm's length principle (see, for example, Baldenius et al. (2004)). In light of the recent developments concerning TAs' awareness of tax evasion, TAs seem to act strategically. TAs face a trade-off between audit costs and additional tax revenues when they audit an MNC's transfer prices and related books. These revenues may be gained due to the possible detection of non-compliance with the arm's length principle and hence adjusting the accepted transfer prices. This leads to the conjecture that an MNC considers the existing tax regulation and enforcement by strategic TAs in its decision of whether to use OSB or TSB. This leads us to the following research questions: (1) When will MNCs decide to use OSB or TSB in equilibrium? (2) What factors influence this decision?

We examine these questions using a dynamic game of incomplete information with two players, namely the MNC and the TA. The MNC consists of a foreign production division in a low-tax jurisdiction and a domestic sales division in a high-tax country. Transfer pricing is used for two purposes. On the one hand, the transfer price affects the quantity decision of the sales division's manager by internalizing the costs of the intermediate product obtained from the production division. Thus, the transfer price is used by the MNC to shift the sales division's objective, i.e., the division's profit, according to the MNC's objective, namely total profit. In a world without taxes, the optimal transfer price is set equal to the marginal costs of the production division (Hirshleifer, 1956). On the other hand, in a world with taxes, transfer pricing enables the MNC to shift profits from the high-tax country to the low-tax country. Thus, the MNC reduces its tax payments, which directly increases its total profit. With TSB, the MNC can separately optimize both the internal and the tax effect of transfer pricing (Nielsen and Raimondos-Møller, 2012). As a consequence, TSB allow the MNC a finer optimization than OSB. However, in addition to the additional administrative and documentation costs of keeping a second set of books, the implementation of TSB instead of OSB may weaken the MNC's bargaining power in the event of a tax audit. In particular, by choosing an external transfer price belonging to the appraised range of acceptable arm's length prices (compliance range), an MNC avoids a transfer pricing adjustment in the event of a tax audit. We extend prior

research by considering two different types of MNCs with two differing compliance ranges. That is, an MNC with low marginal costs faces a different range than an MNC with high marginal costs. Thus, the compliance range depends on the MNC's marginal costs. However, the marginal costs are not ex ante observable by the TA. Neither is the MNC's compliance ex ante verifiable. Hence, a low-cost MNC might have an incentive to mimic a high marginal cost type. If a tax transfer price not belonging to the appraised compliance range is detected during the tax audit, the MNC and the TA negotiate the applicable transfer price.

With TSB and detected non-compliance, the use of a second transfer price for internal purposes is interpreted as evidence of the MNC's strong tax-saving behavior. As a consequence, the TA enforces a tax transfer price belonging to the MNC's appraised compliance range. In contrast, OSB provides a convincing argument in the event of litigation. The MNC uses the same transfer price for internal coordination and tax purposes. Hence, a court may find the TA's appraised compliance range to be inappropriate. Therefore, with OSB, the reported transfer price influences the outcome of the negotiation, and the TA might enforce a tax transfer price that does not belong to the appraised compliance range. In sum, when choosing between OSB and TSB, the MNC faces a trade-off between flexibility in using transfer pricing for both internal and tax purposes and its bargaining power in a tax audit. This is in line with the recognition that differences in book and tax incomes may weaken the taxpayer's position in audits (Mills, 1998, p. 345). To abstract from potential legal disputes between the TA and MNC, the TA enforces the highest transfer price belonging to the appraised compliance range when TSB are kept. Any transfer price in this range satisfies the arm's length principle. The MNC accepts the highest transfer price in this range without objection.

We find that the bargaining power of the TA determines the equilibrium strategies. Our results show that if this power is high, OSB is no longer part of an equilibrium strategy. The intuition is as follows. If the bargaining power of the TA is high, the advantage of OSB compared to TSB diminishes. Thus, TSB are chosen because of the greater flexibility in internal coordination.

The level of audit costs faced by the TA also affects the equilibrium strategies. At a low level of audit costs, the TA will more frequently conduct audits. Thus, the probability of

detecting non-compliance increases, and a transfer pricing report due to tax saving motives becomes less attractive to the firm. Then, the MNC tends to keep TSB with a reported transfer price belonging to the true compliance range in equilibrium.

In addition, the findings show that as the tax difference between the two countries increases the probability of using TSB to shift profits to the low-tax jurisdiction decreases. This result seems to be counterintuitive because profit shifting should be especially important in a situation where the tax rate differential is high. This finding is due to the TA's awareness of the high tax saving potential. High tax saving possibilities entail increased scrutiny by the TA. The MNC recognizes this when making its transfer pricing decisions.

Most existing research investigates the interrelation between an internal and an external transfer price when the accounting system has already been designed (see, for example, Baldenius et al. (2004) and Martini et al. (2012)). We extend prior research by addressing the question of whether tax regulation and strategic TAs can affect the choice of keeping OSB or TSB. Hence, in contrast to previous work, the choice of the accounting system is endogenous.

The paper proceeds as follows. In the next section, the related literature is discussed. Then, the model is described, followed by a presentation and discussion of the equilibrium analysis in section 4. Section 5 concludes the paper.

## 2 Literature Review

A comprehensive overview concerning international transfer prices and their functions is provided by Sansing (2014). We focus on the literature that incorporates the trade-off between internal coordination and tax minimization. MNCs regularly incorporate differences in tax and tariff rates as additional aspect of their transfer pricing decisions; see, for example, Schjelderup and Sorgard, 1997) or Smith, (2002b).

Prior research has already shown that MNCs may use transfer prices as a device to shift profits from high- to low-tax jurisdictions. Particularly, existing research illustrates that the use of TSB is preferable to using a single price for internal and external purposes when an MNC's tax and incentive objectives are in conflict (Lemus, 2011, p. 3). The

intuition for this result is straightforward. Keeping OSB necessarily contains a trade-off between the conflicting objectives of tax minimization and quantity distortion. Narayanan and Smith (2000) find that tax-adjusted marginal costs balance the conflicting objectives when using a single set of books. In a TSB setting, Baldenius et al. (2004) obtain a similar result. They show that tax-adjusted marginal costs should be used for internal purposes, while the external transfer price is straightforwardly the maximum of the compliance range accepted by the TA. However, these results ignore the potential case of non-compliance with the arm's length principle. Kant (1988), Smith (2002b), Hyde and Choe (2005) amd Choe and Hyde (2007) show that a corner solution is no longer straightforward when adjustments by the TA are taken into account. Furthermore, Eden et al. (2005) show that the threat of transfer pricing penalties may already have extensive impacts on the targeted firms. In addition, fiscal authorities have modernized to ensure the government a fair share of corporate taxes (Elliott and Emmanuel, 2000, p. 216). Despite numerous governments' quests for higher tax payments, previous research has not considered the TA as strategic party. However, Cools and Emmanuel (2006) highlight the necessity of taking into account fiscal regulations as an endogenous variable.

Capuzzi (2010) notes that the TA and MNCs can use the arm's length principle to increase their incomes by interpreting it in their favor. Wagenhofer (1994), Raimondos-Møller and Scharf (2002) and Keuschnigg and Devereux (2013) challenge the appropriateness of the arm's length principle in general. They argue that MNCs prevail in markets where they dominate trades between unrelated parties. In addition, Samuelson (1982) finds that MNCs are able to manipulate the arm's length limits. The arm's length principle is applied in nearly all countries with transfer pricing restrictions. Picciotto (1992) provides a detailed overview of arm's length implementation and its historical development. Nevertheless, all of these papers take the decision whether to keep OSB or TSB as given. An exception is the work of Nielsen and Raimondos-Møller (2012). They investigate whether there might exist situations in which keeping OSB is preferable. However, their main research area is the field of interdependences between different transfer prices. By applying the formula apportionment approach, it is possible to obtain independence among different transfer prices (Hyde and Choe, 2005). However, Martini et al. (2012) demonstrate that under a formula apportionment approach, MNCs have incentives to shift the tax base by adjusting investment levels. In contrast to affected investment levels,

MNCs use ex post income shifting with separate entities and transfer prices. They conclude that neither the formula apportionment approach nor the separate entity approach is always preferable. Despite these advantages and disadvantages regarding the tax regime, in almost all countries, the single entity approach is applied. Therefore, we restrict our attention to taxation in terms of the separate entity approach. Wagenhofer (1994) shows that cost-based transfer pricing might induce first-best solutions for internal purposes when there is asymmetric information between the participating divisions. We assume that an MNC's marginal cost plus an appropriate markup is the upper bound of the appraised compliance range. During the negotiation between the TA and the MNC, the applicable transfer price is determined. This transfer price might be greater than the upper bound of the appraised compliance range and includes a bargaining markup.

Keeping OSB or TSB when imperfect competition prevails is much better examined. Schjelderup and Sorgard (1997), Arya and Mittendorf (2008), Dürr and Göx (2011) and Lemus (2011) investigate whether OSB or TSB is preferable under imperfect competition. In their studies, a single transfer price additionally serves as a commitment device to soften competition in external markets. The results depend substantially on whether competitors are able to observe the use of a single transfer price. The accounting system cannot be used to influence competitors when the number of books is unobservable. In contrast to this literature, we assume that the TA is not able to observe whether OSB or TSB has been chosen. None of these studies include a strategic TA in their considerations. Moreover, most of the existing research does not consider the possibility of tax audits. One exception is Diller and Lorenz (2016). They extend the work of Baldenius et al. (2004) by examining a strategic TA. In line with prior research, they take an MNC's decision of whether to keep OSB or TSB as given. They assume the superiority of TSB because of the greater flexibility. When considering a strategic TA, one should bear in mind the possibility that some income shifting is tacitly tolerated by the government. It heightens the competitiveness of the jurisdiction. This is the rationale for why TAs have some leeway when enforcing transfer pricing adjustments. Transfer pricing regulation itself may act as a strategic device (Mansori and Weichenrieder, 2001, p. 1). This opinion is confirmed by the theoretical findings of Nielsen and Raimondos-Møller and Scharf (2002) and Smith (2002a). They demonstrate that ex post discretion over transfer prices may relieve ex ante distortions. Thus, lax transfer pricing regulations

and enforcement may even lead to higher tax revenues in the low- and high-tax jurisdiction.

## 3 Model Description

We consider an MNC operating in a low- and a high-tax jurisdiction. In contrast to prior research, we endogenize the MNC's choice of accounting system while taking into account a strategic TA. We consider a situation in which the MNC decides whether to keep OSB or TSB. During a potential tax audit, the non-compliance of the transfer price used by the MNC might be detected. For the sake of simplicity, we restrict our attention to two strategic players, namely the TA in the high-tax country and the MNC.

### 3.1 Multinational Company

The MNC consists of a foreign production division and a domestic sales division. Specifically, the foreign division produces an intermediate product that is transformed into the final product by the domestic division. Without loss of generality, the domestic division's production costs are set equal to zero. There exists no external market for the intermediate product. The producing foreign division could face either high marginal costs $c_H$ with probability $\beta$ or low marginal costs $c_L$ with probability $1-\beta$, where $0 < \beta < 1$ and $0 \leq c_L < c_H$. The MNC observes the realized marginal costs at the beginning of the period. The TA knows the ex ante probability $\beta$ and can observe the realized marginal costs during an audit. Regardless of their level, the MNC faces constant marginal costs. Hence, we abstract from any economies of scale or scope.

Per unit of the intermediate good provided by the foreign production division, the domestic sales division pays an internal transfer price $p_i$. We assume administered transfer pricing. In particular, the headquarters chooses transfer prices to achieve congruence between the division managers' objectives (divisional profit) and the MNC's objective (global after-tax profit).

The foreign division is located in a low-tax jurisdiction, where its income is taxed at a rate $t$. Furthermore, the domestic division operates in a high-tax jurisdiction with income

tax rate $t + h$, where $0 \leq t, h \leq 1$ and $t + h \leq 1$. The parameter $h$ captures the tax rate differential between the low- and high-tax jurisdictions. We assume taxation in terms of the source principle. Thus, the tax liability of each division is determined by the division's income. Hence, the MNC is interested in a high external transfer price for tax purposes to shift as much income as possible into the low-tax jurisdiction. As in Baldenius et al. (2004), we allow negative pre-tax income for the foreign division.

We consider a monopolistic setting. The revenue function is given by $R(q) = \left(a - \frac{1}{2}q\right)q$, where $q$ denotes the demanded quantity with $a \geq c_H$.[1] The manager of the domestic division is evaluated on the basis of pre-tax divisional profit.[2] Considering the internal transfer price, the domestic sales division maximizes the following:

$$\Pi_D = \left(a - \frac{1}{2}q\right)q - p_i q. \tag{1}$$

The MNC's divisions are legally separate entities. Therefore, the domestic division chooses the quantity to maximize its profits:

$$q_D = a - p_i. \tag{2}$$

For tax purposes, the MNC may choose to use a transfer price that is different from the internal transfer price $p_i$. Nevertheless, the MNC can also decide to report the internal transfer price to the TA. Thus, the reported transfer price depends on whether OSB or TSB was chosen. For the sake of simplicity, we do not consider additional administrative and documentation costs for keeping TSB. It is straightforward that OSB becomes preferable if the costs of keeping a second set of books become sufficiently high.[3] Ex ante, the TA cannot verify whether the MNC keeps OSB or TSB. She only observes the reported transfer price $p_r$.

---

[1] For the sake of simplicity, we assume that $a$ is sufficiently large. In particular, $a$ is so large that a low-cost type MNC keeping OSB finds it optimal to set $p_r = \overline{p_r}$, whereas $\overline{p_r}$ is introduced below.

[2] Other authors assume that the divisions maximize their after-tax profits. This assumption is also ad hoc in the transfer pricing setting. Baldenius et al. (2004) explicitly highlight this fact and refer to the circumstance in which some firms evaluate their divisional managers on a pre-tax basis. For further discussion of the advantages of pre- vs. after-tax profit maximization for divisional performance measurement, see Nielsen and Raimondos-Møller (2012).

[3] If keeping TSB is costly, OSB will occur more often in equilibrium. In fact, we strengthen our findings on OSB by neglecting the additional documentation and administrative costs for keeping a second set of books. If TSB become more expensive, there is a shift to OSB. Even while ignoring these additional costs, OSB is part of an equilibrium strategy.

In line with the extensive documentation requirements imposed on MNCs, we assume that in the event of a tax audit, the TA observes the realized marginal cost and the internally used transfer price when TSB are kept. The comprehensive documentation requirements stem from OECD guidelines, which serve in many countries as a sort of soft law, and national requirements.[4] In line with the OECD guidelines and the monopolistic setting, the transfer price is set using a cost-plus method. According to this transfer pricing method, marginal costs plus an appropriate markup fulfill the needs of the arm's length principle. Hence, the appraised upper bound for the reported transfer price of a low-cost type MNC is given by $\underline{p_r} = c_L + m_L$, where $m_L \geq 0$ captures the accepted markup. Hence, the appraised arm's length compliance range for a low-cost MNC is given by $\left[0, \underline{p_r}\right]$. The same arguments hold for the high-cost type. Thus, during an audit, the TA recognizes compliance with the arm's length principle when an MNC with $c = c_H$ sets its external transfer price equal to marginal costs plus an adequate markup $m_H \geq 0$, i.e., $\overline{p_r} = c_H + m_H$, where $\overline{p_r} > \underline{p_r}$. Moreover, we assume that $m_H \leq m_L - c_H + c_L \frac{\delta(t+h)}{\delta(t+h)-h}$ to ensure that $p_i \leq \underline{p_r}$.[5] In particular, with this assumption, we exclude any negotiation incentives concerning the markup when a compliant TSB strategy is chosen.[6] Therefore, the appraised arm's length compliance range for the high-cost type is described by $[0, \overline{p_r}]$. Hence, for any realized marginal costs, the MNC might choose its reported transfer price from the range $[0, \overline{p_r}]$. However, this range does not necessarily comply with the arm's length principle. The low-cost MNC has an incentive to mimic the high-cost firm. If a low-cost MNC uses $p_r \in (\underline{p_r}, \overline{p_r}]$ to calculate its taxable income, the TA will find non-compliance during an audit.

We summarize the MNC's different possible strategy combinations in the following. After marginal costs are realized, the MNC has to determine the accounting regime and which prices have to be applied. The possible strategies are depicted in figure 1.

---

4 For example, this assumption is in accordance with German tax treaties, which require firms to provide documents that are relevant for transfer pricing calculations. This is also the case for documents that are fully concerned with internal calculations. These do not have to comply with tax regulations or accounting standards (BMF, 12.04.2005).

5 $\delta$ is the penalty factor that is introduced below.

6 The markup for the low-cost type $m_L$ and for the high-cost type $m_H$ can have the same value. $m_L \neq m_H$ is not necessary for obtaining the results of this paper.

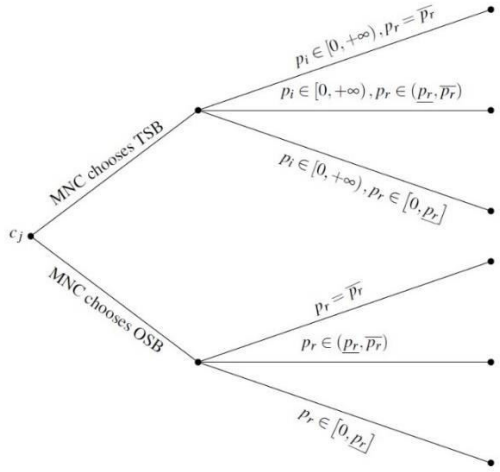


**Figure 1:** Possible strategy choices for an MNC with marginal costs $c_j$, where $j = H, L$

In the event of a tax audit, the MNC may be forced to pay the previously saved tax liability plus a penalty. The TA and the MNC negotiate the applicable transfer price $p_n$, where $p_n$ determines the subsequent tax payment. The tax authority can levy an additional penalty, which is captured by the penalty factor $\delta \geq 1$. Furthermore, we assume the penalty to be linear, that is, $\delta$ multiplied by the evaded tax (Yitzhaki, 1974). Hence, in the event of detected non-compliance, the MNC faces the following payment:

$$S^{MNC} = (t + h)q\delta \cdot \max\{p_r - p_n, 0\}, \tag{3}$$

which comprises the former saved tax payments and a penalty for the tax evasion.

Headquarters is interested in the global after-tax profit. The headquarters incorporates possible tax savings due to tax rate differentials and the resulting penalties. Thus, headquarters maximizes the following:

$$\Pi^{MNC} = q\left[(1 - t - h)\left(a - \frac{1}{2}q\right) - (1 - t)c + hp_r\right] - S^{MNC}. \tag{4}$$

### 3.2 Tax Auditor

The TA is located in the high-tax jurisdiction, i.e., in the home country of the domestic division.[7] We do not explicitly model the incentive problem between the tax authority and the TA. For the sake of simplicity, we assume that the incentive scheme is designed

[7] We do not consider the TA in the low-tax jurisdiction. The foreign TA anticipates that profits will be shifted into her jurisdiction.

in a way that the TA is solely interested in maximizing the additional tax revenues that she generates for the tax authority. Thus, in contrast to the MNC, the TA does not take the additional penalty captured by $\delta$ into account. However, the TA must allow the appraised appropriate markup on the MNC's marginal costs even when it identifies non-compliance. Hence, the lowest transfer price that can be enforced is $\underline{p_r}$. After negotiation with the MNC, the TA enforces the transfer price $p_n$. In the event of detected non-compliance, the TA generates additional tax revenues:

$$S^{TA} = (t + h)q \cdot max\{p_r - p_n, 0\}. \tag{5}$$

However, she faces personal audit costs, $K_a > 0$, if she conducts an audit. Throughout the analysis, we assume that the audit costs are not prohibitively high.

We capture the TA's decision of whether to conduct an audit using a binary variable:

$$x_a = \begin{cases} 1 & \text{if an audit takes place,} \\ 0 & \text{if no audit is conducted.} \end{cases} \tag{6}$$

Thus, the TA maximizes the following:

$$E[\Pi^{TA}] = \begin{cases} E[S^{TA}] - K_a & \text{for} \quad x_a = 1, \\ 0 & \text{for} \quad x_a = 0. \end{cases} \tag{7}$$

The TA's decision of whether to conduct an audit takes place after the MNC's reporting strategy has been determined. In equilibrium, the TA may decide to conduct an audit with positive probability. This audit probability is given by $\eta$.

### 3.3 Transfer Pricing Regimes

After an audit has taken place and non-compliance has been detected, the external transfer price is adjusted. TSB in conjunction with non-compliance supports the TA's imputation of a reported transfer price due to strong tax-saving motives. This weakens the MNC's bargaining power. This is strongly supported by the empirical findings of Mills (1998). There remains no room for the low-cost MNC to persuade the TA to accept a transfer price other than one from the appraised compliance range. Thus, the TA argues that

marginal costs plus an appraised appropriate markup, i.e., $c_L + m_L$, should be applied.[8] When the MNC keeps TSB and reports a price belonging to its true appraised compliance range, the MNC faces no transfer price adjustments in the event of an audit.

TSB does not necessarily indicate aggressive transfer pricing behavior. In particular, some profit shifting might be tacitly tolerated by governments to heighten a jurisdiction's competitiveness compared to others. Only tax aggressive behavior is targeted. Hence, the TA enforces $p_n = \underline{p_r}$ for a non-compliant, low-cost MNC keeping TSB.

However, non-compliance can also be detected while the MNC keeps OSB. If OSB is found, the use of a single transfer price for both the quantity decision and for tax purposes strengthens the MNC's bargaining power. In particular, OSB indicates that transfer prices are driven by economic considerations rather than tax optimization (EY, 2001; EY, 2003). The internal price equals the external price. This might indicate that the upper bound of the appraised arm's length compliance range is in fact too low. For internal coordination while keeping OSB, the MNC prefers a price above this range. In the event of litigation, the MNC has strong arguments for setting its transfer price beyond tax saving motives. The reported transfer price is also used for quantity decisions. Hence, the TA cannot provide sufficient evidence for tax-motivated non-compliance. Thus, the TA and the MNC negotiate the applicable transfer price. In particular, the TA and the MNC negotiate the appropriate markup, which might be different from the appraised markup $m_L$.[9] The extent of the negotiated markup depends on the TA's bargaining power, which is captured by the parameter $\gamma \in [0,1]$. The TA is interested in enforcing a transfer price belonging to the appraised compliance range. However, the MNC maximizes its overall after-tax profit. Hence, it is interested in a transfer price close to the actually used price. Therefore, for a non-compliant MNC keeping OSB, the transfer price after negotiation is $p_n = \gamma \underline{p_r} + (1-\gamma) p_r$.

[8] Previous literature also suggests that the TA enforces the internal transfer price for tax purposes. Since we assume the TA to maximize additional tax revenues and we require that $p_i \leq p_r$, this seems to be intuitive. However, it is unreasonable that the arm's length price should be undercut due to prior tax saving activities. In fact, this in a sense worsens TSB in advance. Since we capture any penalty to be paid by the penalty factor $\delta$, we exclude this additional punishment for using TSB.

[9] Without loss of generality, the divisions do not incur any fixed cost in the model. Thus, the markup solely affects the profit of the foreign division. According to the cost-plus method, a markup on marginal costs is acceptable. Independent of the use of OSB or TSB or detected non-compliance, the TA allows this appraised markup on marginal costs. Hence, the MNC faces no risk of losing this surcharge.

The timing of the game is depicted in figure 2.

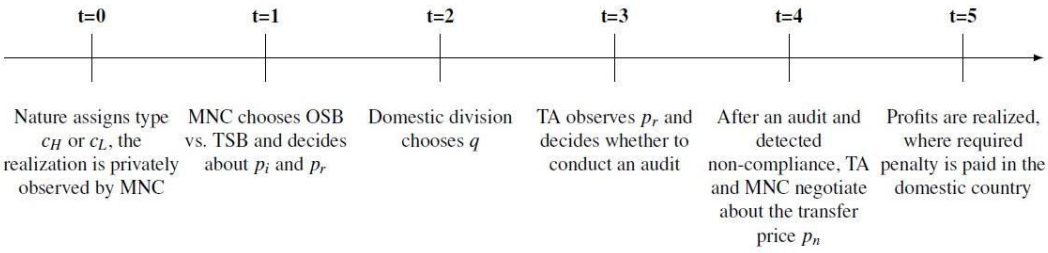


**Figure 2:** Timeline

## 4 Equilibrium Analysis

The TA's decision takes place after the MNC has sent its transfer pricing report. Nevertheless, the game may be seen as strategically 'simultaneous' in the sense that the TA only observes the outcome of the chosen reporting strategy. The strategy itself remains concealed (Crawford and Sobel, 1982, p. 1433). Thus, we apply the weak perfect Bayesian equilibrium (PBE) concept.

### 4.1 Internal Prices and Dominated Strategies

In the extensive form of the game, many of the strategies can be eliminated in advance, as they are strictly dominated.[10] A high-cost type MNC keeps TSB with $\overline{p_r}$. Hence, the MNC chooses its reported transfer price belonging to its compliance range. If an audit has taken place, neither transfer pricing adjustments nor penalization occur. Hence, the MNC maximizes its profits by decoupling its transfer prices to independently optimize internal coordination and tax minimization.

However, an MNC with low costs has an incentive to mimic the high-cost firm, at least with positive probability. Thus, the low-cost MNC will set the reported transfer price equal to $\underline{p_r}$ or $\overline{p_r}$ because every transfer price below $\overline{p_r}$ reveals the MNC's low marginal costs. Hence, for $p_r = \overline{p_r}$, the TA may conduct an audit as long as the audit costs are not prohibitively high. With TSB, the internal transfer price includes an adjustment of marginal costs. In particular, the MNC uses tax adjusted marginal costs as the internal

[10] The proof is stated in the appendix.

transfer price in the compliance case. This price induces the domestic sales division making the optimal quantity decision. Prior research has already demonstrated the optimality of this quantity (Baldenius et al., 2004). In the case of a reported transfer price not belonging to the compliance range, the MNC takes into account the potential costs of a transfer pricing audit. Hence, by considering a strategic TA, tax and audit adjusted marginal costs are used for internal optimization. This finding is summarized in lemma 1.

***Lemma 1:*** When TSB are kept and the reported transfer price belongs to the compliance range of the MNC, tax-adjusted marginal costs $c_j$, $j = H, L$ are adopted for internal coordination:

$$p_i = \frac{1}{1-t-h}\left[(1-t)c_j - hp_r\right]. \tag{8}$$

When a low-cost MNC keeps TSB and chooses a non-compliant reported transfer price, possible payments due to detection are incorporated for internal coordination:

$$p_i = \frac{1}{1-t-h}\left[(1-t)c_L - h\overline{p_r} + \eta\delta(t+h)(\overline{p_r} - \underline{p_r})\right]. \tag{9}$$

*Proof.* All proofs and thresholds are stated in the appendix.

For a compliant external transfer price with TSB, the internal price matches the findings of Baldenius et al. (2004). When TSB with a non-compliant reported transfer price are used, the internal transfer price additionally takes into account the potential audit. Hence, an MNC keeps TSB in a tax-agressive manner and will use tax- and audit-adjusted marginal costs for internal coordination. We summarize the transfer prices given possible and not strictly dominated strategy choices in table 1.

| MNC Type | Accounting System and Transfer Pricing | Internal Transfer Price $p_i$ | Transfer Price after Negotiation $p_n$ |
|---|---|---|---|
| $c = c_H$ | TSB with $p_r = \overline{p_r}$ | $p_{iH} = \frac{1}{1-t-h}[(1-t)c_H - h\overline{p_r}]$ | $p_n = \overline{p_r}$ |
| $c = c_L$ | TSB with $p_r = \overline{p_r}$ | $p_{i1} = \frac{1}{1-t-h}\left[(1-t)c_L - h\overline{p_r} + \eta\delta(t+h)(\overline{p_r} - \underline{p_r})\right]$ | $p_n = \underline{p_r}$ |
| | TSB with $p_r = \underline{p_r}$ | $p_{i2} = \frac{1}{1-t-h}\left[(1-t)c_L - h\underline{p_r}\right]$ | $p_n = \underline{p_r}$ |
| | OSB with $p_r = \overline{p_r}$ | $p_i = \overline{p_r}$ | $p_n = \gamma\underline{p_r} + (1-\gamma)p_r$ |

**Table 1:** Overview of possible transfer pricing choices

After all dominated strategies have been eliminated, the remaining game tree is as displayed in figure 3.

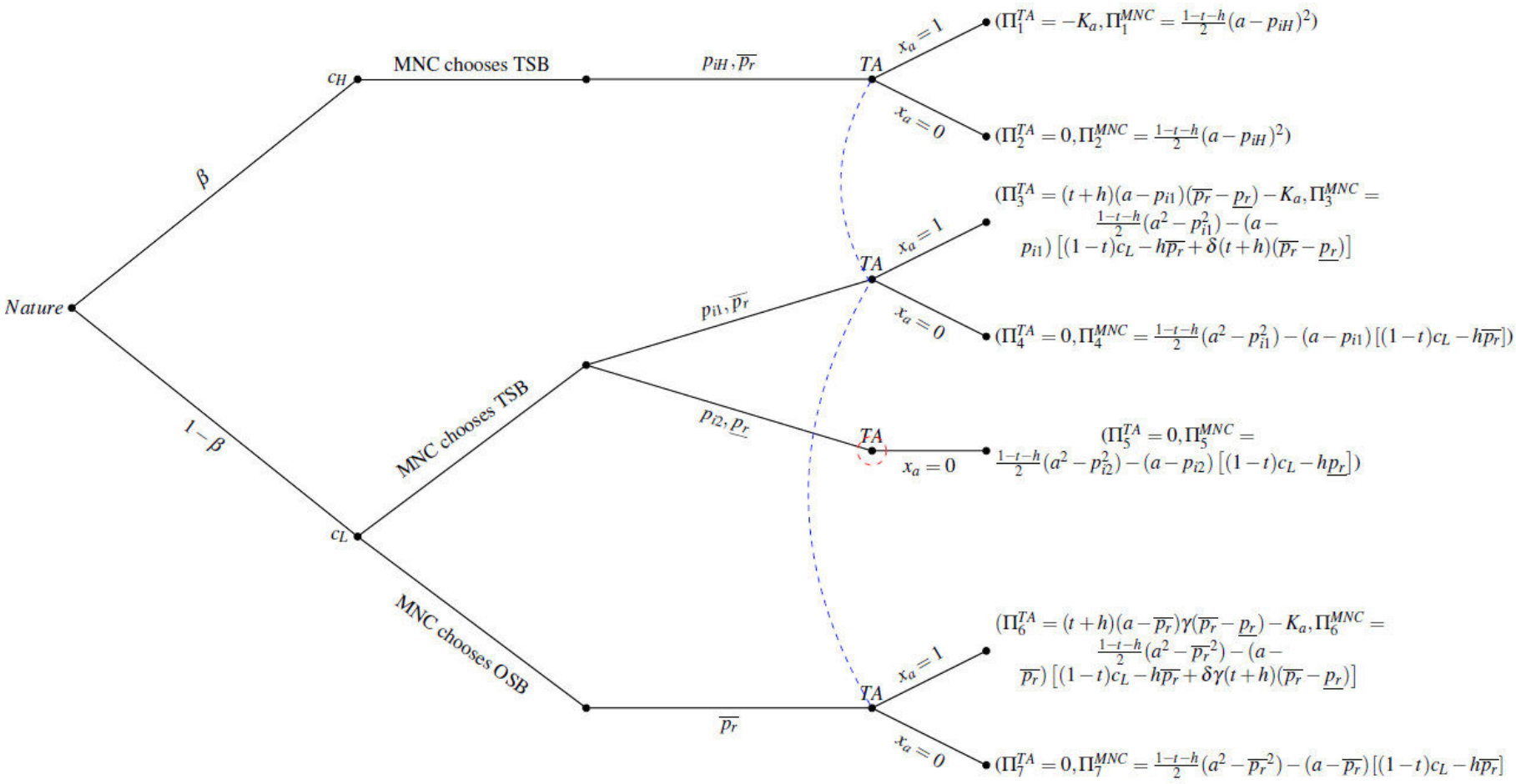


**Figure 3:** Game tree without dominated strategies

### 4.2 Equilibrium Strategies

In a world with taxes, the reduced game tree in figure 3 and table 1 reveals that an MNC with high marginal costs $c_H$ prefers to set its internal transfer price below the marginal costs of the foreign division. Moreover, the MNC uses TSB to decouple transfer prices used for internal and tax purposes. In the event of a tax audit, the high-cost type faces no risk of penalization since $\overline{p_r}$ is assumed to comply with the arm's length principle. Hence, the TA never challenges a high reported transfer price when finding high marginal costs during an audit.[11] The MNC with low marginal costs might prefer to use one of three potential strategies. First, the MNC with low marginal costs can implement OSB and report a high transfer price. This distorts the MNC's quantity decision away from the optimal quantity. However, the MNC can shift some profits from the domestic division to the foreign division and, thus, save some tax payments. Second, the MNC can use TSB with tax- and audit-adjusted marginal costs for internal quantity decisions and a high reported transfer price. This allows the MNC to implement an optimal quantity and shift profits from the high- to the low-tax jurisdiction. However, with TSB, the MNC weakens its bargaining power in the event of an audit. As a consequence, if the TA conducts an audit, the penalty per unit sold of the final good is higher under TSB than when the MNC uses only OSB. Third, the MNC can use TSB with a reported transfer price that complies with the arm's length principle. Then, the external transfer price is not set only according to tax-saving motives. While choosing a truthful report, the low-cost type does not pretend that it faces high marginal costs. Hence, the MNC is not mimicking the high-cost type. It chooses $\underline{p_r}$ as the reported transfer price and an optimal decoupled internal transfer price. If the TA observes a low reported transfer price, the TA never conducts an audit. The reason is that a low reported transfer price can never lead to any revenue for the TA.

The following two propositions show how the TA's audit costs $K_a$, the level of the penalty factor $\delta$ and bargaining power $\gamma$ affect the chosen equilibrium strategies. The specific internal transfer prices in table 1 are used in the propositions. The first proposition considers low audit costs for the TA, while the second proposition considers high audit costs.

[11] In the following, we explicitly state when we are considering a high-cost MNC. Otherwise, we discuss an MNC with low marginal costs.

***Proposition 1:*** An MNC of type $c_H$ always chooses TSB with a reported transfer price $\overline{p_r}$ and uses tax-adjusted marginal costs for internal coordination. For low audit costs $K_a < K_{a1}$ and $\delta > \delta_c$, the equilibrium strategies of an MNC with low marginal costs $c_L$ and the TA are as follows:[12]

- In the case of $\gamma < \gamma_\delta$, the MNC randomizes between TSB with $\underline{p_r}$ and OSB with $\overline{p_r}$. OSB is chosen with probability

$$\tau_{1,V} = \frac{K_a}{(1-\beta)(t+h)(a-\overline{p_r})\gamma(\overline{p_r}-\underline{p_r})} \tag{10}$$

and TSB with probability $1 - \tau_{1,V}$. The TA conducts an audit with probability

$$\eta_V = \frac{1}{(a-\overline{p_r})[\delta(t+h)\gamma(\overline{p_r}-\underline{p_r})]}\left[\frac{1-t-h}{2}(p_{i2}^2 - \overline{p_r}^2) + ah(\overline{p_r} - \underline{p_r}) + c_L(1-t)(\overline{p_r} - p_{i2}) + h(\underline{p_r}p_{i2} - \overline{p_r}^2)\right]. \tag{11}$$

- In the case of $\gamma > \gamma_\delta$, the MNC randomizes between TSB with $\overline{p_r}$ and TSB with $\underline{p_r}$. TSB with $\overline{p_r}$ are chosen with probability

$$\tau_{2,VI} = \frac{K_a}{(1-\beta)(t+h)(a-p_{i1})(\overline{p_r}-\underline{p_r})} \tag{12}$$

and TSB with $\underline{p_r}$ with probability $1 - \tau_{2,VI}$. The TA audits a high reported transfer price $\overline{p_r}$ with audit probability

$$\eta_{VI} = \frac{h}{\delta(t+h)}. \tag{13}$$

*Proof.* All proofs and thresholds are stated in the appendix.

The second proposition addresses the case of high audit costs for the TA. In this case, the TA might conduct an audit with positive probability despite suffering from non-negligible audit costs.

***Proposition 2:*** An MNC of type $c_H$ always chooses TSB with a reported transfer price $\overline{p_r}$ and uses tax adjusted marginal costs for internal purposes. For a high level of audit costs, the equilibrium strategies of an MNC with low marginal costs $c_L$ and the TA are as follows:

- In the case of $\gamma < \gamma_\delta$ and $K_{a1} < K_a < K_{a2,1}$, the MNC randomizes between TSB with $\overline{p_r}$ and OSB with $\overline{p_r}$. The MNC chooses OSB with probability

$$\tau_{1,IV} = \frac{K_a - (1-\beta)(t+h)(a-p_{i1})(\overline{p_r}-\underline{p_r})}{(1-\beta)(t+h)(\overline{p_r}-\underline{p_r})[\gamma(a-\overline{p_r}) - (a-p_{i1})]} \tag{14}$$

and TSB with $\overline{p_r}$ with probability $1 - \tau_{1,IV}$. The TA audits the reported transfer price with probability

[12] Setting $\delta$ larger than $\delta_c$ simplifies the analysis. For $\delta < \delta_c$, $K_a < K_{a1}$, and $\gamma < \gamma_\delta$, an equilibrium might occur in which the MNC always keeps OSB with $\overline{p_r}$.

$$\eta_{IV} = \frac{1}{\delta(\overline{p_r}-\underline{p_r})(t+h)}\left[A - \sqrt{A^2 - (\overline{p_r} - c_L)^2(1-t)^2}\right] \quad (15)$$

with $A := a(1-\gamma)(1-t-h) + \gamma\overline{p_r}(1-t-h) + h\overline{p_r} - c_L(1-t)$.

- In the case of $\gamma > \gamma_\delta$ and $K_{a1} < K_a < K_{a2,2}$, the MNC randomizes between TSB with $\overline{p_r}$ and TSB with $\underline{p_r}$. The randomization probabilities are described in (12) and for the TA in (13).

*Proof.* All proofs and thresholds are stated in the appendix.

The findings of propositions 1 and 2 are illustrated in figure 4. The MNC never chooses OSB when the bargaining power of the TA is above the threshold of $\gamma_\delta$. Hence, the bargaining power of the TA determines whether the reduced flexibility of OSB is outweighed by improved bargaining power for the MNC in event of detected non-compliance. The dark gray area shows that given audit costs that are not prohibitively high, the MNC always randomizes between the two TSB strategies. Thus, the MNC randomizes between mimicking the high-cost type and a truthful report.

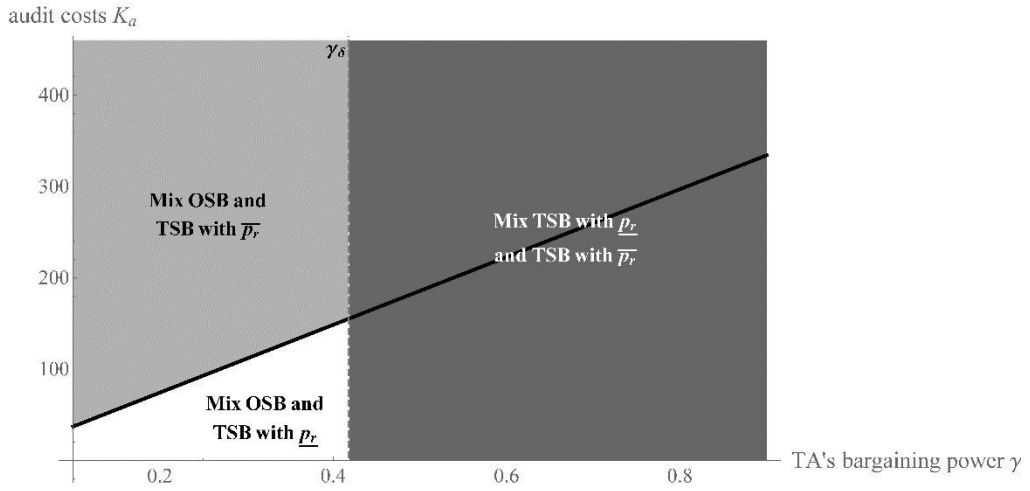


**Figure 4:** Equilibrium Analysis
(plotted for $a = 200, c_H = 80, m_H = 10, c_L = 65, m_L = 10, t = 0.2, \beta = 0.5, h = 0.25$, and $\delta = 2.5$)

When the TA's bargaining power is high, she can enforce her interests independent of the MNC's accounting strategy. The advantage of OSB compared to TSB is lost. However, if the TA's bargaining power is low, the MNC might randomize with OSB. However, keeping OSB is never chosen as a pure strategy in equilibrium because the low-cost type always has an incentive to deviate. If the audit costs for the TA are low, the MNC randomizes between OSB with $\overline{p_r}$ and TSB with $\underline{p_r}$. Due to the low audit costs, the MNC expects frequent auditing. Hence, it balances the conflicting objectives while taking into

account possible transfer pricing adjustments and penalties. For smaller audit incentives for the TA, the reduced flexibility of OSB outweighs the increased risk of penalization while keeping TSB with $\overline{p_r}$. That is, when the auditor's personal costs are high (light gray area), the MNC randomizes between OSB and TSB with $\overline{p_r}$.

Propositions 1 and 2 highlight that for audit costs that are not prohibitively high, the MNC randomizes with OSB as long as the bargaining power $\gamma$ stays below its respective threshold.[13] For almost any level of audit costs and bargaining power, the MNC keeps TSB with a high transfer price with positive probability. Only in the case of low bargaining power for the TA and low audit costs does the MNC not keep TSB with an untruthful report. In this case, the MNC randomizes between OSB and TSB with $\underline{p_r}$. Hence, in this case, the MNC can be prevented from tax aggressive behavior. With audit costs below $K_{a1}$ and $\gamma$ above the threshold, the probability of TSB with $\overline{p_r}$ is low. If there are high audit costs, the probability of TSB with $\overline{p_r}$ is higher. From these reported results, we provide some economic implications. First, we are interested in the effects of bargaining power. When the bargaining power of the TA is high, the MNC randomizes between the two TSB strategies and does not choose OSB. The reason is that the advantage of the bargaining power for the MNC is low, and thus, the disadvantage of OSB in comparison to TSB is large. Therefore, decoupling provides better management incentives to ensure optimal quantity decisions.

Second, we are interested in the effects of the personal audit costs of the TA. As audit costs decrease, the TA conducts audits more frequently. Hence, being tax aggressive becomes more expensive for the MNC. Specifically, as shown in proposition 1 and illustrated in figure 4, the MNC randomizes between TSB with $\overline{p_r}$ and TSB with $\underline{p_r}$ when the TA has high bargaining power. The probability of keeping TSB with $\overline{p_r}$ decreases as the TA's audit costs decline. This is caused by the TA's higher scrutiny. Then, keeping TSB with $\underline{p_r}$ becomes more likely. This reduces the MNC's tax aggressiveness. When the TA has low bargaining power, OSB becomes more favorable. Thus, given high audit costs, the MNC randomizes between OSB and TSB with $\overline{p_r}$. In this case, lower audit costs

[13] The threshold $\gamma_\delta$ can be negative. Specifically, $\gamma_\delta$ is inversely U-shaped in the tax difference $h$. When $\gamma_\delta$ is negative, OSB is no longer part of an equilibrium strategy. Then, the left part of figure 4 does not occur.

lead to a lower probability of keeping TSB with $\overline{p_r}$. Given low audit costs, higher scrutiny by the TA induces the MNC to randomize between OSB and TSB with $\underline{p_r}$. Keeping TSB with $\underline{p_r}$ is not considered tax aggressive. Hence, for any level of the TA's bargaining power, an MNC becomes less tax aggressive as audit costs decrease.

### 4.3 Properties of Equilibrium Strategies

In addition to the level of the audit costs and the bargaining power of the TA, the tax difference between the two jurisdictions influences the MNC's willingness to keep TSB with a high transfer price. As long as the audit costs are not prohibitively high, the MNC tends to refrain from keeping TSB with the high transfer price given an increase in the tax rate difference. Specifically, given an increase in the tax difference, the MNC keeps TSB and reports the high transfer price with a lower probability. This result is caused by the strategic behavior of the TA. When the TA has low bargaining power and audit costs are low, the MNC never keeps TSB with the high transfer price. Otherwise, the MNC keeps TSB with the high transfer price with positive probability, which declines as the tax difference increases. Specifically, a high tax difference implies a high tax-saving potential for the MNC. The TA is aware of the high tax-saving potential. Thus, she exhibits greater scrutiny. This increases the MNC's expected penalization cost, which is incorporated into the transfer pricing decision. In this situation, the weakened bargaining power associated with TSB is particularly harmful for the MNC. In sum, given an increase in the tax difference, the MNC is less frequently inclined to keep TSB with a high transfer price $\overline{p_r}$ because of the TA's greater scrutiny. This finding is summarized in proposition 3 and illustrated in figure 5 for high bargaining power for the TA.[14]

***Proposition 3:*** Given a TA with high (low) bargaining power and audit costs that are not prohibitively high, the MNC's probability of keeping TSB with a high transfer price $\overline{p_r}$ decreases (does not increase) following an increase in the tax difference $h$.

[14] Thus, figure 5 corresponds to the setting depicted in the right part of figure 4.

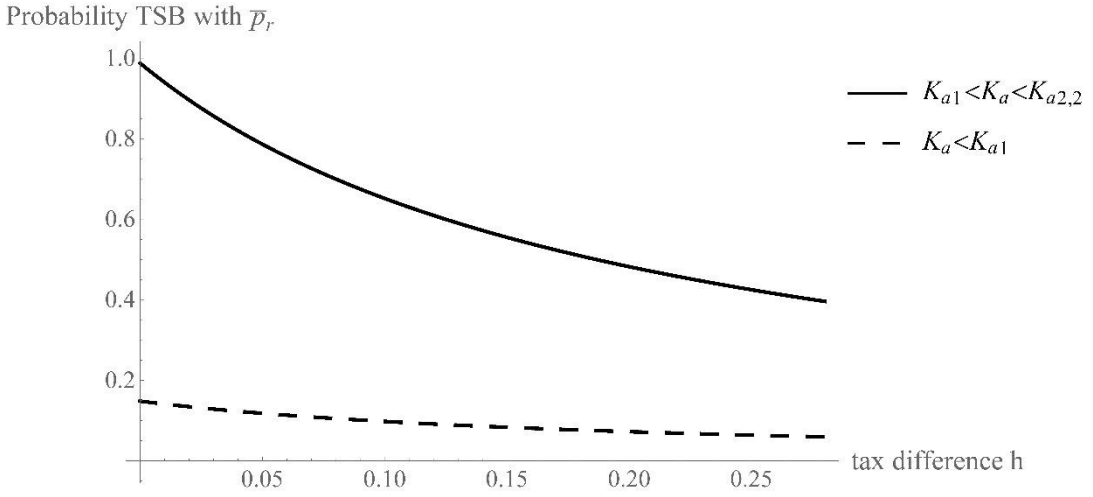


**Figure 5:** Probability of TSB with $\overline{p_r}$ considering the tax rate differential h
(plotted for $a = 200, c_H = 80, m_H = 10, c_L = 65, m_L = 10, t = 0.2, \beta = 0.5$, $\gamma = 0.5$, and $\delta = 2.5$; for $h \in [0,0.28]$, the thresholds $K_{a1}$ and $K_{a2,2}$ lie in the intervals [82.50,198.00] and [202.50,505.39], respectively. The probability of the case $K_{a1} < K_a < K_{a2,2}$ ($K_a < K_{a1}$) is depicted for $K_a = 200$ ($K_a = 30$).)

Next, we are interested in the effects of a change in the tax difference on the internal transfer prices and the quantity produced. An increase in the tax difference $h$ makes shifting profit to the low-tax country more attractive. When the MNC keeps TSB, the reported transfer price is already set to optimize the tax payments. Then, a high-cost type MNC can shift more profit to the foreign division by producing and selling a higher quantity $q$. Increasing the quantity also has an indirect effect on the MNC's profit. The price per unit sold decreases, and the contribution margin per unit sold also decreases. However, for a larger tax difference, the decrease in the contribution margin is outweighed by the positive effects of a higher quantity. A low-cost type MNC either aggressively reduces its tax payments by mimicking the high-cost type MNC or does so non-aggressively by reporting the highest appraised tax transfer price under low marginal costs $\underline{p_r}$. A non-aggressive reporting strategy faces the same trade-off between a smaller contribution margin and the direct effects of increasing the quantity as the high-cost type MNC. In addition to these two effects, an aggressive MNC also considers the increased scrutiny by the TA associated with an increase in the tax difference. As discussed in proposition 3, the MNC reduces the probability of keeping TSB given a high transfer price. This anticipation of the TA's increased scrutiny allows an aggressive MNC to also beneficially increase its quantity following a raise in the tax difference.

***Proposition 4:*** For TSB and when audit costs are not prohibitively high, an increase in the tax difference $h$ decreases the internal transfer prices and, thus, increases the quantity produced and sold $q$ by the MNC.

## 5 Conclusion

Prior research has demonstrated that keeping OSB in markets with imperfect competition might become optimal despite the MNC's reduced flexibility in optimizing both internal decision making and tax payments. However, these results depend crucially on whether competitors are able to observe when one transfer price is used to align conflicting objectives. To the best of our knowledge, we are the first to introduce a strategic tax auditor in a setting where the MNC can choose between keeping OSB and TSB. The findings illustrate that an MNC might keep OSB in equilibrium. In particular, this is the case for a low bargaining power of the TA.

The findings of the equilibrium analysis show that the outcome of the game depends on a variety of factors. Hence, it is not straightforward which equilibrium and which strategies occur. In general, the conclusion of prior research that TSB dominates OSB cannot be confirmed. In the examined setting, the MNC faces a trade-off between flexibility and expected penalty payments. By keeping TSB, an MNC can separately induce the optimal quantity decision and minimize tax payments. However, in contrast to keeping OSB, an MNC suffers from weakened bargaining power. Thus, an MNC with TSB incurs higher penalty payments in the event of detected non-compliance during a tax audit. The costs associated with TSB exceed the benefits from flexibility if the MNC has strong bargaining power while keeping OSB. Then, an MNC keeps OSB.

Another relevant aspect is the tax difference between the foreign and the domestic country. The findings show that when this parameter increases, an MNC's tax aggressiveness decreases. Specifically, we find that the probability of keeping TSB with a transfer pricing report intended to minimize taxes decreases given an increase in the tax difference between the jurisdictions. On the one hand, as expected, a high tax difference yields high tax savings potential. By keeping TSB with a high transfer pricing report, the MNC can exploit the high tax difference by shifting profits to the low-tax country. However, the TA is aware of the MNC's incentive to shift profits. Thus, the high tax

savings potential invites increased scrutiny by the TA. This increases the expected costs stemming from the weakened bargaining power while keeping TSB with a transfer price that does not comply with the arm's length principle. As a consequence, with an increasing tax difference, profit shifting becomes riskier and less attractive for the MNC. Then, the MNC increasingly refrains from keeping TSB with a high reported transfer price.

These results highlight that tax regulation and enforcement affect taxpayer behavior in a non-trivial way. In particular, an MNC's choice of keeping OSB versus TSB and the related potential tax-saving behavior can be influenced by tax legislation and enforcement. This paper illustrates that both the level of audit costs of the TA and the TA's bargaining power in the event of detected non-compliance determine the MNC's tax related equilibrium behavior. As a consequence, the findings are highly relevant for a number of institutional players, for example, legislators, tax authorities, MNCs, and supranational units such as the EU and the OECD.

# 6 Appendix

## 6.1 Proof regarding Dominated Strategies

The following strategies are dominated:

- When the MNC reports $p_r = \underline{p_r}$, the MNC incurs the highest possible tax payments. Thus, a tax audit cannot result in additional tax revenues. Consequently, the TA never audits a low reported transfer price.
- For $p_r > \overline{p_r}$, the TA can claim a high fee without costs. Thus, setting $p_r > \overline{p_r}$ is never chosen by the MNC.
- The TA cannot generate any additional tax revenues in a tax audit when the MNC is of type $c = c_H$ and chooses a $p_r \leq \overline{p_r}$. Thus, the MNC can keep TSB without any additional costs. The MNC minimizes the tax payments by setting $p_r = \overline{p_r}$.
- The TA cannot generate any additional tax revenues in a tax audit when the MNC is of type $c = c_L$ and chooses a $p_r \leq \underline{p_r}$. Thus, the MNC can keep TSB without any additional costs. The MNC sets the internal transfer price so that the profit is maximized. Without any additional costs, this strategy results in a better quantity decision by the domestic division than under OSB with $p_r \leq \underline{p_r}$. Thus, OSB with $p_r \leq \underline{p_r}$ is strictly dominated by TSB with $p_r = \underline{p_r}$.
- For TSB with a $p_r \in \left(\underline{p_r}, \overline{p_r}\right)$, the MNC of type $c = c_L$ prefers one of the not included corner solutions. Thus, using $p_r = \overline{p_r}$ ($p_r = \underline{p_r}$) strictly dominates the use of a $p_r$ close to $p_r = \overline{p_r}$ ($p_r = \underline{p_r}$).
- For a high prohibitive price $a$, the MNC of type $c = c_L$ keeping OSB prefers the transfer price $p_r = \overline{p_r}$ to any $p_r \in \left(\underline{p_r}, \overline{p_r}\right)$.

## 6.2 Proof of Lemma 1

This proof is organized in two steps. First, the case is considered in which the MNC reports a transfer price that is acceptable for its marginal costs. Second, the case is considered in which a low cost type MNC mimics a high cost MNC.

**Step 1:** For an MNC of type $c_j$ with $j = H, L$, the TA does not contest a reported transfer price that belongs to the range $[0, \overline{p_r}]$ or $\left[0, \underline{p_r}\right]$, respectively. Thus, the MNC's profit with marginal costs $c_j$ is determined by

$$\Pi^{MNC}(p_i, p_r) = (a - p_i)\left[(1 - t - h)\left(a - \tfrac{1}{2}(a - p_i)\right) - (1 - t)c_j + hp_r\right]. \quad (16)$$

The FOC of equation 16 with respect to $p_r$ is $(a - p_i)h > 0$. The Hessian matrix of equation 16 is not strictly definite. Hence, the MNC prefers to set $p_r$ as large as possible, i.e. $\overline{p_r}$ ($\underline{p_r}$) for $c_j = c_H$ ($c_j = c_L$).

$$FOCp_i: -(1 - t - h)p_i + (1 - t)c_j - hp_r = 0$$

$$SOCp_i: -(1 - t - h) < 0$$

Thus, the FOC for $p_i$ determines a local maximum:

$$p_i = \frac{1}{1 - t - h}\left[(1 - t)c_j - hp_r\right].$$

**Step 2:** For an MNC of type $c_L$, the TA might want to contest a reported transfer price that belongs to the range $\left(\underline{p_r}, \overline{p_r}\right]$. Then, the MNC's profit is determined by

$$\Pi^{MNC}(p_i, p_r) = (a - p_i)\left[(1 - t - h)\left(a - \tfrac{1}{2}(a - p_i)\right) - (1 - t)c_L + hp_r\right] \quad (17)$$
$$-\eta\delta(t + h)(a - p_i)(p_r - \underline{p_r}).$$

The FOC of equation 17 with respect to $p_r$ is $(a - p_i)[h - \eta\delta(t + h)]$. The Hessian matrix of equation 17 is not strictly definite. Hence, the MNC prefers to either set $p_r$ as large or as small as possible. The case in which the MNC wants to set a small transfer price is already described in step 1. Thus, we next consider the case in which $\overline{p_r}$ is preferred.

$$FOCp_i: -(1 - t - h)p_i + (1 - t)c_L - h\overline{p_r} + \eta\delta(t + h)(\overline{p_r} - \underline{p_r}) = 0$$

$$SOCp_i: -(1 - t - h) < 0$$

Thus, the FOC for $p_i$ determines a local maximum:

$$p_i = \frac{1}{1-t-h}\Big[(1-t)c_L - h\overline{p_r} + \eta\delta(t+h)(\overline{p_r} - \underline{p_r})\Big].$$

### 6.3 Proof of Proposition 1 and Proposition 2

The following proof is organized in several steps. For all steps, let $\rho$ be the TA's belief that an MNC reporting a high transfer price, $p_r = \overline{p_r}$, has high marginal costs, $c = c_H$. In addition, $\tau = (\tau_1, \tau_2, \tau_3)$ is the randomized strategy of the MNC for $c = c_L$. $\tau_1$ ($\tau_2/\tau_3$) denotes the MNC's chosen probability to set OSB with a high reported transfer price $p_r = \overline{p_r}$ (TSB with a high reported transfer price $p_r = \overline{p_r}$/TSB with a low reported transfer price $p_r = \underline{p_r}$). When observing a high reported transfer price $p_r = \overline{p_r}$, the TA chooses to (not) conduct an audit with probability $\eta$ ($1-\eta$). Note that an MNC with $c = c_H$ always chooses TSB with a high reported transfer price $p_r = \overline{p_r}$ and the TA never audits a low reported transfer price $p_r = \underline{p_r}$.

**Step 1:** Under which conditions does the MNC randomize between OSB with $p_r = \overline{p_r}$ and TSB with $p_r = \overline{p_r}$? The MNC randomizes the strategies OSB with a high transfer price and TSB with a high transfer price if and only if, the expected profit of these two strategies are the same and this expected profit is higher than the expected profit obtainable with TSB with a low transfer price:

$$E[\Pi | c = c_L, OSB, p_r = \overline{p_r}] = \eta\Pi_6^{MNC} + (1-\eta)\Pi_7^{MNC},$$

$$E[\Pi | c = c_L, TSB, p_r = \overline{p_r}] = \eta\Pi_3^{MNC} + (1-\eta)\Pi_4^{MNC},$$

$$\eta\Pi_6^{MNC} + (1-\eta)\Pi_7^{MNC} = \eta\Pi_3^{MNC} + (1-\eta)\Pi_4^{MNC}$$

$$\Leftrightarrow \eta = \frac{1}{\delta(\overline{p_r} - \underline{p_r})(t+h)}\Big[A \pm \sqrt{A^2 - (\overline{p_r} - c_L)^2(1-t)^2}\Big],$$

where $A := a(1-\gamma)(1-t-h) + \gamma\overline{p_r}(1-t-h) + h\overline{p_r} - c_L(1-t)$. We assume throughout the paper, that $a$ is sufficiently large so that $A > 0$ and $A \pm \sqrt{A^2 - (\overline{p_r} - c_L)^2(1-t)^2} > 0$. Thus, the MNC is indifferent between OSB with $p_r = \overline{p_r}$ and TSB with $p_r = \overline{p_r}$ for

$$\eta_{IV} := \frac{1}{\delta(\overline{p_r} - \underline{p_r})(t+h)}\left[A - \sqrt{A^2 - (\overline{p_r} - c_L)^2(1-t)^2}\right] > 0.$$

$\eta_{IV}$ is smaller than 1 if and only if

$$\delta \geq \frac{A - \sqrt{A^2 - (\overline{p_r} - c_L)^2(1-t)^2}}{(t+h)(\overline{p_r} - \underline{p_r})} =: \delta_4. \tag{18}$$

In addition, $E[\Pi | c = c_L, OSB, p_r = \overline{p_r}] \geq E\left[\Pi | c = c_L, TSB, p_r = \underline{p_r}\right]$ if and only if

$$\eta_{IV} \leq \eta_V \Leftrightarrow \delta_4 \leq \delta_c,$$

where $\delta_c$ is defined in step 2.

For observing a high reported transfer price, the TA wants to randomize between conducting and not conducting an audit if and only if

$$\tau_1 = \frac{K_a - (1-\beta)(t+h)(a - p_{i1})(\overline{p_r} - \underline{p_r})}{(1-\beta)(t+h)(\overline{p_r} - \underline{p_r})[\gamma(a - \overline{p_r}) - (a - p_{i1})]} := \tau_{1,IV}.$$

$\tau_{1,IV}$ is positive and smaller than 1 if and only if $K_{a1} < K_a < K_{a2,1}$, where

$$K_{a1} := (1-\beta)(t+h)(\overline{p_r} - \underline{p_r})\gamma(a - \overline{p_r}) \tag{19}$$

and

$$K_{a2,1} := (a - p_{i1})(1-\beta)(t+h)(\overline{p_r} - \underline{p_r}). \tag{20}$$

In sum, randomizing between OSB with $p_r = \overline{p_r}$ and TSB with $p_r = \overline{p_r}$ can occur for $K_{a1} < K_a < K_{a2,1}$, $\delta > \delta_4$, and $\delta_4 \leq \delta_c$. In this case, $\tau_2 = 1 - \tau_{1,IV}$, $\eta = \eta_{IV}$, and $\rho = \beta$ constitutes a weak PBE.

**Step 2:** Under which conditions does the MNC randomize between OSB with $p_r = \overline{p_r}$ and TSB with $p_r = \underline{p_r}$? The MNC randomizes the strategies OSB with a high transfer price and TSB with a low transfer price if and only if, the expected profit of these two strategies are the same and this expected profit is higher than the expected profit obtainable with TSB with a high transfer price:

$$E[\Pi | c = c_L, OSB, p_r = \overline{p_r}] = \eta \Pi_6^{MNC} + (1-\eta)\Pi_7^{MNC},$$

$$E\left[\Pi|c = c_L, TSB, p_r = \underline{p_r}\right] = \Pi_5^{MNC},$$

$$\eta\Pi_6^{MNC} + (1-\eta)\Pi_7^{MNC} = \Pi_5^{MNC}$$

$$\Leftrightarrow \eta = \frac{1}{(a-\overline{p_r})[\delta(t+h)\gamma(\overline{p_r}-\underline{p_r})]}\left[\frac{1-t-h}{2}(p_{i2}^2 - \overline{p_r}^2) + ah(\overline{p_r}-\underline{p_r})\right.$$

$$\left. + c_L(1-t)(\overline{p_r}-p_{i2}) + h(\underline{p_r}p_{i2} - \overline{p_r}^2)\right] := \eta_V.$$

We assume throughout the paper, that $a$ is sufficiently large so that $\eta_V > 0$. $\eta_V$ is smaller than 1 if and only if

$$\delta \geq \frac{1}{(a-\overline{p_r})[(t+h)\gamma(\overline{p_r}-\underline{p_r})]}\left[\frac{1-t-h}{2}(p_{i2}^2 - \overline{p_r}^2) + ah(\overline{p_r}-\underline{p_r}) + c_L(1-t)(\overline{p_r} - \right.$$

$$\left. p_{i2}) + h(\underline{p_r}p_{i2} - \overline{p_r}^2)\right] := \delta_c. \qquad (21)$$

In addition, $E[\Pi|c = c_L, OSB, p_r = \overline{p_r}] \geq E[\Pi|c = c_L, TSB, p_r = \overline{p_r}]$ if and only if

$$\eta_{IV} \leq \eta_V \Leftrightarrow \delta_4 \leq \delta_c,$$

where $\delta_4$ is defined in (18).

For observing a high reported transfer price, the TA wants to randomize between conducting and not conducting an audit if and only if

$$\tau_1 = \frac{K_a}{(1-\beta)(t+h)(\overline{p_r}-\underline{p_r})\gamma(a-\overline{p_r})} := \tau_{1,V}.$$

$\tau_{1,V}$ is positive. In addition, it is smaller than 1 if and only if $K_a \leq K_{a1}$ of (19).

In sum, randomizing between OSB with $p_r = \overline{p_r}$ and TSB with $p_r = \underline{p_r}$ can occur for $K_a < K_{a1}$, $\delta > \delta_c$, and $\delta_4 \leq \delta_c$. In this case, $\tau_3 = 1 - \tau_{1,V}$, $\eta = \eta_V$, and $\rho = \beta$ constitutes a weak PBE.

**Step 3:** Under which conditions does the MNC randomize between TSB with $p_r = \overline{p_r}$ and TSB with $p_r = \underline{p_r}$? The MNC randomizes the strategies TSB with a high transfer price and TSB with a low transfer price if and only if, the expected profit of these two strategies are the same and this expected profit is higher than the expected profit obtainable with OSB with a high transfer price:

$$E[\Pi|c = c_L, TSB, p_r = \overline{p_r}] = \eta\Pi_3^{MNC} + (1-\eta)\Pi_4^{MNC},$$

$$E\left[\Pi|c = c_L, TSB, p_r = \underline{p_r}\right] = \Pi_5^{MNC},$$

$$\eta\Pi_3^{MNC} + (1-\eta)\Pi_4^{MNC} = \Pi_5^{MNC}$$

$$\Leftrightarrow \eta \in \left\{\frac{h}{\delta(t+h)}, \frac{h}{\delta(t+h)} + \frac{2[a(1-t-h) - c_L(1-t)]}{\delta(\overline{p_r} - \underline{p_r})(t+h)}\right\}.$$

We assume throughout the paper, that $a$ is big. Conducting an audit is associated with costs for the TA. Thus, the TA audits with probability

$$\eta_{VI} = \frac{h}{\delta(t+h)} > 0.$$

$\eta_{VI}$ is smaller than 1.

In addition, $E[\Pi|c = c_L, TSB, p_r = \overline{p_r}] \geq E[\Pi|c = c_L, OSB, p_r = \overline{p_r}]$ if and only if

$$\eta_V \leq \eta_{VI} \Leftrightarrow \delta_c \leq \frac{h}{t+h}.$$

For observing a high reported transfer price, the TA wants to randomize between conducting and not conducting an audit if and only if

$$\tau_2 = \frac{K_a}{(1-\beta)(t+h)(\overline{p_r} - \underline{p_r})(a - p_{i1})} := \tau_{2,VI}.$$

$\tau_{2,VI}$ is positive. In addition, it is smaller than 1 if and only if $K_a < K_{a2,2}$, where

$$K_{a2,2} := (a - p_{i1})(1-\beta)(t+h)(\overline{p_r} - \underline{p_r}). \tag{22}$$

In sum, randomizing between TSB with $p_r = \overline{p_r}$ and TSB with $p_r = \underline{p_r}$ can occur for $K_a < K_{a2,2}$ and $\delta_c \leq \frac{h}{t+h}$. In this case, $\tau_3 = 1 - \tau_{2,VI}$, $\eta = \eta_{VI}$, and $\rho = \beta$ constitutes a weak PBE.

**Step 4:** What are the properties of $\delta_c$ and $\delta_4$?

For $0 < \gamma < \gamma_\delta$, we obtain $\delta_c > \delta_4$, $\delta_4 < 1$, and $\delta_c > \frac{h}{t+h}$, where

$$\gamma_\delta := \frac{1}{2h(a-\overline{p_r})(\overline{p_r}-\underline{p_r})}\Big[2ah(\overline{p_r}-\underline{p_r}) - (1-t-h)(\overline{p_r}^2 - p_{i2}^2) + 2(1-t)c_L(\overline{p_r} - p_{i2}) - 2h(\overline{p_r} - p_{i2}\underline{p_r})\Big]. \quad (23)$$

For $\gamma_\delta < \gamma \leq 1$, we obtain $\delta_c < \frac{h}{t+h}$ and $\delta_c < \delta_4 < \frac{h}{t+h}$ is smaller than 1. Thus, for $\gamma_\delta < \gamma \leq 1$, $\delta_c$ is also smaller than 1.

### 6.4 Proof of Proposition 3

For $\gamma > \gamma_\delta$ and $K_a < K_{a2,2}$, the MNC keeps TSB with $\overline{p_r}$ with probability $\tau_{2,VI}$ and uses the internal transfer price

$$p_{i1} = \frac{1}{1-t-h}\Big[(1-t)c_L - h\overline{p_r} + \eta_{VI}\delta(t+h)\left(\overline{p_r} - \underline{p_r}\right)\Big]$$

$$= \frac{1}{1-t-h}\Big[(1-t)c_L - h\underline{p_r}\Big].$$

$$\frac{dp_{i1}}{dh} = \frac{1}{(1-t-h)^2}\Big[(1-t)(-c_L - \underline{p_r})\Big] < 0 \quad (24)$$

Therefore,

$$\frac{d\tau_{2,VI}}{dh} = \underbrace{\frac{\partial\tau_{2,VI}}{\partial h}}_{<0} + \underbrace{\frac{\partial\tau_{2,VI}}{\partial p_{i1}}}_{>0}\underbrace{\frac{dp_{i1}}{dh}}_{<0} < 0.$$

For $\gamma < \gamma_\delta$ and $K_a \in \left(K_{a1}, K_{a2,1}\right)$, the MNC keeps TSB with $\overline{p_r}$ with probability $\tau_{2,IV}$ and uses the internal transfer price

$$p_{i1} = \frac{1}{1-t-h}\Big[(1-t)c_L - h\overline{p_r} + \eta_{IV}\delta(t+h)(\overline{p_r} - \underline{p_r})\Big].$$

$$\frac{\partial\tau_{2,IV}}{\partial h} = (-1)\cdot\underbrace{\Big[(1-\beta)(t+h)(\overline{p_r}-\underline{p_r})[a - p_{i1} - \gamma(a-\overline{p_r})]\Big]^{-2}}_{>0}\cdot$$

$$\underbrace{K_a\Big[(1-\beta)(\overline{p_r}-\underline{p_r})[a - p_{i1} - \gamma(a-\overline{p_r})]\Big]}_{>0} < 0.$$

$$\frac{\partial \tau_{2,IV}}{\partial p_{i1}} = (-1) \cdot \underbrace{\left[(1-\beta)(t+h)(\overline{p_r} - \underline{p_r})[a - p_{i1} - \gamma(a - \overline{p_r})]\right]^{-2}}_{>0} \cdot$$

$$\left[\underbrace{(1-\beta)(t+h)(\overline{p_r} - \underline{p_r})}_{>0} \underbrace{(K_{a1} - K_a)}_{<0 \text{for} K_a \in (K_{a1}, K_{a2,1})}\right] > 0.$$

$$\frac{dp_{i1}}{dh} = \frac{1}{(1-t-h)^2}[(1-t-h)\left[A(a-\overline{p_r})(1-\gamma)(A^2 - (\overline{p_r} - c_L)^2(1-t)^2)^{-\frac{1}{2}}\right] -$$
$$\sqrt{A^2 - (\overline{p_r} - c_L)^2(1-t)^2}]. \quad (25)$$

For $A > 0$ and $A^2 - (\overline{p_r} - c_L)^2(1-t)^2$, $\frac{dp_{i1}}{dh}$ is negative. In sum,

$$\frac{d\tau_{2,IV}}{dh} = \underbrace{\frac{\partial \tau_{2,IV}}{\partial h}}_{<0} + \underbrace{\frac{\partial \tau_{2,IV}}{\partial p_{i1}}}_{>0} \underbrace{\frac{dp_{i1}}{dh}}_{<0} < 0.$$

For $\gamma < \gamma_\delta$ and $K_a < K_{a1}$, the MNC keeps TSB with $\overline{p_r}$ with probability 0.

### 6.5 Proof of Proposition 4

A high cost type MNC uses the internal transfer price

$$p_{iH} = \frac{1}{1-t-h}[(1-t)c_H - h\overline{p_r}].$$

$$\frac{dp_{iH}}{dh} = (-1)\frac{1}{(1-t-h)^2}[(1-t)m_H] < 0.$$

A low cost type MNC keeping TSB with $\underline{p_r}$ uses the internal transfer price

$$p_{i2} = \frac{1}{1-t-h}\left[(1-t)c_L - h\underline{p_r}\right].$$

$$\frac{dp_{i2}}{dh} = (-1)\frac{1}{(1-t-h)^2}[(1-t)m_L] < 0.$$

For $\gamma > \gamma_\delta$, a low cost type MNC keeping TSB with $\overline{p_r}$ uses the internal transfer price

$$p_{i1} = \frac{1}{1-t-h}\left[(1-t)c_L - h\overline{p_r} + \eta_{VI}\delta(t+h)(\overline{p_r} - \underline{p_r})\right]$$
$$= \frac{1}{1-t-h}\left[(1-t)c_L - h\underline{p_r}\right].$$

According to equation (24) $\frac{dp_{i1}}{dh}$ is negative.

For $\gamma < \gamma_\delta$, a low cost type MNC keeping TSB with $\overline{p_r}$ uses the internal transfer price

$$p_{i1} = \frac{1}{1-t-h}\left[(1-t)c_L - h\overline{p_r} + \eta_{IV}\delta(t+h)(\overline{p_r} - \underline{p_r})\right].$$

According to equation (25) $\frac{dp_{i1}}{dh}$ is negative.

**References**

Arya, A. and Mittendorf, B. (2008). Pricing internal trade to get a leg up on external rivals. *Journal of Economics & Management Strategy*, 17(3): 709-731.

Baldenius, T., Melumad, N. D., and Reichelstein, S. (2004). Integrating managerial and tax objectives in transfer pricing. *The Accounting Review*, 79(3): 591-615.

Capuzzi, C. (2010). Transfer pricing and fin 48: removing uncertainty through the advanced pricing agreement process. *Northwestern Journal of International Law & Business*, 30: 721.

Choe, C. and Hyde, C. E. (2007). Multinational transfer pricing, tax arbitrage and the arm's length principle. *Economic Record*, 83(263): 398-404.

Cools, M. and Emmanuel, C. (2006). Transfer pricing: The implications of fiscal compliance, in: Chapman, C. S., Hopwood, A. G., and Shields, M. D., (editors): Handbook of Management Accounting Research, 2, Elsevier: 573-585.

Crawford, V. P. and Sobel, J. (1982). Strategic information transmission. *Econometrica*, 50(6): 1431-1451.

Diller, L. and Lorenz, J. (2016). Transfer pricing and strategic audit. *Working Paper*.

Dürr, O. M. and Göx, R. F. (2011). Strategic incentives for keeping one set of books in international transfer pricing. *Journal of Economics & Management Strategy*, 20(1): 269-298.

Eden, L., Valdez, L. F. J., and Li, D. (2005). Talk softly but carry a big stick: Transfer pricing penalties and the market valuation of japanese multinationals in the united states. *Journal of International Business Studies*, 36(4): 398-414.

Elliott, J. and Emmanuel, C. (2000). International transfer pricing: Searching for patterns. *European Management Journal*, 18(2): 216-222.

EY (2001). Transfer Pricing 2001 Global Survey, Internet: http://webcache.googleusercontent.com/search?q=cache:DMiHS3vVBSwJ:webapp01.ey.com.pl/EYP/WEB/eycom_download.nsf/resources/Transfer%2520Pricing_survey_2001.pdf/%24FILE/Transfer%2520Pricing_survey_2001.pdf+&cd=1&hl=de&ct=clnk&gl=de (20.09.2016).

EY (2003). Transfer Pricing 2003 Global Survey, Internet: http://webcache.googleusercontent.com/search?q=cache:JIPqK6JWVSUJ:webapp01.ey.com.pl/EYP/WEB/eycom_download.nsf/resources/Transfer%2520Pricing%2520Survey%2520Report_2003.pdf/%24FILE/Transfer%2520Pricing%2520Survey%2520Report_2003.pdf+&cd=1&hl=de&ct=clnk&gl=de (20.09.2016).

EY (2013). 2013 Global Transfer Pricing Survey, Internet: http://webcache.googleusercontent.com/search?q=cache:CsR7BN89vGYJ:www.ey.com/Publication/vwLUAssets/EY-2013_Global_Transfer_Pricing_Survey/%24FILE/EY-2013-GTP-Survey.pdf+&cd=2&hl=de&ct=clnk&gl=de (20.09.2016).

Göx, R. F. and Schiller, U. (2006). An economic perspective on transfer pricing, in: Chapman, C. S., Hopwood, A. G., and Shields, M. D., (editors): Handbook of Management Accounting Research, 2, Elsevier: 673-695.

Hirshleifer, J. (1956). On the economics of transfer pricing. *The Journal of Business*, 29(3): 172-184.

Hyde, C. E. and Choe, C. (2005). Keeping two sets of books: The relationship between tax and incentive transfer prices. *Journal of Economics & Management Strategy*, 14(1): 165-186.

Kant, C. (1988). Endogenous transfer pricing and the effects of uncertain regulation. *Journal of International Economics*, 24(1-2): 147-157.

Keuschnigg, C. and Devereux, M. P. (2013). The arm's length principle and distortions to multinational firm organization. *Journal of International Economics*, 89(2): 432-440.

Lemus, A. (2011). Strategic incentives for keeping one set of books under the arm's length principle. *Working Paper*.

Mansori, K. S. and Weichenrieder, A. J. (2001). Tax competition and transfer pricing disputes. *Finanz-Archiv: Public Finance Analysis*, 58(1): 1-11.

Martini, J. T. (2015). The optimal focus of transfer prices: pre-tax profitability versus tax minimization. *Review of Accounting Studies*, 20(2): 866-898.

Martini, J. T., Niemann, R., and Simons, D. (2012). Transfer pricing or formula apportionment? tax–induced distortions of multinationals' investment and production decisions. *Contemporary Accounting Research*, 29(4): 1060-1086.

Mills, L. F. (1998). Book-tax differences and internal revenue service adjustments. *Journal of Accounting Research*, 36(2): 343-356.

Narayanan, V. G. and Smith, M. (2000). Impact of competition and taxes on responsibility center organization and transfer prices. *Contemporary Accounting Research*, 17(3): 497-529.

Nielsen, S. B. and Raimondos-Møller, P. (2012). Multiple roles of transfer prices: One vs. two books, in; Schön, W. and Konrad, K. A., (editors): Fundamentals of International Transfer Pricing in Law and Economics, 1, Springer: 25-46.

OECD (2015). OECD/G20 Base Erosion and Profit Shifting Project - Transfer Pricing Documentation and Country-by-Country Reporting*, Action 13 - 2015 Final Report*.

Picciotto, S. (1992). International taxation and intrafirm pricing in transnational corporate groups. *Accounting, Organizations and Society*, 17(8): 759-792.

Raimondos-Møller, P. and Scharf, K. (2002). Transfer pricing rules and competing governments. *Oxford Economic Papers*, 54(2): 230-246.

Samuelson, L. (1982). The multinational firm with arm's length transfer price limits. *Journal of International Economics*, 13(3): 365-374.

Sansing, R. (2014). International transfer pricing. *Foundations and Trends in Accounting*, 9(1): 1-57.

Schjelderup, G. and Sorgard, L. (1997). Transfer pricing as a strategic device for decentralized multinationals. *International Tax and Public Finance*, 4(3): 277-290.

Smith, M. (2002a). Ex ante and ex post discretion over arm's length transfer prices. *The Accounting Review*, 77(1): 161-184.

Smith, M. (2002b). Tax and incentive trade-offs in multinational transfer pricing. *Journal of Accounting, Auditing & Finance*, 17(3): 209-236.

Springsteel, I. (1999). Separate but unequal. when tax-based transfer prices fall short, a second managerial system helps some companies measure internal profits better. *CFO*, 15(8): 89-92.

Wagenhofer, A. (1994). Transfer pricing under asymmetric information: An evaluation of alternative methods. *European Accounting Review*, 3(1): 71-103.

Yitzhaki, S. (1974). Income tax evasion: A theoretical analysis. *Journal of Public Economics*, 3(2): 201-202.

# Beitrag II

## Titel

An Experimental Investigation of Strategic Decision Behavior and Audit Quality of Big and Small Audit Firms in a Tendering Process

Eine experimentelle Untersuchung des strategischen Entscheidungsverhalten und der Prüfungsqualität von großen und kleinen Prüfungsgesellschaften in einem Ausschreibungsprozess

## Koautor

Prof. Dr. Martin Fochmann

## Anmerkungen

Dieser Beitrag ist in einer vorherigen Version bereits in der SSRN-Working Paper Series veröffentlicht worden.

Link: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2689550.

# An Experimental Investigation of Strategic Decision Behavior and Audit Quality of Big and Small Audit Firms in a Tendering Process


## ABSTRACT

We experimentally investigate the strategic decision making of audit firms in a tendering process. In particular, we are interested in how audit firms behave to acquire audit clients and which planned audit quality is offered. Our main findings are as follows. First, if two big audit firms are competing, we do not observe that each firm tries to acquire all clients. However, if one big and one small audit firm are competing, we find evidence that the big audit firm generally apply strategies to acquire all available clients. In contrast, the small audit firm uses a clear "Guerilla Strategy" which means that the firm concentrates only on few clients whereas the other clients are almost ignored. Second, small audit firms are better off if more clients do exist in the tendering process. Thus, the legislator should ensure that more audit clients are tendered if the competitiveness of smaller audit firms should be enhanced. Third, in a situation in which the competitive advantage of big audit firms increases over-proportionally, we do not observe that big audit firms are able to decrease the market share of small audit firms markedly or are even able to push small audit firms out of the market. Fourth, we find that the planned quality level of an audit is higher if the client is acquired by a small audit firm. This implies that increasing the number of smaller audit firms could increase the planned quality level of the audit market.



***Acknowledgement:*** We gratefully acknowledge funding by the Land Niedersachsen through the Leibniz University of Hanover. We thank Thomas Omer, Dirk Simons, Jochen Bigus, Stefan Wielenberg, Joachim Gassen, Michelle Muraz and participants of the 39th Annual Congress of the European Accounting Association (2016), 2015 Analytical Research in Financial Accounting Workshop and 2014 GfeW Conference for helpful comments and suggestions.

## 1 Introduction

In 2010 the European Commission released a green paper on audit policy. One of the main goals is to increase the competition on the audit market (EC, 2010). In particular, smaller audit firms should be more considered in the audit process and their market share should increase. As the audit process starts with the tendering of an audit client, we investigate this tendering process in more detail. Dopuch and King (1996), for example, look at price competition in the tendering process and provide experimental evidence that lowballing does not reduce audit quality in a competitive market. Recently, audit fees are already very low and there is empirical evidence that competition between audit firms leads to a higher effect on planned audit quality than on audit fees (Johnstone et al., 2004). Thus, audit quality is one of the most important factors in the tendering process. However, there is no experimental study which examines the strategical behavior of audit firms in a tendering process focusing on planned audit quality. Our contribution to the literature is that we provide an experimental analysis to fill this research gap. We address the following research questions: Which strategies do audit firms use to acquire audit clients? Do big and small audit firms differ with respect to their strategical behavior? Are big audit firms able to decrease the market share of small audit firms markedly or are they even able to push them out of the market? How can the legislator improve the competitiveness level of small audit firms? Does the planned audit quality depend on whether a big or small audit firm acquires an audit client?

A competition between audit firms emerges if an auditee decides to tender. In accordance with Beattie and Fearnley (1998a), this tendering process can be characterized in five steps. First of all, the auditee has the initial idea. Second, a request for bids is sent to potential audit firms. Hereafter, a brief meeting with the CFO and (possibly) a company visit take place before the potential auditors present their offers to the audit committee or the full board of the company in the third step (Beattie and Fearnley, 1998b). After the presentations, the client has to evaluate the offers (fourth step) and has to decide which audit firm is chosen in the last step. In our study, we will focus on the strategical behavior of audit firms when making their offers in the third step.

Unfortunately, detailed information on the bidding behavior and the offers made by different audit firms to acquire an audit client in a tendering process are not disclosed. As

archival data is therefore not feasible, we decided to conduct laboratory experiments to analyze our research questions. Furthermore, this research method allows us to clearly identify cause and effect relationships because we are able to vary the tendering situation (e.g., varying the competitiveness level of audit firms or varying the number of audit clients) while keeping the other economic aspects constant (what otherwise would bias an analysis). This grants a high level of internal validity. As firms' responses are not examined in their natural environment, the level of external validity is lower with this kind of research method. However, since an environment in which situations *only* differ with respect to the level of competitiveness or the number of audit clients cannot be achieved in reality, such an environment has to be created if these different situations should be analyzed. As a consequence, conducting a laboratory experiment is an appropriate method to answer our research questions.

In our study, we are interested in how audit firms behave to acquire audit clients and which planned audit quality is offered. We examine different situations and vary the number of audit clients and the competitiveness level of the audit firms. The latter variation enables us to analyze decision behavior on audit markets with two big (i.e., first-tier) audit firms or with one big and one small (i.e., second-tier) audit firm. Our experimental design is based on the Colonel Blotto Game in which originally two players with battalions fight against each other for different battlefields (see section 3.3 for more details). We apply this game theoretical approach to model an audit context in which two audit firms compete for audit clients in a tendering process. The main reason for our design decision is that this approach reflects the tendering process observed on audit markets appropriately (see section 3.1 for more details). On real audit markets, audit firms compete and "bid" for an audit client and the audit firm with the best offer will acquire the client. This process is exactly captured by the Colonel Blotto Game in a simple way which enables us to easily transfer the tendering process in the lab.

As we are not interested in how subjects solve complex case studies where an expertise is crucial, we decided to use students as subjects to analyze strategical behavior. This is in line with, for example, Dopuch et al. (2001) and Church and Zhang (2011) who simulates strategic decisions in an audit context with students. Please note that there is much evidence that student decision making does not differ significantly from that of professionals and non-students – especially if the complexity of the applied experimental

task is low like it is in our experiments (Alm et al., 2015; Depositario et al., 2009; Liyanarachchi, 2007; Remus, 1996; Ashton and Kramer, 1980; Elliot et al., 2007). Peecher and Solomon (2001) extensively discuss different advantages of using students as participants instead of professionals or practitioners in an audit context and argue that using students is not a "research trap". To put the students in the position of an audit firm's manager, we use a framed context with loaded instructions.

We conduct two experiments with different treatments. In the first experiment, two audit firms compete for audit clients in a tendering process. If an audit firm acquires an audit client, this will effect only the current period, but has no effect on future audit tendering processes. This experiment serves as a benchmark to analyze strategic behavior in a constant and stable environment. In the second experiment, the acquisition of clients has an influence on future tendering processes since we would expect a positive effect of an acquired client on the competitiveness of the audit firm in real audit markets. This enables us to investigate the development and the dynamic effects on a market with big and small audit firms. In particular, we want to analyze whether big audit firms are able to push small audit firms out of the market in the long run.

Our main findings are as follows. First, if two big audit firms are competing, we do not observe that each firm tries to acquire all clients. However, if one big and one small audit firm are competing, we find evidence that the big audit firm generally apply strategies to acquire all available clients. In contrast, the small audit firm uses a clear "Guerilla Strategy" which means that the firm concentrates only on few clients whereas the other clients are almost ignored. Second, whereas the clients are almost shared equally in case of two big audit firms, the big audit firm is better off (in monetary terms) and acquires significantly more clients in case of one big and one small audit firm. Third, small audit firms are better off if more clients do exist in the tendering process. As a consequence for real markets, if the competitiveness of smaller audit firms should be enhanced, the legislator should ensure that more audit clients are tendered. Fourth, in a situation in which the competitive advantage of big audit firms increases over-proportionally, we do not observe that big audit firms are able to decrease the market share of small audit firms significantly or are even able to push small audit firms out of the market.

Fifth, we find that the planned quality level of an audit is higher if the client is acquired by a small audit firm. For real audit markets, this implies that increasing the number of smaller audit firms could increase the planned quality level of the audit market. At a first glance, this finding seems to be in contrast to the literature initiated by the seminal paper of DeAngelo (1981b) which provides robust evidence for a positive relationship between auditor size and audit quality. But more recently, different studies do not observe a positive relationship (see section 2). Consequently, our study is in line with these recent studies. It is important to note that this strand of literature mainly focuses on the realized audit quality when the audit is carried out. However, as we are interested in the strategical behavioral in the tendering process, we look at the planned audit quality. Johnstone et al. (2004) discuss different reasons why planned audit quality can deviate from realized audit quality (see section 2 for more details). Thus, we argue that both effects – positive (negative) relationship between auditor size and realized (planned) audit quality – are not contradictory and both can appear in real audit markets (see section 5 for a more detailed discussion).

The remainder of the paper is organized as follows. In section 2, we give a brief overview over the related literature. In section 3, we discuss the experimental design, explain our sample and experimental protocol, give a short overview about the Colonel Blotto Game, and present the results of our *first* experiment. We describe the experimental design of our *second* experiment and show the results in section 4. A summary is presented in section 5.

## 2 Related Literature

There is of course a large body of literature analyzing the competition on the market for audit services. Whereas earlier studies focused on audit market concentration and price competition (e.g., Simunic, 1980; Maher et al., 1992; Pearson and Trompeter, 1994), later studies focused on specific determinants like auditor rotation (e.g., Myers et al., 2003; Carey and Simnett, 2006) and auditor industry specialization (e.g., Lim and Tan, 2008; Carson, 2009). For excellent literature overviews see, for example, Willekens and Achmadi (2003) and Knechel et al. (2013). Importantly, observed audit fees are the result of stipulated and realized contracts and the levels of audit quality (if observable at all) are

the result of executed audits after the respective audit contract is signed.[1] However, data on initial offers made in a tendering process (thus before any contract is signed) by different audit firms to acquire an audit client is not feasible. Consequently, the strategical behavior of audit firms in the tendering process cannot be analyzed with the available data. To avoid this data problem, we decided to conduct a controlled experiment to examine the strategical behavior of audit firms when acquiring audit clients.

Initiated by the seminal paper of DeAngelo (1981a), audit fees are the most important aspect for choosing an audit firm in the audit literature.[2] However, recent studies suggest that audit quality and audit service have a greater impact on the auditee's decision since audit fees are generally on a low level and are very similar across audit firms. For example, Johnstone et al. (2004) show that increasing audit services is more important than decreasing audit fees and argue that auditees mainly focus on quality instead on fees. In particular, they show that competition for audit clients leads to an increase of planned audit hours of 34% while the audit fees only decrease by 13%. Beattie and Fearnley (1998b) find that two-thirds of the auditees have other reasons than the level of audit fee when they decide on their auditors. They argue that the bids are within the acceptable range or are very similar. A survey of more than 1,000 German audit firms confirms this finding and reveals that more than half of all audit contracts are based on flat-rate fees (Wirtschaftsprüferkammer, 2015). Consequently, the audit quality (e.g., audit scope and audit depth) has become a very important aspect in the tendering process. In line with these findings, we will use the offered audit hours as a proxy for planned audit quality as the criterion that determines which audit firm is chosen by the audit client to analyze strategic decision making in our study.

Another reason why we decided to use only one dimension specifying the outcome of the tendering process is to make our experiments as simple as possible for the participants. Thus, we refrain from implementing both decision variables: audit fee and audit quality. In particular, we decided to fix the audit fee and allow the planned audit quality to be

---

[1] Usually audit quality in its entirety cannot be observed by stakeholders (for a detailed discussion see, for example, Knechel et al., 2013). By applying a controlled experiment, however, we are able to avoid any misinterpretation of planned audit quality.

[2] In a meta-study, Hay et al. (2006) summarize and evaluate the research on audit fees. By analyzing different independent variables which influence audit fees, they show, for example, that auditor size is positively correlated with audit quality and that auditor size is positively correlated with audit fees.

varied. This captures the described observation that audit fees are generally very similar in the current audit market and that the audit quality has therefore become a very important driver in the tendering process. Additionally, this is in line with the mentioned observation that price-flat-rates are often contracted. An alternative would be to fix the planned audit quality and allow the price of an audit to be varied. In such a setting, only one dimension would determine the outcome, again, and consequently the decision task would be very similar for our participants. In fact, both settings are equivalent in economic terms if we look at the relation of audit quality and audit fee (i.e., the planned audit quality per currency unit).

To the best of our knowledge there is no study explicitly analyzing how audit firms strategically set audit quality offers in the tendering process. However, since we are especially interested in how the strategic decision making differs between big and small audit firms, our study is strongly related to the important literature on the relationship between auditor size and audit quality initiated by the seminal paper of DeAngelo (1981b). She theoretically shows that large audit firms have a higher incentive to issue accurate reports than small audit firms. The reason is that, due to reputation effects, large audit firms will lose their relatively higher client-specific quasi-rents if an inaccurate report is issued. Thus, these firms supply a higher audit quality as they have "more to lose" than small audit firms. In line with this finding, the theoretical paper by Dye (1993) suggests that larger (and consequently wealthier) audit firms, which would suffer larger litigation penalties in case of issuing an inaccurate report (i.e., more wealth at risk from litigation), will report more accurately. Lennox (1999) uses a very similar theoretical model and provides empirical evidence that audit quality is higher for big audit firms.

Further empirical papers confirm a positive relationship between auditor size and audit quality. For example, Palmrose (1988) and Teoh and Weng (1993) provide evidence that big audit firms supply higher audit quality. Becker et al. (1998) argue that big audit firms increase reporting quality as they prevent an excessive use of "accounting flexibility". Reynolds and Francis (2001) find evidence that concerns regarding reputation and litigation risk are important for big audit firms even in case of large clients and that these concerns lead to higher audit quality. Choi et al. (2010) show a positive relationship between auditor's office size and audit quality. Taking the observations of most of these papers into account, it seems that big audit firms offer a higher audit quality. More

recently, however, there are more studies which do not reveal a difference in audit quality between big and small audit firms. The results of Chaney et al. (2004) suggest that auditees do not view big audit firms as superior in terms of perceived audit quality. Boone et al. (2010) show that the actual audit quality does not differ between first-tier audit firms and second-tier audit firms. This result is supported by Bills et al. (2016). They figured out that the audit quality between Big 4 audit firms and audit firms organized in associations is similar.

Importantly, this strand of literature analyzes the level of quality when the audit is carried out. As mentioned before, we are investigating the tendering process. Thus, there is no audit carried out and the audit quality is only planned through the planned audit hours. Johnstone et al. (2004) used exactly the same deliberations because they used the planned personnel audit hours for all classes of professionals. The planned level might differ from the effort during an audit. One reason for such a difference could be overstatements in the process of bidding (Beck and Barefield, 1986). Further suggestions for a variation between planned and produced effort are provided by Johnstone et al. (2004). Because of information asymmetry during the tendering process, it is difficult to predict the right effort which is needed to conduct an audit with all necessary tests for an initial engagement in a specific client environment. Thus, it is important to note that we focus on the planned (instead of realized) audit quality in our study because we are interested in the bidding behavior in the tendering process.

# 3 Experiment 1

## 3.1 Experimental Design and Treatments

Our experiment – which is based on the Colonel Blotto Game (see section 3.3) – is framed as a decision of an audit firm manager.[3] Each participant is a manager of a single audit firm. The task of each manager is to acquire audit clients in a tendering process. In our experiment, the audit market consists of two audit firms. Therefore, two participants are assigned to one group who compete for the available clients. The experiment consists of

[3] We use a framed context with loaded instructions. Instructions are presented in appendix A1.

15 periods and the group allocation remains constant over all periods. This means that a participant is always confronted with the same counterpart.

As motivated in section 2, we use the planned audit hours, which an audit firm offers to spend on the audit, as a proxy for planned audit quality. This is the only criterion that determines which audit firm acquires a client. Spending more audit hours implies more audit work which results in a higher audit quality. With respect to real audit markets, the number of audit hours can also be seen as the number of auditing staff (including different positions like junior or senior managers). Thus, these offered audit hours incorporate all classes of professionals of an audit firm like in the study of Johnstone et al. (2004). In our study, we abstract from any possible efficiency differences between different types of audit firms. Thus, there are no differences between a big (first-tier) and a small (second-tier) audit firm with respect to the audit technology.[4] We also neglect reputation and litigation effects.[5]

At the beginning of each period, each participant is endowed with a fixed amount of hours which is common knowledge for both group members. This initial endowment of audit hours symbolizes the existing audit staff of an audit firm. We assume that the price for an audit (paid by the audit client) is constant. Therefore, an audit firm always receives the same compensation for an audit independent of the audit quality. Furthermore, the compensation does not depend on which audit firm conducts the audit. We do not distinguish between the clients who can be acquired. This implies that one client is of equal value as another client for an audit firm. For example, the clients are from the same industry with similar accounting problems and risks in the auditing process. We assume that these clients are public companies which mainly operate nationwide. So, we do not incorporate clients as Deutsche Bank or General Motors in our experiment. Instead, we consider clients which belong to the medium or small sector of the public market (for example, companies of the SDAX in Germany). Thus, the audit firm does not need to be part of a worldwide audit network to be able to conduct an audit of the considered clients

[4] Both types of audit firms are either specialist or non-specialist audit firms. Hence, a different degree of specialization does not influence our results (Krishnan, 2003).

[5] In the German audit market, litigation is not a relevant factor. This assumption is used, for example, in the study of Weber et al. (2007) as well. Audit firms structure their business to specific client segments. Audit markets are more complex than the two dimensions high financial power or reputational effects (Chaney et al., 2004). Therefore, we assume that our two audit firms are in the same specific client segment and does not differ in their characteristics. Then, reputation effects do not play any role.

in our experiment. In particular, an audit firm gains 100 lab-points for each acquired client (where 100 lab-points exactly correspond to 5 Euro) and 0 otherwise. Therefore, each participant's total payment of one period is determined by the number of acquired clients in this period.

In our experiment, we model a market situation where an acquired client leads to an excess return for the audit firm. If the audit client is not acquired, we assume that the audit firm will use the remaining audit hours (i.e., auditing staff) for auditing or consulting other audit clients outside from the modelled setting (decision alternative). So, it is important to note that no audit firm leaves resources unexploited (even if no client is acquired). The revenue from this alternative equals the cost of auditing or consulting by assumption. As a result, the alternative yields no positive return in total. That is why the audit firms first try to acquire an audit client from our setting before considering the decision alternative. If the audit client is acquired, the audit firm spends the promised audit hours and earns a revenue which is higher than the cost of auditing. Thus, an acquired audit client leads to an excess return. This excess return equals the compensation of 100 lab-points that we model in our experiment. Consequently, compared to the decision alternative, an audit firm bears no additional cost when the firm acquires an audit client in our experiment. We use this approach to keep the experimental setting as simple as possible for our subjects. Incorporating cost and explicitly modeling the decision alternative would complicate the setting without receiving additional advantages for answering our research questions.

Which of the two audit firms acquires a client is decided in a (first-price sealed-bid) auction dependent on the number of audit hours. The audit firm who has bid the highest planned audit quality (in hours) acquires the client and has to spend the promised audit hours (i.e., no ex post modification is possible). The audit firm who has bid the lower planned audit quality does not acquire the respective audit client and receives no compensation (i.e., 0 lab-points). Audit firms bid simultaneously and the bid of one audit firm is unknown by the other. There is one bidding for each client. This implies that for each client it is decided separately which audit firm acquires the respective client. However, all bidding are conducted simultaneously. Therefore, audit firms are informed about the outcome of each bidding after all decisions are made. Figure 1 presents one exemplary screenshot of the bidding stage and figure 2 one of the outcome stage.

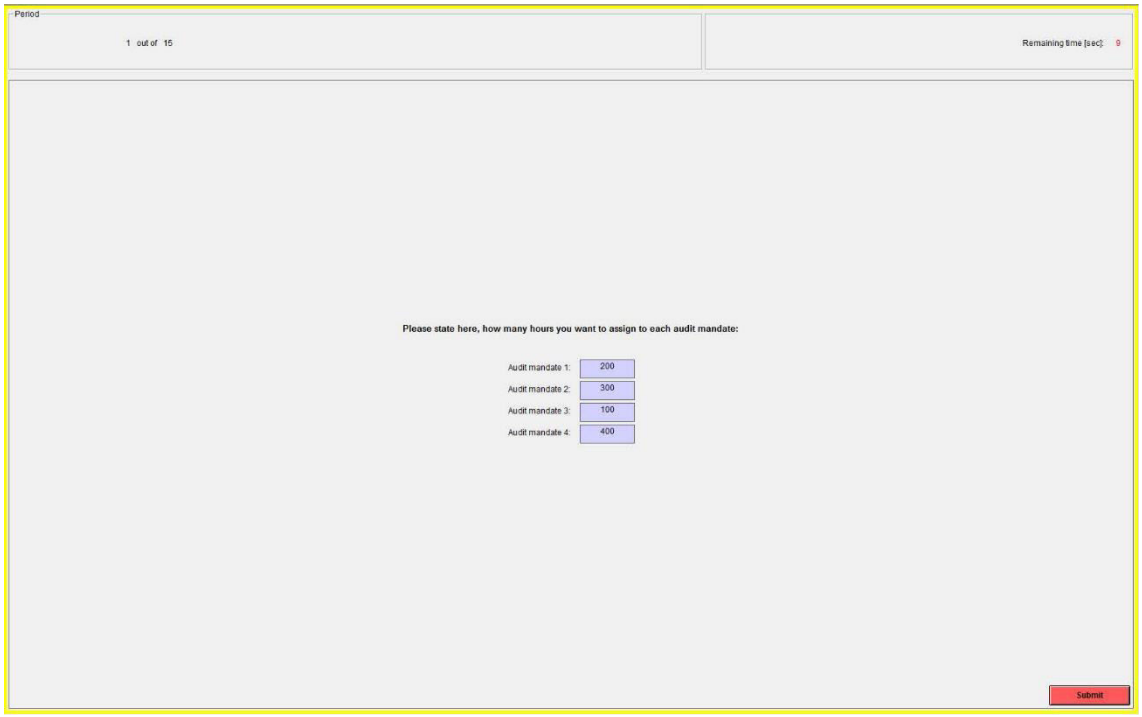


**Figure 1:** Exemplary screenshot of the negotiation stage

*Note:* This figure presents one exemplary screenshot of the negotiation stage in our experiment 1. The example is taken from the 1000-600-Treatment with four clients.

A subject is not allowed to allocate more or less than her endowment of hours. If more or less hours are allocated to the available clients in one period, an error message appears and the subject is asked to adjust her allocation accordingly. This implies that an overbidding is not possible to guarantee that the promised audit hours are always ensured. If overbidding will be allowed, a situation where an audit firm is not able to spend the promised audit hours for each acquired audit client is likely to occur and would call for readjustments. However, this is not what we want to model and would make the setting much more complicated. Furthermore, underbidding is not possible to ensure that resources are not wasted. As acquiring audit clients in our setting leads to an excess return compared to the mentioned decision alternative, underbidding would not be efficient and is thus not allowed. Please note that the simultaneous bidding and the prohibition of over- and underbidding imply that the remaining audit hours in the case where an audit firm does not acquire the desired audit client cannot be used for acquiring other clients in the experiment. As described above, the remaining endowment of audit hours (i.e. the audit staff) is used for services outside from the experiment (decision alternative).

As we are only interested in the bidding behavior of the audit firms, the clients are computerized (i.e., no human market players) and no real audit is conducted by a participant. Therefore, the only task of each participant is to acquire clients in the tendering process. In each period, the participants are confronted with completely the same decision problem.

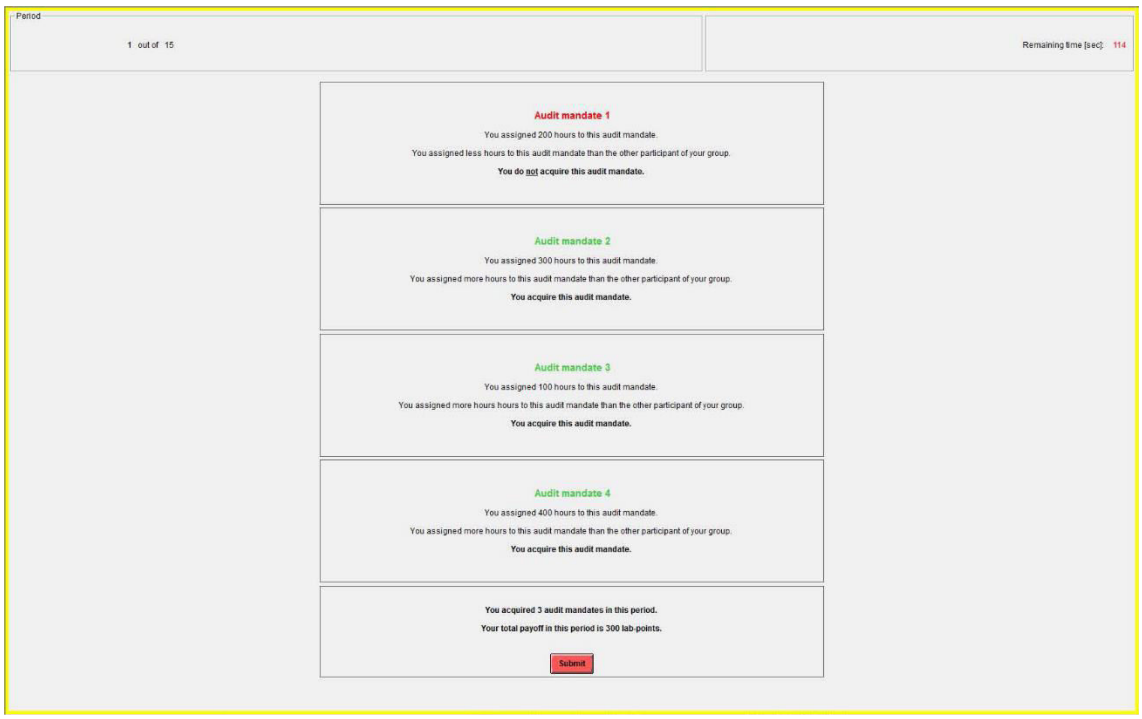


**Figure 2:** Exemplary screenshots of the outcome stage
*Note:* This figure presents one exemplary screenshot of the outcome stage in our experiment 1. The example is taken from the 1000-600-Treatment with four clients.

In our first experiment, we use a 2x2 between-subject design in which we vary the number of clients and the number of audit hours assigned to each audit firm. Within one out of our four treatments, the number of clients or the number of hours is not varied. The number of clients is either four in the *4-Clients-Treatment* or eight in the *8-Clients-Treatment*. In the *1000-1000-Treatment*, the first and the second audit firm are each endowed with 1000 hours at the beginning of each period. This symmetric case reflects an audit market with two big audit firms. In the *1000-600-Treatment*, the first audit firm is endowed with 1000 hours, but the second with 600 hours only. This asymmetric case mirrors an audit market consisting of one big (first-tier) and one small (second-tier) audit firm. A participant is randomly assigned to one treatment only. Table 1 gives an overview on our four (between-subject design) treatments including the number of participants per

treatment. For reasons of simplification, we call the first audit firm *Type-1-Audit-Firm* and the second audit firm *Type-2-Audit-Firm* in the following. Whereas the Type-1-Audit-Firm is always endowed with 1000 hours, the Type-2-Audit-Firm is endowed with either 1000 hours (1000-1000-Treatment) or 600 hours (1000-600-Treatment).

| | **1000-1000-Treatment** | | **1000-600-Treatment** | |
|---|---|---|---|---|
| | **4-Clients-Treatment** | **8-Clients-Treatment** | **4-Clients-Treatment** | **8-Clients-Treatment** |
| Number of clients | 4 | 8 | 4 | 8 |
| Endowment of Type-1-Audit-Firm | 1,000 | 1,000 | 1,000 | 1,000 |
| Endowment of Type-2-Audit-Firm | 1,000 | 1,000 | 600 | 600 |
| No. of subjects | 22 | 20 | 24 | 22 |

**Table 1:** Overview on treatments in experiment 1

*Note:* This table highlights the differences between the four (between-subject design) treatments in our first experiment.

If both audit firms allocated the same amount of hours to one client, we apply the following two decision rules which are commonly used in the Colonel Blotto Game literature (for example Roberson (2006)) for this situation. In the symmetric case (1000-1000-Treatments), a (computerized) random draw (with an equal probability) decides which audit firm is awarded the contract. In the asymmetric case (1000-600-Treatments), the big audit firm wins the client. With respect to real audit markets, the last decision rule can be, for example, explained by a higher level of reputation and experience of big audit firms. So, even if we neglect reputational differences in the setting above, we use some kind of reputational deliberations for the decision of the audit client.

### 3.2 Sample and Experimental Protocol

Before the actual experiment was executed, we measured subject's risk attitude with the Holt-Laury-Task (Holt and Laury, 2002).[6] We use the total number of low risk lottery choices (i.e., lottery A) as our measure for subject's risk aversion which is measured on an 11-point Likert scale (where 0 = very risk seeking and 10 = very risk averse). The

[6] Instructions are presented in appendix A1.2.

participant's payments from this task and from the actual experiment are incentive based. After the entire experiment was completed, the payoff from the Holt-Laury-Task is determined in accordance with the procedure described in the instructions.

To avoid income effects and strategies to hedge the risk across all periods, only one out of the 15 periods determines pay of the actual experiment. To determine this payoff, the computer decides randomly which of the 15 periods is relevant for the participant's payment at the end of the experiment. Dependent on the acquired clients in this selected period, the participant's payoff was calculated and converted into Euro. The resulting total payment from the actual experiment and from the Holt-Laury-Task is then paid out in cash immediately.

At the beginning of each experiment the individuals are granted with two training periods which are not relevant for the final payment. After each period, each participant is informed (for each client separately) whether she or the other group member has acquired this client. Furthermore, we displayed the audit hours the participant has assigned to each client. However, the information how many audit hours the other group member has chosen is not provided to her. After the two training periods, the participants are regrouped. That is why we do not consider the training sessions in our analysis.

The experiment was conducted at the computerized experimental laboratory of the Leibniz University Hannover (LLEW) in 2014 and 2015. In total, 136 subjects (70 females and 66 males) participated and earned on average 19.20 Euros in approximately 90 minutes (approximately 12.80 Euros per hour). Participants were paid in cash immediately after the experiment. A show-up fee was not granted. Table 2 provides an overview of the main characteristics of our participants. The experimental software was programmed with z-Tree (Fischbacher, 2007) and the participants were recruited with the software hroot (Bock et al., 2014).

| | mean | median | standard deviation |
|---|---|---|---|
| age | 23.21 | 22.00 | 5.16 |
| female | 51.47% | | |
| econ major | 25.74% | | |
| bachelor's degree | 75.00% | | |
| no. of semesters studied | 4.34 | 4.00 | 2.74 |
| risk aversion | 5.77 | 6.00 | 1.31 |
| income (in Euro) | 264.01 | 250.00 | 190.40 |

**Table 2:** Descriptive statistics for individual characteristics

*Note:* This table gives an overview on the individual characteristics of the 136 participants of the experiment. "Economics major"("bachelor's degree") denotes whether a subject studies economics or management (in a bachelor's degree program). We use the total number of low risk lottery choices in the Holt-Laury-Task (i.e., lottery A) as our measure for subject's risk aversion which is measured on an 11-point Likert scale where 0 = very risk seeking and 10 = very risk averse. "Income" is the monthly income after fixed cost.

### 3.3 Colonel Blotto Game

The Colonel Blotto (CB) Game is first described in a game theory essay by Borel (1921) and is named by Gross and Wagner (1950). In this game, a fictional Colonel Blotto is confronted with the following military situation.[7] Two combatants A and B fight for $n$ battlefields. A battlefield $i$ ($i = 1,...,n$) is won by the player who send more troops to it. Each combatant is endowed with a battalion ($X^A, X^B$) where the battalion's strength (e.g. number of soldiers, etc.) can vary between both players (i.e., $X^A = X^B$ or $X^A \neq X^B$). The information about the battalion's strength of each player is common knowledge. The task of the combatants is to allocate their entire battalions to the $n$ battlefields (i.e., $X^A = x_1^A + ... + x_n^A$ and $X^B = x_1^B + ... + x_n^B$) to win as many battlefields as possible.

In the literature, different solutions for the CB Game are presented (see, for example, Borel and Ville, 1938; Gross and Wagner, 1950). However, we will only refer to the studies of Myerson (1993), Roberson (2006) and Hart (2008) in the following since these are the most important studies and closest to our experiment. Myerson (1993) considers a CB Game with an infinite number of battlefields, with symmetric resources of both players (i.e., $X^A = X^B$), and in which the battalions are arbitrarily divisible.[8] He figures out that there exists only an equilibrium with mixed strategies. In particular, the two

[7] See, for example, Myerson (1993), Roberson (2006) and Homburg (2011).

[8] In his paper, he uses the CB Game to model a two-party election campaign.

competing players assign battalions on the interval $[0,2a]$ to each battlefield where $a = X^A/n$. This implies that each player should not send more than twice as much as the average numbers of troops to one specific battlefield. With respect to our first experiment, participants should therefore make a bid for each audit client in-between 0 and 500 in the 4-Clients-Treatment and in-between 0 and 250 in the 8-Clients-Treatment.

Roberson (2006) relaxes the assumptions of Myerson (1993) and considers a finite number of battlefields. However, he has to make a further assumption for the case when both players send the same number of troops to one battlefield. In this case, the stronger player A always gains the specific battlefield. For symmetric resources, Roberson (2006) is able to replicate the finding of Myerson (1993) and show that each player should distribute the troops on the interval $[0,2a]$. For the asymmetric case with $X^A > X^B$ [9], the solution changes a little bit. Whereas player A uses the same strategy as before, player B will now choose one or more battlefields randomly to which he will not send troops (since he is aware of the stronger player A). But on the remaining battlefields, he distributes his resources on the mentioned interval. So, on these battlefields, the weaker player B fights with his full strength. In the following, we will refer to this strategy as a "Guerilla Strategy" which implies that the player concentrates only on some battlefields (in our case: audit clients) whereas the others are completely ignored.

While the above mentioned solutions only cover real numbers resources, Hart (2008) discusses solutions for the allocation of integer battalions to the battlefields. The problem becomes much more complicated in this case. But he is able to show that the players should still stay in the mentioned interval $[0,2a]$.

There are already some experimental investigations of the CB game. Most of them support the theoretical predictions. For example, Chowdhury et al. (2013) find evidence that stronger players try to win all battlefields. In contrast, subjects use a "Guerilla Strategy" if they are in the position of the weaker player. Avrahami and Kareev (2009) also observe that the weaker player will give up enough battlefields to compete on the

[9] Roberson (2006) analyzes this asymmetric case under the assumption that the following condition is fulfilled: $2/n \cdot X_A \leq X_B$. This implies that the battalion's strength of player B is not too weak compared to player A.

other battlefields with the stronger player. Modzelweski et al. (2009) use five battlefields and observe that many subjects play a "High-Stakes-on-3-Battlefields" strategy. This strategy implies that subjects send no or only very few troops to two battlefields, but a high amount of troops is sent to each of the three remaining battlefields. Interestingly, Chowdhury et al. (2013) find that if the participants are regrouped, they often allocate exactly the same amount of troops to a battlefield. These "hot box" strategy diminishes when the subjects play against the same opponent. Although some experimental research is done, the CB Game is never conducted in a framed context with loaded instructions. Moreover, this game theoretical approach is not applied for an audit context so far.

### 3.4 Results

In our analysis, we focus on three dependent variables: (1) the number of clients the Type-1-Audit-Firm has acquired, (2) the planned quality level per acquired client, and (3) the different bidding strategies.[10] With respect to the first variable, table 3 presents the descriptive statistics for the number of clients the Type-1-Audit-Firm has acquired in each treatment over all periods. Figure 3 displays the number of clients on average for each period and treatment. As expected, we observe that both types of audit firms share the clients equally in the 1000-1000-Treatment irrespective of whether four or eight clients are obtainable. In this case, we do not find any significant differences between both types ($p = 0.43$ for the 4-Clients-Treatment, $p = 0.15$ for the 8-Clients-Treatment, Wilcoxon signed-rank test, two-tailed). In the 1000-600-Treatment, we find that the Type-1-Audit-Firm acquires more clients than the Type-2-Audit-Firm. The Type-1-Audit-Firm gains 2.92 clients in the 4-Clients-Treatment and 5.52 clients in the 8-Clients-Treatment on average. The differences between both types are highly significant ($p < 0.001$ for the 4-Clients-Treatment, $p < 0.001$ for the 8-Clients-Treatment, Wilcoxon signed-rank test, two-tailed). With respect to the decision pattern over time (see figure 3), we do not find

[10] Our results are in line with the theoretical prediction of the Colonel Blotto Game that each subject makes a bid in-between 0 and 500 in the 4-Clients-Treatment and in-between 0 and 250 in the 8-Clients-Treatment (see section 3.3). Over all treatments, we observe a very high level of theory conformity. In particular, we find theory conformity in more than 98% of our cases. Since we do not observe significant differences between the treatments in this regard, we abstain from reporting these results in more detail.

any unexpected or discontinuous behavior. In contrast, the number of clients the Type-1-Audit-Firm has acquired remains almost stable over time.

With respect to the differences between the 4- and 8-Clients-Treatment, we observe (as expected) that the Type-1-Audit-Firm acquires approximately twice as much clients in the latter than in the first case ($3.90 \approx 3.92 = 2 \cdot 1.96$) in the 1000-1000-Treatment. However, in the 1000-600-Treatment, we find that the number of acquired clients in the 8-Clients-Treatment is significantly lower than twice this value in the 4-Clients-Treatment ($5.52 < 5.84 = 2 \cdot 2.92$) although twice as much clients are obtainable ($p < 0.001$, Wilcoxon signed-rank test, two-tailed). This implies that the Type-2-Audit-Firm (with the lower endowment of 600) is able to acquire more clients relatively and therefore is better off if more clients do exist in the tendering process. As a consequence for real markets, if the competitiveness of smaller audit firms should be enhanced, the legislator should ensure that more audit clients are tendered.

| | | **4-Clients-Treatment** | **8-Clients-Treatment** |
|---|---|---|---|
| **1000-1000-Treatment** | mean | 1.96 | 3.90 |
| | median | 2 | 4 |
| | standard deviation | 0.59 | 1.14 |
| | minimum | 1 | 1 |
| | maximum | 3 | 7 |
| | no. of observations | 165 | 180 |
| **1000-600-Treatment** | mean | 2.92 | 5.52 |
| | median | 3 | 5 |
| | standard deviation | 0.66 | 0.92 |
| | minimum | 2 | 4 |
| | maximum | 4 | 8 |
| | no. of observations | 150 | 165 |

**Table 3:** Number of clients the Type-1-Audit-Firm has acquired in experiment 1

*Note:* This table presents the descriptive statistics for the number of clients the Type-1-Audit-Firm (with an endowment of 1,000) has acquired in each treatment of experiment 1 over all periods.

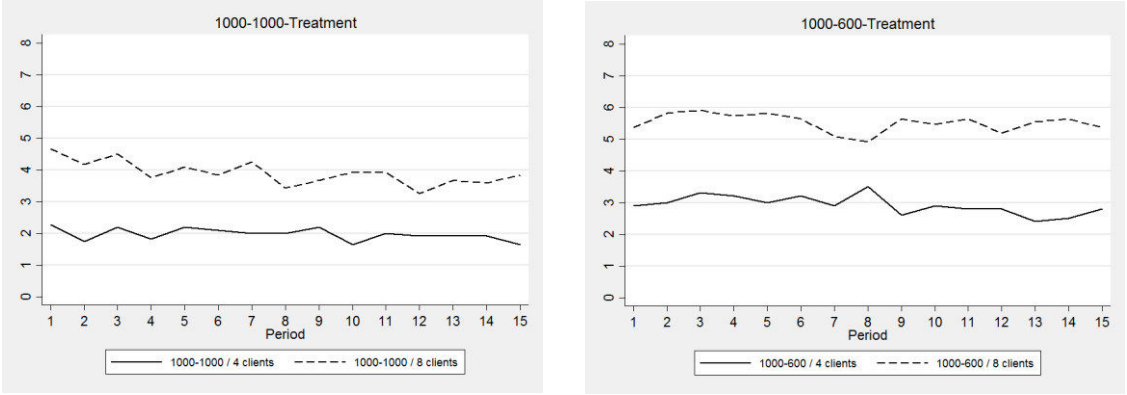


**Figure 3:** Average number of clients the Type-1-Audit-Firm has acquired in experiment 1
*Note:* In this figure the average number of clients the Type-1-Audit-Firm has acquired is displayed for each period and treatment.

In table 4, we present the mean planned quality level (in hours) per acquired client in each treatment and over all periods. Since both types of audit firms face the same endowment of 1,000 hours in the 1000-1000-Treatment and therefore are confronted with absolute the same decision problem, we do not differentiate between both types in this case. Irrespective of whether we look at the 1000-1000 or 1000-600 scenario, we observe (as expected due to our design) that the planned quality level when four clients are obtainable is approximately twice as high as the level with eight clients. For example, the mean quality level is 354.2 with four clients and 176.1 with eight clients in the 1000-1000-Treatment. All differences are highly significant ($p < 0.001$ for all "four vs. eight clients" comparisons, Mann-Whitney U test, two-tailed). More surprisingly, in the 1000-600-Treatment, we find that Type-2-Audit-Firms provide a significantly higher planned quality level per acquired client than Type-1-Audit-Firms independent of whether four or eight clients are obtainable ($p < 0.001$ for both the 4- or 8-Clients-Treatment, Mann-Whitney U test, two-tailed). For instance, the mean planned quality level is 311.4 of the Type-2-Audit-Firms whereas the Typ-1-Audit-Firms only provide a planned quality level of 269.2 on average per acquired client in the 4-Clients-Treatment. Therefore, the planned quality level of an audit is higher if the client is acquired by a small audit firm. For real markets, this implies that increasing the number of smaller audit firms could increase the planned quality level of the audit market as well.

| | | Typ-1-Audit-Firm | Typ-2-Audit-Firm |
|---|---|---|---|
| **1000-1000-Treatment** | 4-Clients-Treatment | 354.2 | |
| | 8-Clients-Treatment | 176.1 | |
| **1000-600-Treatment** | 4-Clients-Treatment | 269.2 | 311.4 |
| | 8-Clients-Treatment | 137.7 | 149.7 |

**Table 4:** Planned audit quality level on average per acquired client in experiment 1

*Note:* This table presents the planned audit quality level (in hours) on average per acquired client in each treatment of experiment 1 over all periods. Since both types of audit firms face the same endowment of 1,000 hours in the 1000-1000-Treatment and therefore are confronted with absolute the same decision problem, we do not differentiate between both types in this case.

To confirm these descriptive results, we run linear regressions for our asymmetric 1000-600-Treatments. Since subjects face repeated decision situations, we run linear regression models with random effects, where the period number is the time variable and the subject's identity number is the cross-sectional variable. In model 1, the dependent variable is the number of acquired clients in a period. In model 2, we use the mean quality level (in hours) per acquired client in a period as dependent variable.[11] The results of both models are displayed in table 5 (regression coefficients, robust standard errors in parentheses clustered at the subject level). In both models, we regress on two dummy variables. The dummy "Type-2-Audit-Firm" takes the value 1 if a subject acts as a manager of a Type-2-Audit-Firm and 0 in case of a Type-1-Audit-Firm. The dummy "8-Clients-Treatment" takes the value 1 if a subject participated in the 8-Clients-Treatment and 0 if a subject was assigned to the 4-Clients-Treatment. As controls, we use the number of periods ("period") to control for time effects, "age", "gender" (female = 0, male = 1), "economics major" (1 if subject studies economics or management, 0 otherwise), "bachelor's degree" (1 if subject studies in a bachelor's degree program, 0 otherwise), "number of semesters studied", "risk aversion" denotes the total number of low risk lottery choices in the Holt-Laury-Task (i.e., lottery A) and is our measure for subject's risk aversion (measured on an 11-point Likert scale where 0 = very risk seeking and 10 = very risk averse), "income" is the monthly income after fixed cost (in Euro).

[11] In each case in which a subject is not able to acquire a client in one period, the dependent variable mean quality level (in hours) per acquired client is not defined (i.e., missing value). That's why the number of observations is lower in model 2 than in model 1.

Our previous findings observed in the asymmetric 1000-600-Treatments are confirmed by both regression analyses. In particular, we observe that Type-2-Audit-Firms significantly acquire less audit clients than Type-1-Audit-Firms (see model 1). However, the planned audit quality is significantly higher if an audit client is acquired by a Type-2-Audit-Firm (see model 2). Not surprisingly, it turns out that subjects significantly acquire more clients in the 8-Clients-Treatment (model 1) and that the mean quality level per acquired client decreases if eight instead of four clients are available (model 2). In both models, the variable period has no significant influence which indicates that our results are stable over time. With respect to the demographic variables, we observe that age and economics major (bachelor's degree) have a positive and significant influence on the number of acquired clients (mean quality level per acquired client). However, even if we control for these demographic characteristics, our previous findings are supported.

| Model | model 1 | model 2 |
|---|---|---|
| **Dependent variable** | **number of acquired clients** | **mean planned quality level (in hours) per acquired client** |
| Type-2-Audit-Firm | -2.6220*** | 23.0915** |
| | (0.1527) | (9.4883) |
| 8-Clients-Treatment | 2.1266*** | -150.0785*** |
| | (0.1550) | (12.8636) |
| period | -0.0009 | -0.1839 |
| | (0.0108) | (0.5534) |
| age | 0.0467*** | 1.3831 |
| | (0.0143) | (1.1208) |
| gender | 0.0197 | 11.9120 |
| | (0.1475) | (11.7863) |
| economics major | 0.3909** | -10.4655 |
| | (0.1732) | (20.3192) |
| bachelor's degree | 0.0622 | 20.2217** |
| | (0.2043) | (8.1543) |
| no of semesters studied | 0.0114 | 0.3505 |
| | (0.0337) | (1.3858) |
| risk aversion | -0.0470 | -0.8724 |
| | (0.0638) | (3.8060) |
| income | -0.0002 | -0.0123 |
| | (0.0003) | (0.0223) |
| constant | 2.2160*** | 234.3635*** |
| | (0.4946) | (31.5960) |
| observations | 615 | 584 |
| no. of subjects | 41 | 41 |
| R-sq within | 0.0000 | 0.0006 |
| R-sq between | 0.9301 | 0.8721 |
| R-sq overall | 0.7808 | 0.7388 |

**Table 5:** Linear regression models with random effects (1000-600-Treatments, experiment 1)

*Note:* In this table, the results of linear regression models with random effects (where the period number is the time variable and the subject's identity number is the cross-sectional variable) are presented (regression coefficients, robust standard errors in parentheses clustered at the subject level). In model 1, the dependent variable is the number of acquired clients in a period. In model 2, we use the mean planned quality level (in hours) per acquired client in a period as dependent variable. In both models, we regress on two dummy variables. The dummy "Type-2-Audit-Firm" takes the value 1 if a subject acts as a manager of a Type-2-Audit-Firm and 0 in case of a Type-1-Audit-Firm. The dummy "8-Clients-Treatment" takes the value 1 if a subject participated in the 8-Clients-Treatment and 0 if a subject was assigned to the 4-Clients-Treatment. As controls, we use the number of periods ("period") to control for time effects, "age", "gender" (female = 0, male = 1), "economics major" (1 if subject studies economics or management, 0 otherwise), "bachelor's degree" (1 if subject studies in a bachelor's degree program, 0 otherwise), "number of semesters studied", "risk aversion" denotes the total number of low risk lottery choices in the Holt-Laury-Task (i.e., lottery A) and is our measure for subject's risk aversion (measured on an 11-point Likert scale where 0 = very risk seeking and 10 = very risk averse), "income" is the monthly income after fixed cost (in Euro). *** $p \leq 0.01$, ** $p \leq 0.05$, * $p \leq 0.1$.

To analyze the acquisition strategies of the two types of audit firms in the tendering process, we define different strategies dependent on the chosen quantity levels. Each

allocation (i.e., chosen hours per client in a period) is assigned to one of these strategies. Since the decision behavior is in all periods similar, we only categorize the decisions made in the last five periods. In each of these periods, we use each allocation of an audit firm for our categorization. In the 4-Clients-Treatment, we distinguish four strategies. The "High-Stakes-On-4-Clients" strategy implies that an audit firm put a high stake of the available hours on every client. For example, if an audit firm shares the available hours equally across all clients (i.e., 250-250-250-250), we will define that this audit firm pursues a "High-Stakes-On-4-Clients" strategy. However, other combinations in which a high stake of hours is allocated on all clients (like 250-250-300-200 or 200-200-300-300, for example) are assigned to this strategy as well. The "High-Stakes-On-3-Clients" strategy mirrors allocations where a large share of the available hours is allocated on three clients and nothing or only some hours are allocated on the fourth client (for example, 300-300-400-0 or 310-300-330-60). The "High-Stakes-On-2-Clients" and the "High-Stake-On-1-Client" strategy are defined accordingly. In appendix A2, tables A1 to A3 give a detailed overview on the observed allocations and the corresponding strategy assignments. The same procedure is applied in the 8-Clients-Treatment. However, eight different strategies are defined. In tables A4 to A6 in appendix A3, the different allocations and assignments are presented for this treatment.

With respect to the 4-Clients-Treatment, table 6 presents the distribution of revealed strategies. The mean number of acquired clients resulting from a strategy is displayed in brackets. Since both types of audit firms face the same endowment of 1,000 hours in the 1000-1000-Treatment, we do not differentiate between both types again. In this case, the "High-Stakes-On-2-Clients" and "High-Stakes-On-3-Clients" are the most chosen strategies (approximately 75% of all allocations). Interestingly, the "High-Stakes-On-4-Clients" strategy is only chosen in 22.7% of the cases. However, the mean number of acquired clients is almost the same for all three strategies (approximately 2 clients). In the asymmetric 1000-600 case, most of the Type-1-Audit-Firms (62.0%) apply a "High-Stakes-On-4-Clients" strategy. The "High-Stakes-On-3-Clients" strategy is only chosen in 36.0% of the cases, but results in the same number of acquired clients (approximately 2.7 clients). With respect to the Type-2-Audit-Firms, we observe that 88.0% of all allocations are assigned to the "High-Stakes-On-2-Clients" strategy and we find that this strategy leads to the highest number of acquired clients (1.41). To summarize: If two big

audit firms are competing (1000-1000-Treatment), we do not observe that they invest high stakes on each client. Instead, "High-Stakes-On-2-Clients" and "High-Stakes-On-3-Clients" strategies are predominantly. In contrast, if one big and one small audit firm are competing (1000-600-Treatment), the big audit firm tries to acquire all clients generally by applying a "High-Stakes-On-4-Clients" strategy. The small audit firm uses a clear "Guerilla Strategy" which means that the firm concentrates only on two clients whereas the other two clients are completely ignored.

| **Strategy** | **1000-1000-Treatment** | **1000-600-Treatment** | |
|---|---|---|---|
| | Type-1- and Type-2-Audit-Firm | Type-1-Audit-Firm | Type-2-Audit-Firm |
| High-Stake-On-1-Client | 0.9%<br>(1.00) | 0.0%<br>(NA) | 0.0%<br>(NA) |
| High-Stakes-On-2-Clients | **40.9%**<br>**(2.04)** | 2.0%<br>(2.00) | **88.0%**<br>**(1.41)** |
| High-Stakes-On-3-Clients | **35.5%**<br>**(2.05)** | 36.0%<br>(2.67) | 8.0%<br>(0.75) |
| High-Stakes-On-4-Clients | 22.7%<br>(1.92) | **62.0%**<br>**(2.70)** | 4.0%<br>(1.0) |

**Table 6:** Revealed acquisition strategies in the 4-Clients-Treatment

*Note:* This table presents the distribution of revealed strategies over all periods separated by treatment. The mean number of acquired clients resulting from a strategy is displayed in brackets. Since both types of audit firms face the same endowment of 1,000 hours in the 1000-1000-Treatment and therefore are confronted with absolute the same decision problem, we do not differentiate between both types in this case. If data is not available, this is denoted by "NA".

Table 7 presents the corresponding analysis for the 8-Clients-Treatment. In the symmetric 1000-1000 case, the audit firms mainly choose a "High-Stakes-On-5-Clients" with a mean number of acquired clients of 4.05. Although other strategies are chosen less often, they are similar effectively. For example, the "High-Stakes-On-4-Clients" ("High-Stakes-On-7-Clients") strategy leads to a mean of 4.17 (4.40). In the asymmetric 1000-600 case, there is no predominant strategy of the Type-1-Audit-Firms. Instead, many different strategies are applied. With respect to the Type-2-Audit-Firms, we observe that over 90% use a "High-Stakes-On-3-Clients" (56.4%) or "High-Stakes-On-4-Clients" (34.6%) strategy resulting in a mean number of acquired clients of approximately 2.6. To summarize: The behavior in the symmetric case is very similar to the behavior revealed in the 1000-1000-Treatment with 4 clients. In both environments, the audit firms do not invest high stakes on each client. In the asymmetric case, the big audit firms apply many different strategies. This is in contrast to the 4-Clients-Treatment where a clear "High-Stakes-On-All-Clients" strategy was revealed. The small audit firms again use a clear

"Guerilla Strategy" which means that each firm concentrates only on three or four clients whereas the other clients are completely ignored.

| Strategy | 1000-1000-Treatment | 1000-600-Treatment | |
|---|---|---|---|
| | Type-1- and Type-2-Audit-Firm | Type-1-Audit-Firm | Type-2-Audit-Firm |
| High-Stake-On-1-Client | 0.0% (NA) | 7.3% (5.0) | 5.5% (1.67) |
| High-Stakes-On-2-Clients | 0.0% (NA) | 10.9% (5.67) | 1.8% (3.00) |
| High-Stakes-On-3-Clients | 2.5% (4.00) | **14.6% (5.00)** | **56.4% (2.61)** |
| High-Stakes-On-4-Clients | 20.0% (4.17) | **29.1% (5.94)** | **34.6% (2.63)** |
| High-Stakes-On-5-Clients | **60.0% (4.05)** | 5.5% (5.67) | 0.0% (NA) |
| High-Stakes-On-6-Clients | 9.2% (3.64) | **14.6% (6.00)** | 1.8% (1.00) |
| High-Stakes-On-7-Clients | 4.2% (4.40) | 0.0% (NA) | 0.0% (NA) |
| High-Stakes-On-8-Clients | 4.2% (3.00) | **18.2% (4.80)** | 0.0% (NA) |

**Table 7:** Revealed acquisition strategies in the 8-Clients-Treatment
*Note:* This table presents the distribution of revealed strategies over all periods separated by treatment. The mean number of acquired clients resulting from a strategy is displayed in brackets. Since both types of audit firms face the same endowment of 1,000 hours in the 1000-1000-Treatment and therefore are confronted with absolute the same decision problem, we do not differentiate between both types in this case. If data is not available, this is denoted by "NA".

# 4 Experiment 2

## 4.1 Experimental Design and Treatments

In our first experiment, if an audit firm acquires an audit client, this will effect only the current period, but has no effect on future audit tendering processes. However, in real markets we would expect a positive effect of an acquired client on the competitiveness of the audit firm. This higher level of competitiveness can, for example, be explained by a higher level of reputation or experience resulting from current audit clients or simply by the fact that an acquired client has a positive effect on the budget of an audit firm which can increase the planned audit quality finally. In turn, a higher level of competitiveness will increase the probability that this audit firm acquires clients in the future. As a

consequence, such effects will have an important influence on the development of the audit market.

To capture these effects, we modify the experiment with respect to the endowment of hours at the beginning of each period.[12] Whereas this endowment is constant in every period in the first experiment (either 1,000 or 600 hours), the endowment of the next period now depends on the number of acquired clients in the current period. In particular, each acquired client increases the endowment of the next period by a constant amount. Dependent on the treatment, this accumulation amount is either 30 (*Accumulation-30-Treatment*) or 60 hours (*Accumulation-60-Treatment*) for both types of audit firms. To allow for a comparison of both experiments, we use the (constant) endowments of the first experiment as the initial endowment in the second experiment. Therefore, the initial endowment in the first period is either 1,000 or 600 hours. For each acquired client, this endowment increases by either 30 or 60 hours.[13] For the first case, for example, if an audit firm is confronted with an initial endowment of 1,000 and acquires three clients in period 1, the endowment is 1,090 $(=1{,}000+3\cdot 30)$ at the beginning of period 2. If this firm acquires five clients in period 2, the endowment is 1,240 $(=1{,}090+5\cdot 30)$ at the beginning of period 3 and so on.

The main purpose of this new experimental environment is to investigate the development and the dynamic effects on a market with a big (first-tier) and a small (second-tier) audit firm. In particular, we want to analyze whether a big audit firm is able to decrease the market share of the small audit firm markedly or is even able to push the small audit firm out of the market. As a consequence, we only apply the asymmetric case in which the Type-1-Audit-Firm (Type-2-Audit-Firm) is initially endowed with 1,000 (600) hours.[14] In the first experiment, we observed that the small audit firms are better off if eight instead

[12] Instructions are presented in appendix A1.3.

[13] Since we do not distinguish between the clients who can be acquired (i.e., one client is of equal value as another client), we use the same constant accumulation amount for each acquired client.

[14] Although we apply the asymmetric 1000-600 case, we decided to use the same accumulation amount for both audit types. This implies that one acquired audit client has an identical impact on the endowment for the small as for the big audit firm in absolute terms, but a greater impact in relative terms. Although other constellations are theoretically possible in real markets, we do not have evidence that a small audit firm would generally benefit less or more than a big audit firm in absolute terms from the same client. In experiment 1, we assume a rent when a client is acquired. This rent is the same for a small and a big audit firm. Thus, with the assumption that an acquired audit client has an identical impact on the endowment of the small and the big audit firm, both settings are comparable with each other.

of four clients do exist (see section 3.4 and table 3). To lower the probability that subjects who fill the role of the small audit firm are not able to acquire clients after some periods (in the cases when the big audit firm is too big) and therefore are not able to earn money from this experiment, we decided to only investigate the case with eight clients.[15] The 1000-600-Treatment with eight clients (but without accumulation) from the first experiment is used for comparison and serves as a reference treatment. In the following, we call this treatment *No-Accumulation-Treatment*. Table 8 gives an overview on our (between-subject design) treatments including the number of participants per treatment.

| | **No-Accumulation-Treatment** | **Accumulation-30-Treatment** | **Accumulation-60-Treatment** |
|---|---|---|---|
| Number of clients | 8 | 8 | 8 |
| Initial endowment of Type-1-Audit-Firm | 1,000 | 1,000 | 1,000 |
| Initial endowment of Type-2-Audit-Firm | 600 | 600 | 600 |
| Accumulation amount (for both types of audit firms) | 0 | 30 | 60 |
| No. of subjects | 22 | 22 | 26 |

**Table 8:** Overview on treatments in experiment 2

*Note:* This table highlights the differences between the (between-subject design) treatments in our second experiment. Note that the 1000-600-Treatment with eight clients (but without accumulation) from the first experiment is used for comparison and serves as a reference treatment (No-Accumulation-Treatment).

## 4.2 Results

We focus on four dependent variables: (1) the number of clients the Type-1-Audit-Firm has acquired, (2) the relation between the endowments (in hours) of Type-1- and Type-2-Audit-Firm after accumulation, (3) the planned quality level per acquired client, and (4) the different bidding strategies. Table 9 presents the descriptive statistics for the number

[15] Compared to the first experiment, we only modify how the endowment of one period is determined. Everything else is kept constant. In particular, each group still consists of two audit firm types who compete in 15 periods whereas one period is chosen randomly at the end of the experiment to determine payoff. The only exemption is that we now use three instead of two training periods, since the decision problem in the second experiment is a little bit more complicated than in the first experiment. Analogously to the first experiment, the audit firm with the highest number of audit hours at the beginning of a period, will win the bid if both audit firms allocated the same amount of audit hours to a client.

of clients the Type-1-Audit-Firm has acquired in each treatment over all periods. Figure 4 displays the number of clients on average for each period and treatment. As observed in the first experiment, the number of clients the Type-1-Audit-Firm has acquired remains almost stable and constant over time. Especially in the Accumulation-60-Treatement, we observe that approximately six clients are acquired on average by the Type-1-Audit-Firm in every single period. Again, we find that Type-1-Audit-Firms acquire more clients than Type-2-Audit-Firms. Over all periods, the Type-1-Audit-Firm gains 5.24 (5.93) clients in the Accumulation-30-Treatment (Accumulation-60-Treatment) on average. The differences between the Type-1- and Type-2-Audit-Firm are highly significant in all treatments ($p < 0.001$, Wilcoxon signed-rank test, two-tailed).

With respect to the differences between the treatments, we observe only small differences. On average, the number of clients is 5.24 and 5.52 in the Accumulation-30- and No-Accumulation-Treatment, respectively. Over all periods, this difference is statistically significant at the 5%-level ($p = 0.033$, Mann-Whitney U test, two-tailed). However, figure 4 reveals that both treatments differ only in the first 6 periods. In later periods, the results look very similar. If we take, for example, the results of the last 10 periods only, no statistically significant difference is observed ($p = 0.473$, Mann-Whitney U test, two-tailed). Therefore, we can conclude that the number of clients acquired by the Type-1-Audit-Firm is the same in the Accumulation-30- and No-Accumulation-Treatment. In the Accumulation-60-Treatment, we observe a mean number of clients of 5.93. Although this value is only slightly different to the values of the other two treatments, the differences are statistically significant at the 1%-level ($p < 0.001$ for both comparisons, Mann-Whitney U test, two-tailed).

| | **No-Accumulation-Treatment** | **Accumulation-30-Treatment** | **Accumulation-60-Treatment** |
|---|---|---|---|
| mean | 5.52 | 5.24 | 5.93 |
| median | 5 | 5 | 6 |
| standard deviation | 0.92 | 1.29 | 1.05 |
| minimum | 4 | 2 | 4 |
| maximum | 8 | 8 | 8 |
| no. of observations | 165 | 165 | 195 |

**Table 9:** Number of clients the Type-1-Audit-Firm has acquired in experiment 2

*Note:* This table presents the descriptive statistics for the number of clients the Type-1-Audit-Firm (with an initial endowment of 1,000) has acquired in each treatment of experiment 2 over all periods. The results of the 1000-600-Treatment with 8 clients from the first experiment are displayed for comparison ("No-Accumulation-Treatment").

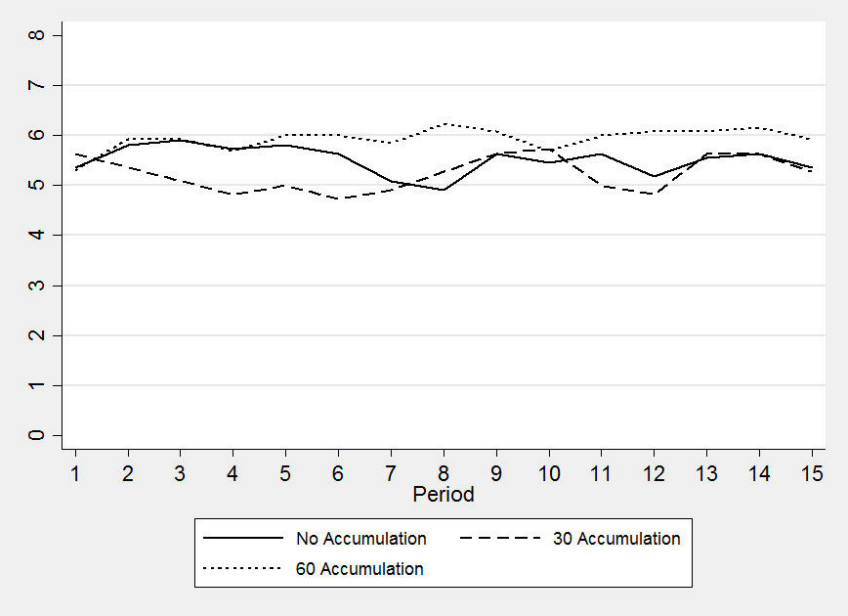


**Figure 4:** Average number of clients the Type-1-Audit-Firm has acquired in experiment 2
*Note:* In this figure the average number of clients the Type-1-Audit-Firm has acquired is displayed for each period and treatment. The results of the 1000-600-Treatment with 8 clients from the first experiment are displayed for comparison ("No Accumulation").

Figure 5 presents the mean relation between the endowments (in hours) of Type-1- and Type-2-Audit-Firm after accumulation (i.e., the endowment available in the next period) for each treatment and period. Since an acquired client does not increase the endowment of the next period in the No-Accumulation-Treatment, the relation is constant (1.667 = 1000/600) in this case. In both treatments with accumulation, we observe an increase of the relation. This implies that the Type-1-Audit-Firms benefit from their superior starting position with an initial endowment of 1,000 audit hours and are able to increase their endowment in the following periods much more than the Type-2-Audit-Firms with an initial endowment of only 600 hours. Whereas the increase is moderate in the Accumulation-30-Treatment, we observe a sharp increase in the Accumulation-60-Treatment.[16] All differences between the treatments are statistically significant ($p < 0.001$ for all three treatment comparisons, Mann-Whitney U test, two-tailed).

Although we expected this development, we are surprised that the permanent improvement of the competitiveness level of Type-1-Audit-Firms did not lead to an

[16] The mean endowment after accumulation is 1,477 / 2,234 / 3,032 (843 / 1,286 / 1,688) in the periods 1-5 / 6-10 / 11-15 for the Type-1-Audit-Firms (Type-2-Audit-Firms) in the Accumulation-30-Treatment. The values for the Accumulation-60-Treatment are 2,025 / 3,810 / 5,611 (1,015 / 1,630 / 2,229), respectively.

increased number of acquired clients. In contrast, the average number of clients acquired by this type of audit firm remains almost stable over the periods (see figure 4). This is especially unexpected in the Accumulation-60-Treatment. Here, we observe a heavy increase of endowment relation (from 1.667 in the beginning to 2.834 in the last period), but a nearly constant number of acquired clients of approximately 6. Furthermore, if we focus on the last period only, we observe a 70% higher endowment relation on average in the Accumulation-60- than in the No-Accumulation-Treatment (2.834/1.667), but the number of clients acquired by the Type-1-Audit-Firms is only about 10% higher (5.92/5.36). In the Accumulation-30-Treatment the relation is about 18% higher than in the No-Accumulation-Treatment (1.965/1.667), but the number of acquired clients is even slightly lower (5.27 vs. 5.36). As a consequence, we can summarize: Although the competitive advantage increases over-proportionally over time, we do not observe that our big audit firms (i.e., Type-1-Audit-Firms) are able to decrease the market share of the small audit firms markedly or are even able to push the small audit firms out of the market.

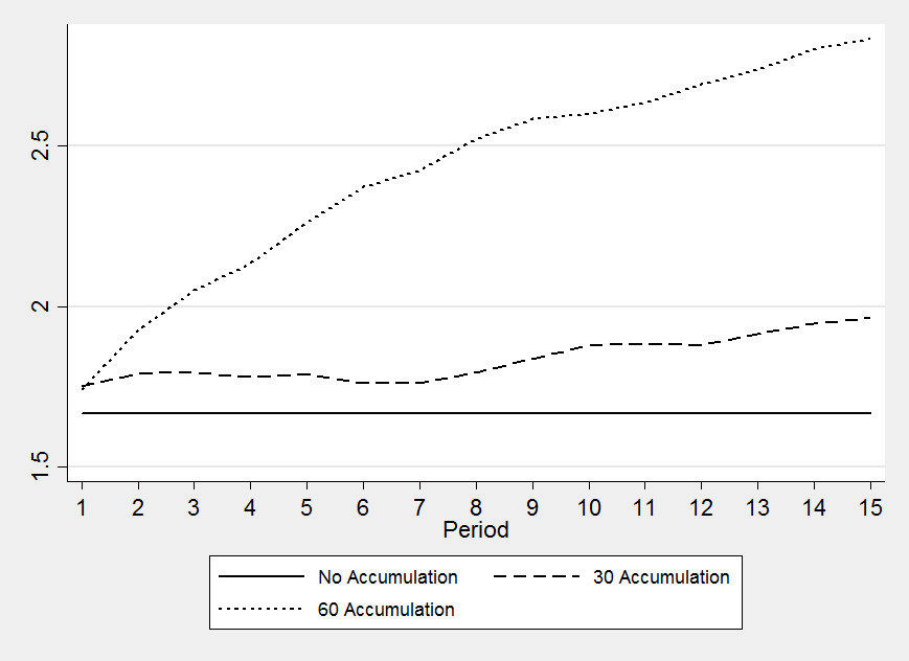


**Figure 5:** Mean relation between the endowments (in hours) of Type-1- and Type-2-Audit-Firm after accumulation

*Note:* In this figure the mean relation between the endowments (in hours) of Type-1- and Type-2-Audit-Firm after accumulation (i.e., endowment available in the next period) is displayed for each period and treatment. The constant relation of 1.667 (= 1000/600) of the 1000-600-Treatment from the first experiment is displayed for comparison ("No Accumulation").

Table 10 presents the planned quality level (in hours) on average per acquired clients for each type of audit firm over all periods and figure 6 displays the planned audit quality level over time. In line with the results from the first experiment, we observe that Type-2-Audit-Firms provide a significantly higher planned quality level per acquired client than Type-1-Audit-Firms in both accumulation treatments ($p < 0.001$ for both the Accumulation-30- and Accumulation-60-Treatment, Mann-Whitney U test, two-tailed). In fact, the difference is even more pronounced in these treatments than in the No-Accumulation-Treatment (see table 10). Although the endowment relation increases in favor of Type-1-Audit-Firms in both accumulation treatments, figure 6 reveals that the planned audit quality level gap between Type-2- and Type-1-Audit-Firms increases slightly over time (especially in the Accumulation-60-Treatment). Again, we can conclude that the planned audit quality level of an audit is significantly higher if the client is acquired by a small audit firm.

| | **Typ-1-Audit-Firm** | **Typ-2-Audit-Firm** |
|---|---|---|
| **No-Accumulation-Treatment** | 137.7 | 149.7 |
| **Accumulation-30-Treatment** | 286.6 | 343.0 |
| **Accumulation-60-Treatment** | 445.7 | 550.8 |

**Table 10:** Planned audit quality level on average per acquired client in experiment 2
*Note:* This table presents the planned audit quality level (in hours) on average per acquired client in each treatment of experiment 2 over all periods. The results of the 1000-600-Treatment with 8 clients from the first experiment are displayed for comparison ("No-Accumulation-Treatment").

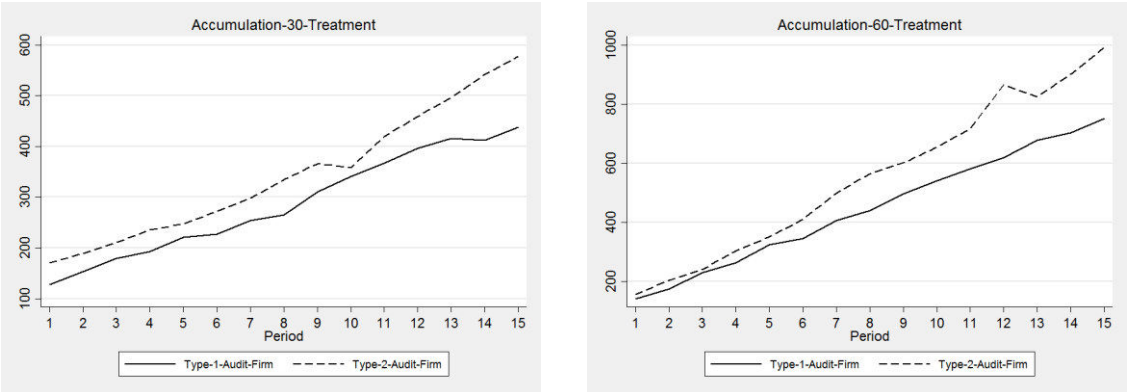


**Figure 6:** Planned audit quality level on average per acquired client in experiment 2
*Note:* In this figure the planned audit quality level (in hours) on average per acquired client in experiment 2 is displayed for each period and treatment.

To confirm these descriptive results, we run linear regression models with random effects, again. We use the same approach as described in section 3.4 (table 5). In model 3 to 5, the dependent variable is the number of acquired clients in a period. In model 6, we use the mean quality level (in hours) per acquired client in a period as dependent variable. The results of these models are displayed in table 11 (regression coefficients, robust standard errors in parentheses clustered at the subject level). To analyze the treatment effects, we use treatment dummy variables. The dummy variable "Accumulation-30-Treatment" ("Accumulation-60-Treatment") takes the value 1 if a subject participated in the Accumulation-30-Treatment (Accumulation-60-Treatment) and 0 otherwise. The No-Accumulation-Treatment serves as the default and, therefore, the coefficient of each treatment dummy measures the difference between the respective treatment and the No-Accumulation-Treatment. After each regression, we conducted Wald tests to analyze whether the coefficients of both treatment dummy variables differ significantly. The resulting p-values are presented at the end of the table.

In model 3 in which the data of Type-1- and Type-2-Audit-Firms is considered, we observe that Type-2-Audit-Firms significantly acquire less audit clients. This supports our previous finding. Although we observed slight differences between the treatments in our descriptive analyses, the treatment coefficients are not significant and the Wald test indicates that there is no difference between both accumulation treatments. However, we split the data to analyze the treatment differences further. In model 4, in which only Type-1-Audit-Firms are considered, we observe no significant differences between each accumulation treatment and the No-Accumulation-Treatment, again, but a significant difference between both accumulation treatments ($p = 0.0092$). This implies that Type-1-Audit-Firms are able to significantly acquire more audit clients in the Accumulation-60- than in the Accumulation-30-Treatment. This result is supported by model 5 in which only Type-2-Audit-Firms are considered. In particular, Type-2-Audit-Firms acquire significantly less audit clients in the former than in the latter treatment ($p = 0.0004$). Furthermore, we observe that Type-2-Audit-Firms are able to acquire more clients in the No-Accumulation- than in the Accumulation-60-Treatment (significant at the 10%-level). However, the difference between the No-Accumulation- and Accumulation-30-Treatment is not significant, again. In all three models, the variable period is not significant which indicates that our results are stable over time. In model 6, we are able

to confirm our previous result that the planned audit quality is significantly higher when the audit client is acquired by a Type-2-Audit-Firm. As each acquired client leads to an increase of the endowment of hours, it is not surprising that both treatment dummy variables and the variable period have positive and highly significant coefficients.

| **Model** | **model 3** | **model 4** | **model 5** | **model 6** |
|---|---|---|---|---|
| **Dependent variable** | **number of acquired clients** | **number of acquired clients** | **number of acquired clients** | **mean planned quality level (in hours) per acquired client** |
| **Type of audit firm** | **Type-1- and Type-2-Audit-Firms** | **Only Type-1-Audit-Firms** | **Only Type-2-Audit-Firms** | **Type-1- and Type-2-Audit-Firms** |
| Type-2-Audit-Firm | -3.1234*** | | | 61.6302*** |
| | (0.1856) | | | (11.7198) |
| Accumulation-30-Treatment | -0.0413 | -0.6254 | 0.4168 | 170.7100*** |
| | (0.2977) | (0.4628) | (0.3086) | (14.7460) |
| Accumulation-60-Treatment | 0.0412 | 0.2998 | -0.5502* | 347.3319*** |
| | (0.2279) | (0.2830) | (0.2927) | (15.6884) |
| period | -0.0027 | 0.0054 | -0.0106 | 27.1682*** |
| | (0.0094) | (0.0133) | (0.0134) | (2.8434) |
| age | 0.0055 | -0.0700 | 0.0876** | -7.4968** |
| | (0.0435) | (0.0721) | (0.0432) | (3.2244) |
| gender | -0.3271* | -0.4909* | -0.1294 | -5.2994 |
| | (0.1974) | (0.2550) | (0.2225) | (11.0230) |
| economics major | -0.0024 | -0.0504 | 0.3339 | -11.3833 |
| | (0.2175) | (0.3068) | (0.2541) | (11.8566) |
| bachelor's degree | 0.0456 | 0.4948 | -0.3601 | -44.1147* |
| | (0.3481) | (0.4808) | (0.3029) | (24.1958) |
| no of semesters studied | 0.0176 | 0.0863 | -0.0759 | 6.2786* |
| | (0.0511) | (0.0549) | (0.0784) | (3.3476) |
| risk aversion | 0.0658 | 0.1596** | -0.0120 | -1.3348 |
| | (0.0654) | (0.0802) | (0.0930) | (4.3592) |
| income | 0.0002 | 0.0014 | 0.0006* | 0.0315 |
| | (0.0004) | (0.0011) | (0.0003) | (0.0228) |
| constant | 5.0999*** | 5.3642*** | 1.0687 | 83.7714 |
| | (0.9930) | (1.7594) | (0.8812) | (74.3997) |
| observations | 1,005 | 495 | 510 | 982 |
| no. of subjects | 67 | 33 | 34 | 67 |
| R-sq within | 0.0002 | 0.0008 | 0.0031 | 0.5258 |
| R-sq between | 0.8162 | 0.4132 | 0.3108 | 0.9221 |
| R-sq overall | 0.6687 | 0.1978 | 0.1473 | 0.7193 |
| Wald test: Accumulation-30-TR = Accumulation-60-TR | p=0.7540 | p=0.0092 | p=0.0004 | p<0.0001 |

**Table 11:** Linear regression models with random effects (No Accumulation-Treatment, Accumulation-30-Treatment, Accumulation-60-Treatment, experiment 2)

*Note:* In this table, the results of linear regression models with random effects (where the period number is the time variable and the subject's identity number is the cross-sectional variable) are presented

(regression coefficients, robust standard errors in parentheses clustered at the subject level). In model 3 to 5, the dependent variable is the number of acquired clients in a period. In model 6, we use the mean planned quality level (in hours) per acquired client in a period as dependent variable. In models 3 and 6, we regress on the dummy variable "Type-2-Audit-Firm" which takes the value 1 if a subject acts as a manager of a Type-2-Audit-Firm and 0 in case of a Type-1-Audit-Firm. The dummy variable "Accumulation-30-Treatment" ("Accumulation-60-Treatment") takes the value 1 if a subject participated in the Accumulation-30-Treatment (Accumulation-60-Treatment) and 0 otherwise. The No-Accumulation-Treatment serves as the default. The resulting p-values of Wald tests analyzing whether the coefficients of both treatment dummy variables differ significantly are presented at the end of this table. As controls, we use the number of periods ("period") to control for time effects, "age", "gender" (female = 0, male = 1), "economics major" (1 if subject studies economics or management, 0 otherwise), "bachelor's degree" (1 if subject studies in a bachelor's degree program, 0 otherwise), "number of semesters studied", "risk aversion" denotes the total number of low risk lottery choices in the Holt-Laury-Task (i.e., lottery A) and is our measure for subject's risk aversion (measured on an 11-point Likert scale where 0 = very risk seeking and 10 = very risk averse), "income" is the monthly income after fixed cost (in Euro). *** $p \leq 0.01$, ** $p \leq 0.05$, * $p \leq 0.1$.

In table 12, we present the results of two linear regressions (model 7 and 8) with the endowment of hours after accumulation (i.e., endowment of hours available in the next period) as dependent variable. As independent variables, we use the dummy variable "Type-2-Audit-Firm" and the variable "period", again. Furthermore, we regress on the interaction term "Type-2-Audit-Firm X period" to analyze the different endowment development between both types of audit firms over time. Independent of whether we focus on the Accumulation-30- (model 7) or Accumulation-60-Treatment (model 8), we observe that the endowment of hours is significantly lower for Type-2- than for Type-1-Audit-Firms. This result is not surprisingly as Type-2-Audit-Firms start with lower endowments and are generally not able to achieve the higher level of Type-1-Audit-Firms in the course of the experiment. With respect to the variable period, we observe a positive and highly significant influence on the endowment of hours. This is due to our experimental design since acquiring an audit client leads automatically to an increase of the endowment of hours in both accumulation treatments. However, the negative and highly significant interaction term "Type-2-Audit-Firm X period" indicates that the increase is much higher for Type-1- than for Type-2-Audit-Firms in both accumulation treatments. This supports our previous findings and explains the increase of the mean relation between the endowments (in hours) of Type-1- and Type-2-Audit-Firms depicted in figure 5.

| **Model** | **model 7** | **model 8** |
|---|---|---|
| **Dependent variable** | **endowment of hours after accumulation** (i.e., endowment available in the next period) | |
| **Treatment** | **Accumulation-30-Treatment** | **Accumulation-60-Treatment** |
| Type-2-Audit-Firm | -298.4374*** | -435.3122*** |
| | (82.1868) | (113.8476) |
| period | 152.1786*** | 358.6319*** |
| | (10.1096) | (13.1162) |
| Type-2-Audit-Firm X period | -67.9545*** | -234.6676*** |
| | (13.3682) | (19.1342) |
| age | 57.3086 | -8.1609 |
| | (61.1786) | (41.5475) |
| gender | -156.1100 | 128.0037 |
| | (109.7466) | (150.6692) |
| economics major | 106.6781 | -90.1329 |
| | (140.7339) | (167.0462) |
| bachelor's degree | -80.6528 | -87.6460 |
| | (241.0021) | (201.5669) |
| no of semesters studied | -8.9807 | 9.1369 |
| | (37.3700) | (31.0130) |
| risk aversion | -39.6291 | 60.7470 |
| | (54.2372) | (38.4237) |
| income | 0.4106 | 0.6244** |
| | (0.5111) | (0.2781) |
| constant | 0.5979 | 677.7690 |
| | (1,167.4662) | (930.5058) |
| observations | 300 | 375 |
| no. of subjects | 20 | 25 |
| R-sq within | 0.9418 | 0.9706 |
| R-sq between | 0.8921 | 0.9363 |
| R-sq overall | 0.9175 | 0.9543 |

**Table 12:** Linear regression models with random effects (Accumulation-30-Treatment, Accumulation-60-Treatment, experiment 2)

*Note:* In this table, the results of linear regression models with random effects (where the period number is the time variable and the subject's identity number is the cross-sectional variable) are presented (regression coefficients, robust standard errors in parentheses clustered at the subject level). The dependent variable is the endowment of hours after accumulation. In model 7 (8), we consider the results from the Accumulation-30-Treatment (Accumulation-60-Treatment). In both models, we use the number of periods ("period") to control for time effects and we regress on the dummy variable "Type-2-Audit-Firm" which takes the value 1 if a subject acts as a manager of a Type-2-Audit-Firm and 0 in case of a Type-1-Audit-Firm. The variable "Type-2-Audit-Firm X period" is an interaction term between the dummy variable "Type-2-Audit-Firm" and the variable "period". As controls, we use "age", "gender" (female = 0, male = 1), "economics major" (1 if subject studies economics or management, 0 otherwise), "bachelor's degree" (1 if subject studies in a bachelor's degree program, 0 otherwise), "number of semesters studied", "risk aversion" denotes the total number of low risk lottery choices in the Holt-Laury-Task (i.e., lottery A) and is our measure for subject's risk aversion (measured on an 11-point Likert scale where 0 = very risk seeking and 10 = very risk averse), "income" is the monthly income after fixed cost (in Euro). *** $p \leq 0.01$, ** $p \leq 0.05$, * $p \leq 0.1$.

To analyze the acquisition strategies of the two types of audit firms, we define different strategies dependent on the chosen quantity levels (in audit hours), again. We use the same approach as in the first experiment. However, we take the decisions of all periods for the categorization since the endowment of hours varies from period to period in the accumulation treatments. In tables A7 to A10 in appendix A4, we present a detailed overview on the observed allocations and the corresponding strategy assignments. Table 13 presents the distribution of revealed strategies. The mean number of acquired clients resulting from a strategy is displayed in brackets. Whereas Type-1-Audit-Firms apply different strategies in the No-Accumulation-Treatment, we observe a clear decision pattern in both accumulation treatments. In the Accumulation-30-Treatment, nearly 80% of the Type-1-Audit-Firms use a "High-Stakes-On-6-Clients" (20.0%), "High-Stakes-On-7-Clients" (28.5%), or a "High-Stakes-On-8-Clients" (29.1%) strategy. In the Accumulation-60-Treatment, most subjects apply a "High-Stakes-On-8-Clients" strategy (53.9%). Interestingly, in both treatments the number of acquired clients is similar across all strategies. With respect to the Type-2-Audit-Firms, we observe the same decision pattern in the accumulation treatments as in the No-Accumulation-Treatment. In the Accumulation-30-Treatment, nearly 75% of the subjects use a "High-Stakes-On-3-Clients" (45.5%) or a "High-Stakes-On-4-Clients" (27.9%) strategy resulting in a mean number of acquired clients of approximately 2.7. In the Accumulation-60-Treatment, approximately 90% apply a "High-Stakes-On-2-Clients" (26.2%), "High-Stakes-On-3-Clients" (35.9%), or a "High-Stakes-On-4-Clients" (28.7%) strategy where the highest number of acquired clients is observed in the latter case. To summarize: In both accumulation treatments, the big audit firms apply strategies to acquire nearly all clients. The small audit firms use a clear "Guerilla Strategy" which means that each firm concentrates on two, three, or four clients only.

| Strategy | No-Accumulation-Treatment | | Accumulation-30-Treatment | | Accumulation-60-Treatment | |
|---|---|---|---|---|---|---|
| | Type-1-Audit-Firm | Type-2-Audit-Firm | Type-1-Audit-Firm | Type-2-Audit-Firm | Type-1-Audit-Firm | Type-2-Audit-Firm |
| High-Stake-On-1-Client | 7.3% (5.0) | 5.5% (1.67) | 0.0% (NA) | 0.6% (1.00) | 0.0% (NA) | 5.6% (0.82) |
| High-Stakes-On-2-Clients | 10.9% (5.67) | 1.8% (3.00) | 1.8% (5.33) | 11.5% (1.95) | 0.5% (6.00) | **26.2% (1.65)** |
| High-Stakes-On-3-Clients | **14.6% (5.00)** | **56.4% (2.61)** | 1.8% (4.66) | **45.5% (2.57)** | 2.1% (6.00) | **35.9% (2.14)** |
| High-Stakes-On-4-Clients | **29.1% (5.94)** | **34.6% (2.63)** | 9.1% (5.06) | **27.9% (2.80)** | 5.1% (5.40) | **28.7% (2.64)** |
| High-Stakes-On-5-Clients | 5.5% (5.67) | 0.0% (NA) | 9.7% (6.00) | 10.3% (3.88) | 11.8% (5.57) | 3.1% (2.17) |
| High-Stakes-On-6-Clients | **14.6% (6.00)** | 1.8% (1.00) | **20.0% (5.73)** | 3.6% (4.50) | 14.9% (5.93) | 0.5% (0.00) |
| High-Stakes-On-7-Clients | 0.0% (NA) | 0.0% (NA) | **28.5% (5.38)** | 0.6% (3.00) | 11.8% (6.30) | 0.0% (NA) |
| High-Stakes-On-8-Clients | **18.2% (4.80)** | 0.0% (NA) | **29.1% (4.58)** | 0.0% (NA) | **53.9% (5.97)** | 0.0% (NA) |

**Table 13:** Revealed acquisition strategies in experiment 2

*Note:* This table presents the distribution of revealed strategies over all periods in experiment 2 separated by treatment. The mean number of acquired clients resulting from a strategy is displayed in brackets. If data is not available, this is denoted by "NA". The results of the 1000-600-Treatment with 8 clients from the first experiment are displayed for comparison ("No-Accumulation-Treatment").

## 5 Summary

We conducted laboratory experiments to analyze the strategical behavior of audit firms in a tendering process. We can draw the following conclusions from our main results. First, if two big audit firms are competing (1000-1000-Treatments), we do not observe that they invest high stakes on each client to acquire all clients. In contrast, if one big and one small audit firm are competing (1000-600-Treatments), the big audit firms apply strategies to acquire nearly all clients. The only exemption occurs in the No-Accumulation-Treatment (1000-600-Treatment with eight clients) where big audit firms apply many different strategies. In all treatments, we observe that small audit firms use a clear "Guerilla Strategy" which means that each firm concentrates only on few clients whereas the other clients are almost ignored.

Second, whereas the clients are almost shared equally in case of two big audit firms, the big audit firm is better off (in monetary terms) and acquires (as expected) significantly more clients in case of one big and one small audit firm. Third, comparing the 4-Clients-

and 8-Clients-Treatment in the first experiment reveals that small audit firms are able to acquire more clients relatively and therefore are better off if more clients do exist in the tendering process. As a consequence for real markets, if the competitiveness of smaller audit firms should be enhanced, the legislator should ensure that more audit clients are tendered.

Fourth, in all treatments of both experiments, we observe that the number of clients acquired by each audit firm type remains almost stable over time. Although this is to be expected in the first experiment, we are surprised that this also occurs in the second experiment with accumulation. In both accumulation treatments, we find that big audit firms benefit from their superior starting position with an initial endowment of 1,000 hours and are able to increase their endowment in the subsequent periods much more than the small audit firms with an initial endowment of only 600 hours. Although this implies that the competitive advantage of big audit firms increases over-proportionally over time, we do not observe that the big audit firms are able to decrease the market share of the small audit firms markedly or are even able to push the small audit firms out of the market.

Fifth, in all treatments, we find that small audit firms offer a significantly higher planned quality level per acquired client than big audit firms. For real markets, this implies that increasing the number of smaller audit firms could increase the audit quality level of the audit market as well. Please notice that this robust finding is in contrast to the literature initiated by DeAngelo (1981b) which shows a positive relationship between auditor size and audit quality. More recently, however, studies do not reveal such a relationship on audit quality. In particular, these studies do not observe a difference between the audit quality of second-tier audit firms and first-tier audit firms. Our results indicate a negative relationship between auditor size and planned audit quality. At a first glance, this is a surprising result. However, Beck and Barefiled (1986) discuss the possibility of overstatements during a bidding process. This could be a possible explanation for the observation that small audit firms bid too much to acquire clients. Like Johnstone et al. (2004), we are not interested in the performed audit quality while caring out an audit. Our focus is the composition of the bidding behavior. Therefore, the higher planned audit quality for small audit firms could be a strategic behavior to acquire clients. The rationale is as follows: If we assume that market players (audit clients and audit firms) anticipate that a big audit firm will provide a higher quality level then a small audit firm when the

audit is carried out finally (in line with DeAngelo, 1981b), a small audit firm which offers the same planned audit quality in the tendering process for a given audit fee will never be preferred over a big audit firm. To compensate for the anticipated higher quality level of a big audit firm, it is consequently necessary that the small audit firm offers a higher planned audit quality level for having a chance to acquire an audit client. Thus, in the tendering process it is possible that small audit firms set a higher planned audit quality level than big audit firms. Please notice that this effect is not in contrast to the higher audit quality effect of big audit firms suggested and proven by the literature initiated by DeAngelo (1981b). Both effects can appear in the audit market: one effect in the tendering process and the other one in the actual audit.

Our study has of course limitations. For example, we are abstracting from looking at efficiency, litigation and reputational effects. In our setting, there is no difference between small and big audit firms. These might limit our results. Efficiency effects should be rather small because a second-tier audit firm and a first-tier audit firm should not differ too much in their audit technology. Some kind of reputational thought is already considered in our experiment as mentioned. But, incorporating a stronger reputational effect could lead to different results. A further aspect is the number of audit firms. We only consider two different audit firms. But, it is also possible that more than two audit firms bid for an audit client. The results could then differ from our results. Thus, for further research, an experiment could integrate or control for these aspects.

## Appendix (Online Appendix, not intended for publication)

## A1 Instructions (originally written in German)

### A1.1 General Information

Thank you very much for your participation in the today's experiment. The experiment that you will participate in consists of two parts, in which you have the possibility to earn money. Before each part of the experiment, you will receive instructions explaining that part of the experiment. Next, that part of the experiment starts. After the second part of the experiment, the experiment ends and you will receive a payment that depends on the results of both parts of the experiment.

Please note that you are neither allowed to communicate with other participants nor allowed to leave your desk during the entire experiment. Please read the instructions thoroughly. If you have any questions, please, raise your hand. We will then come to you to answer your questions.

You will now receive the instructions for the first part of the experiment.

### A1.2 Holt-Laury-Task

Please choose one of the two lotteries A or B in each of the following 10 decision situations by marking the corresponding box in the table.

You will make a decision for all 10 situations, but your payoff from this part of the experiment is determined only by the one situation that is randomly drawn after the experiment.

In each situation, you can either earn 2.00 € or 1.60 € from lottery A and either 3.85 € or 0.10 € from lottery B. The probabilities of winning, however, vary from situation to situation. The further down you move in the table, the higher is the probability of the higher payment and the lower is the probability of the lower payment.

After part 1 and 2 of the experiment are completed, you will be asked to roll a ten-faced die two times. Once to determine one of the ten decision situations and a second time to determine your payoff from the lottery that you have chosen in this decision situation. If the number you roll is lower or equals the probability of the higher payoff, you will

receive the higher payoff. Otherwise, you will receive the lower payoff. Please note that the "1" on the die corresponds to the "10%" in the table; the "2" to the "20%" and so forth up to the "9." The "0" corresponds to the "100%."

| | Lottery A | Lottery B | Your decision | |
|---|---|---|---|---|
| | | | A | B |
| 1. | 2.00 € with 10% or 1.60 € with 90% | 3.85 € with 10% or 0.10 € with 90% | o | o |
| 2. | 2.00 € with 20% or 1.60 € with 80% | 3.85 € with 20% or 0.10 € with 80% | o | o |
| 3. | 2.00 € with 30% or 1.60 € with 70% | 3.85 € with 30% or 0.10 € with 70% | o | o |
| 4. | 2.00 € with 40% or 1.60 € with 60% | 3.85 € with 40% or 0.10 € with 60% | o | o |
| 5. | 2.00 € with 50% or 1.60 € with 50% | 3.85 € with 50% or 0.10 € with 50% | o | o |
| 6. | 2.00 € with 60% or 1.60 € with 40% | 3.85 € with 60% or 0.10 € with 40% | o | o |
| 7. | 2.00 € with 70% or 1.60 € with 30% | 3.85 € with 70% or 0.10 € with 30% | o | o |
| 8. | 2.00 € with 80% or 1.60 € with 20% | 3.85 € with 80% or 0.10 € with 20% | o | o |
| 9. | 2.00 € with 90% or 1.60 € with 10% | 3.85 € with 90% or 0.10 € with 10% | o | o |
| 10. | 2.00 € with 100% or 1.60 € with 0% | 3.85 € with 100% or 0.10 € with 0% | o | o |

### A1.3 Audit Market Experiment

We divided the instructions of our actual experiment into different parts. The beginning part (appendix A1.3.1) is identical in all treatments, whereas the following part differs between the treatments (appendix A1.3.2 to A1.3.4). In the following, the instructions are presented.

#### A1.3.1 Beginning Instructions of All Treatments

In the second part of the experiment your payoff depends on your decisions, on the decisions of another participant and possibly on chance. These instructions will explain you, how you are able to influence your payoff by your decisions. Therefore, read the following paragraphs carefully. When all participants have understood the instructions, the experiment will start.

For reasons of simplicity, during the experiment there are no calculations in Euro-amounts, but in lab-points. At that 1 lab-point exactly corresponds to 5 Euro-cents. That means 100 lab-points exactly correspond to 5 Euros.

**General information**

In this experiment, you and one of the other participants form a group. The assignment to this group happens randomly at the beginning of the experiment and remains unchanged until the end of the experiment. You and the other participant of your group make the

same decision which will be described in the following. The experiment consists of 15 periods which are independent of each other. At the end of the experiment, one period will be randomly chosen which determines your payoff.

**Experimental background**

In this experiment, decision situations of audit firms are simulated. One of their main activities is the examination of the annual financial statements of their audit clients. The audit client has the choice to choose an audit firm for the audit of their annual financial statement. To make a choice, the audit client tenders a so called ***audit mandate***. Audit firms are able to apply on this tendered audit mandates.

A crucial point for the selection decision is the warranted audit performance and the compensation which the audit client has to pay to the audit firm. The audit performance is the effort which an audit firm spends on the audit client. The performance mainly depends on the total number of hours which are spent on the audit client. As the demanded compensation for an audit will be likely the same between the audit firms in general, the audit clients principally make their selection decision on the basis of the warranted audit performance.

### A1.3.2 Specific Instructions for the 1000-1000-Treatment and 8-Clients-Treatment (Instructions for 4-Clients-Treatment are accordingly)

**Your task in the experiment**

In the experiment, you are taking the role of a manager of an audit firm and you are responsible for the application on the audit clients. In each period, there are in total 8 audit clients for which you and the other participant of your group can apply. To apply on an audit client, you decide how many hours your audit firm will spend on this client. In total, you are endowed with 1.000 hours in each period. The chosen number of hours can vary from audit client to audit client. However, you have to allocate the 1.000 hours completely. Therefore, it is not possible to transfer hours to the next period.

The other participant of your group is also endowed with 1.000 hours which he can allocate freely on the 8 audit clients. Therefore, he is making exactly the same decisions like you. Your decision and the decision of the other participant take place simultaneously. That's why you do not know the chosen number of hours of the other participant before your own decision.

For each audit client in each period, it will be decided separately if you or the other participant of your group acquired the audit client. For this purpose, for every single audit client it is checked who has chosen the most hours. That one who assigned the higher number of hours to an audit client acquires the audit client. If both assigned the same number of hours to an audit client, a random draw decides with a probability of 50% whether you or the other participant acquires the audit client. This also holds for the case that both participants assign an amount of 0 hours to an audit client.

After you and the other participant of your group decided on the allocation of hours in a period, both group members receive for each audit client the information whether you or the other participant acquired the audit client. But, you do not receive the information how many hours the other participant of your group assigned to each single audit client.

For each acquired audit client, you receive 100 lab-points. For each audit client you have not acquired, you receive 0 lab-points. Because there are 8 audit clients in each period in total, you can earn maximally 800 lab-points in a period.

Please notice that only integer values are possible when you decide on the hours.

Furthermore, please notice that you are confronted with the same decision in each period and that the periods are independent of each other. This means that you are endowed with 1.000 hours in each period and you decide in each period again about the assignment to the 8 audit clients.

**Total payoff**

Your total payoff of a period is determined as follows:

Total payoff = 100 lab-points x number of acquired audit clients

**Training periods**

Before the experiment with the 15 periods starts, there is a rehearsal with 2 training periods. In these training periods, you will make the above described decisions in a two-person group. The assignment to the two-person group will be randomly at the beginning of the rehearsal. However, it will be ensured that you will not form a group with the same participant in the actual experiment with 15 periods. The goal of the training periods is

that you are able to familiarize with the computer program and are therefore not relevant for your payoff.

**Final information and payoff**

After you have made your decisions in all 15 periods which are relevant for your payoff, *one* period is randomly chosen at the end of the experiment. The total payoff of this selected period will be converted into Euros and will be paid in cash to you after the experiment.

### A1.3.3 Specific Instructions of the Type-1-Audit-Firm for the 1000-600-Treatment and 8-Clients-Treatment (specific instructions of the Type-2-Audit-Firm are presented in curly brackets, instructions for 4-Clients-Treatment are accordingly)

**Your task in the experiment**

In the experiment, you are taking the role of a manager of an audit firm and you are responsible for the application on the audit clients. In each period, there are in total 8 audit clients for which you and the other participant of your group can apply. To apply on an audit client, you decide how many hours your audit firm will spend on this client. In total, you are endowed with 1.000 hours in each period. The chosen number of hours can vary from audit client to audit client. However, you have to allocate the 1.000 hours completely. Therefore, it is not possible to transfer hours to the next period. {*Type-2-Audit-Firm:* In total, you are endowed with 600 hours in each period. The chosen number of hours can vary from audit client to audit client. However, you have to allocate the 600 hours completely. Therefore, it is not possible to transfer hours to the next period.}

The other participant of your group is endowed with 600 hours which he can allocate freely on the 8 audit clients. Therefore, he is making exactly the same decisions like you, but has less hours available per period. Your decision and the decisions of the other participant take place simultaneously. That's why you do not know the chosen number of hours of the other participant before your own decision.

{*Type-2-Audit-Firm:* The other participant of your group is endowed with 1.000 hours which he can allocate freely on the 8 audit clients. Therefore, he is making exactly the same decisions like you, but has more hours available per period. Your decision and the

decisions of the other participant take place simultaneously. That's why you do not know the chosen number of hours of the other participant before your own decision.}

For each audit client in each period, it will be decided separately if you or the other participant of your group acquired the audit client. For this purpose, for every single audit client it is checked who has chosen the most hours. That one who assigned the higher number of hours to an audit client acquires the audit client. If both assigned the same number of hours on an audit client, you (with the higher available number of hours) will acquire the audit client. {*Type-2-Audit-Firm:* If both assigned the same number of hours to an audit client, the other participant of your group (with the higher available number of hours) will acquire the audit client.} This also holds for the case that both participants assign an amount of 0 hours to an audit client.

After you and the other participants of your group decided on the allocation of hours in a period, both group members receive for each audit client the information whether you or the other participant acquired the audit client. But, you do not receive the information how many hours the other participant of your group assigned to each single audit client.

For each acquired audit client, you receive 100 lab-points. For each audit client you have not acquired, you receive 0 lab-points. Because there are 8 audit client in each period in total, you can earn maximally 800 lab-points in a period.

Please notice that only integer values are possible when you decide on the hours.

Furthermore, please notice that you are confronted with the same decision in each period and that the periods are independent of each other. This means that you are endowed with 1.000 hours {*Type-2-Audit-Firm:* 600 hours} in each period and you decide in each period again about the assignment to the 8 audit clients.

**Total payoff**

Your total payoff of a period is determined as follows:

Total payoff = 100 lab-points x number of acquired audit clients

**Training periods**

Before the experiment with the 15 periods starts, there is a rehearsal with 2 training periods. In these training periods, you will make the above described decisions in a two-person group. The assignment to the two-person group will be randomly at the beginning of the rehearsal. However, it will be ensured that you will not form a group with the same participant in the actual experiment with 15 periods. The goal of the training periods is that you are able to familiarize with the computer program and are therefore not relevant for your payoff.

**Final information and payoff**

After you have made your decisions in all 15 periods which are relevant for your payoff, *one* period is randomly chosen at the end of the experiment. The total payoff of this selected period will be converted into Euros and will be paid in cash to you after the experiment.

### A1.3.4 Specific Instructions of the Type-1-Audit-Firm for the Accumulation-30-Treatment (specific instructions of the Type-2-Audit-Firm are presented in curly brackets, instructions for Accumulation-60-Treatment are accordingly)

**Your task in the experiment**

In the experiment, you are taking the role of a manager of an audit firm and you are responsible for the application on the audit clients. In each period, there are in total 8 audit clients for which you and the other participant of your group can apply. To apply on an audit client, you decide how many hours your audit firm will spend on this client. The chosen number of hours can vary from audit client to audit client. Therefore, it is not possible to transfer hours to the next period. How many hours are available in each period depends on the number of acquired audit clients. In the first period, you are endowed with 1.000 hours. {*Type-2-Audit-Firm:* In the first period, you are endowed with 600 hours.}

The other participant of your group is endowed with 600 hours which he can allocate freely on the 8 audit clients. Therefore, he is making exactly the same decisions like you, but has less hours available in the first period. Your decision and the decisions of the

other participant take place simultaneously. That's why you do not know the chosen number of hours of the other participant before your own decision.

{*Type-2-Audit-Firm:* The other participant of your group is endowed with 1.000 hours which he can allocate freely over the 8 audit clients. Therefore, he is making exactly the same decisions like you, but has more hours available in the first period. Your decision and the decisions of the other participant take place simultaneously. That's why you do not know the chosen number of hours of the other participant before your own decision.}

For each audit client in each period, it will be decided separately if you or the other participant of your group acquired the audit client. For this purpose, for every single audit client it is checked who has chosen the most hours. That one who assigned the higher number of hours to an audit client acquires the audit client. If both assign the same number of hours to an audit client, the participant with the higher available number of hours in this period will always acquire the audit client. However, if the number of hours is identical for both participants in this case, a random draw decides with a probability of 50% whether you or the other participant acquires the audit client. This also holds for the case that both participants assign an amount of 0 hours to an audit client.

After you and the other participants of your group decided on the allocation of hours in a period, both group members receive for each audit client the information whether you or the other participant acquired the audit client. But, you do not receive the information how many hours the other participant of your group assigned to each single audit client.

For each acquired audit client, you receive 100 lab-points. For each audit client you have not acquired, you receive 0 lab-points. Because there are 8 audit clients in each period in total, you can earn maximally 800 lab-points in a period.

Furthermore, for each acquired audit client in one period you receive an additional endowment of 30 hours in the next period. These hours are added to your initial endowment of hours which you had at the beginning of a period. Because there are 8 audit client in each period in total, you can maximally receive 240 additional hours per period. As you can receive additional hours in each period, your endowment of hours can increase from period to period. A reduction of the number of hours is not possible.

The other participant of your group also receives an additional endowment of 30 hours for each acquired audit client. The available amount of hours in one period of both participants will be displayed at the beginning of each period.

Please notice that only integer values are possible when you decide on the hours.

Furthermore, please notice that you are confronted with the same decision in each period and that the periods are independent of each other. This means that you decide in each period again about the assignment to the 8 audit clients.

**Total payoff**

Your total payoff of a period is determined as follows:

Total payoff = 100 lab-points x number of acquired audit clients

Please notice that your endowment of hours in one period does not affect your total payoff directly.

**Amount of hours**

In the first period, you are endowed with 1.000 hours in total.

{*Type-2-Audit-Firm:* In the first period, you are endowed with 600 hours in total.}

In each further period, your number of hours is determined as follows:

Number of hours in a period = number of hours in the last period + 30 x number of acquired audit clients in the last period

**Training periods**

Before the experiment with the 15 periods starts, there is a rehearsal with 3 training periods. In these training periods, you will make the above described decisions in a two-person group. The assignment to the two-person group will be randomly at the beginning of the rehearsal. However, it will be ensured that you will not form a group with the same participant in the actual experiment with 15 periods. The goal of the training periods is that you are able to familiarize with the computer program and are therefore not relevant for your payoff.

**Final information and payoff**

After you have made your decisions in all 15 periods which are relevant for payoff, *one* period is randomly chosen at the end of the experiment. The total payoff of this selected period will be converted into Euros and will be paid in cash to you after the experiment.

## A2 Revealed Strategies in the 4-Clients-Treatments

| strategy | audit client | audit client | audit client | audit client | no. of observed allocations |
|---|---|---|---|---|---|
| High-Stake-On-1-Client | ≥ 150 | > 0 & < 10 | > 0 & < 10 | > 0 & < 10 | 1 |
| High-Stakes-On-2-Clients | ≥ 150 | ≥ 150 | > 0 & < 10 | > 0 & < 10 | 12 |
| | ≥ 150 | ≥ 150 | ≥ 10 & < 150 | ≥ 10 & < 150 | 11 |
| | ≥ 150 | ≥ 150 | ≥ 10 & < 150 | > 0 & < 10 | 1 |
| | ≥ 150 | ≥ 150 | ≥ 10 & < 150 | 0 | 1 |
| | ≥150 | ≥ 150 | 0 | 0 | 4 |
| | 500 | 500 | 0 | 0 | 16 |
| High-Stakes-On-3-Clients | ≥ 150 | ≥ 150 | ≥ 150 | > 0 & < 10 | 14 |
| | ≥ 150 | ≥ 150 | ≥ 150 | > 10 & < 150 | 12 |
| | ≥ 150 | ≥ 150 | ≥ 150 | 0 | 13 |
| High-Stakes-On-4-Clients | ≥ 150 | ≥ 150 | ≥ 150 | ≥ 150 | 18 |
| | 250 | 250 | 250 | 250 | 7 |

**Table A1:** Overview on the observed allocations and the corresponding strategy assignments in the 1000-1000-Treatment

| strategy | audit client | audit client | audit client | audit client | no. of observed allocations |
|---|---|---|---|---|---|
| High-Stakes-On-2-Clients | ≥ 150 | ≥ 150 | ≥ 10 & < 150 | ≥ 10 & < 150 | 1 |
| High-Stakes-On-3-Clients | ≥ 150 | ≥ 150 | ≥ 150 | ≥ 10 & < 150 | 16 |
| | ≥ 150 | ≥ 150 | ≥ 150 | 0 | 2 |
| High-Stakes-On-4-Clients | ≥ 150 | ≥ 150 | ≥ 150 | ≥ 150 | 23 |
| | 250 | 250 | 250 | 250 | 8 |

**Table A2:** Overview on observed allocations and corresponding strategy assignments of Type-1-Audit-Firms in the 1000-600-Treatment

| strategy | audit client | audit client | audit client | audit client | no. of observed allocations |
|---|---|---|---|---|---|
| High-Stakes-On-2-Clients | 300 | 300 | 0 | 0 | 10 |
| | ≥ 150 | ≥ 150 | ≥ 50 & < 100 | < 50 | 2 |
| | ≥ 150 | ≥ 150 | ≥ 25 & < 75 | 0 | 3 |
| | ≥ 150 | ≥ 150 | ≥ 50 & < 100 | ≥ 50 & < 100 | 1 |
| | ≥ 150 | ≥ 150 | < 50 | < 50 | 15 |
| | ≥ 150 | ≥ 150 | 0 | 0 | 13 |
| High-Stakes-On-3-Clients | ≥ 150 | ≥ 150 | ≥ 150 | < 50 | 1 |
| | ≥ 150 | ≥ 150 | ≥ 150 | 0 | 3 |
| High-Stakes-On-4-Clients | 150 | 150 | 150 | 150 | 1 |
| | ≥ 50 & < 150 | ≥ 50 & < 150 | ≥ 50 & < 150 | ≥ 50 & < 150 | 1 |

**Table A3:** Overview on observed allocations and corresponding strategy assignments of the Type-2-Audit-Firms in the 1000-600-Treatment

## A3 Revealed Strategies in the 8-Clients-Treatments

| strategy | audit client | audit client | audit client | audit client | audit client | audit client | audit client | audit client | no. of observed allocations |
|---|---|---|---|---|---|---|---|---|---|
| High-Stakes-On-3-Clients | 300 | 300 | 300 | 20 | 20 | 20 | 20 | 20 | 3 |
| High-Stakes-On-4-Clients | 251 | 251 | 249 | 249 | 0 | 0 | 0 | 0 | 13 |
| | ≥ 100 | ≥ 100 | ≥ 100 | ≥ 100 | < 50 | < 50 | < 50 | ≥ 50 & < 100 | 2 |
| | ≥ 100 | ≥ 100 | ≥ 100 | ≥ 100 | < 50 | < 50 | < 50 | < 50 | 1 |
| High-Stakes-On-5-Clients | 200 | 200 | 200 | 200 | 200 | 0 | 0 | 0 | 10 |
| | ≥ 100 | ≥ 100 | ≥ 100 | ≥ 100 | ≥ 100 | < 75 | < 25 | < 25 | 2 |
| | ≥ 100 | ≥ 100 | ≥ 100 | ≥ 100 | ≥ 100 | < 75 | < 75 | < 25 | 2 |
| | ≥ 100 | ≥ 100 | ≥ 100 | ≥ 100 | ≥ 100 | ≥ 50 & < 100 | ≥ 50 & < 100 | ≥ 25 & < 50 | 1 |
| | ≥ 100 | ≥ 100 | ≥ 100 | ≥ 100 | ≥ 100 | < 25 | < 25 | < 25 | 36 |
| | ≥ 100 | ≥ 100 | ≥ 100 | ≥ 100 | ≥ 100 | ≥ 25 & < 50 | ≥ 25 & < 50 | ≥ 25 & < 50 | 3 |
| | ≥ 100 | ≥ 100 | ≥ 100 | ≥ 100 | ≥ 100 | 0 | 0 | 0 | 18 |
| High-Stakes-On-6-Clients | ≥ 100 | ≥ 100 | ≥ 100 | ≥ 100 | ≥ 100 | ≥ 100 | < 75 | < 75 | 3 |
| | ≥ 100 | ≥ 100 | ≥ 100 | ≥ 100 | ≥ 100 | ≥ 100 | 0 | 0 | 2 |
| | ≥ 100 | ≥ 100 | ≥ 100 | ≥ 100 | ≥ 100 | ≥ 100 | < 50 | < 50 | 6 |
| High-Stakes-On-7-Clients | ≥ 100 | ≥ 100 | ≥ 100 | ≥ 100 | ≥ 100 | ≥ 100 | ≥ 100 | < 75 | 4 |
| | ≥ 100 | ≥ 100 | ≥ 100 | ≥ 100 | ≥ 100 | ≥ 100 | ≥ 100 | 0 | 1 |
| High-Stakes-On-8-Clients | ≥ 75 | ≥ 75 | ≥ 75 | ≥ 75 | ≥ 75 | ≥ 75 | ≥ 75 | ≥ 75 | 2 |
| | 125 | 125 | 125 | 125 | 125 | 125 | 125 | 125 | 3 |

**Table A4:** Overview on observed allocations and corresponding strategy assignments in the 1000-1000-Treatment

| strategy | audit client | audit client | audit client | audit client | audit client | audit client | audit client | audit client | no. of observed allocations |
|---|---|---|---|---|---|---|---|---|---|
| High-Stake-On-1-Client | ≥ 150 | ≥ 100 | ≥ 100 | ≥ 100 | ≥ 100 | ≥ 100 | ≥ 100 | ≥ 100 | 4 |
| High-Stakes-On-2-Clients | ≥ 150 | ≥ 150 | ≥ 100 | ≥ 100 | ≥ 100 | ≥ 100 | ≥ 50 & < 100 | ≥ 50 & < 100 | 1 |
| | ≥ 150 | ≥ 150 | ≥ 100 | ≥ 100 | ≥ 100 | ≥ 100 | ≥ 100 | ≥ 15 & < 50 | 1 |
| | ≥ 150 | ≥ 150 | ≥ 100 | ≥ 100 | ≥ 100 | ≥ 100 | ≥ 100 | 0 | 2 |
| | ≥ 150 | ≥ 150 | ≥ 100 | ≥ 100 | ≥ 100 | ≥ 100 | ≥ 100 | ≥ 100 | 2 |
| High-Stakes-On-3-Clients | ≥ 150 | ≥ 150 | ≥ 150 | ≥ 100 | ≥ 50 & < 100 | ≥ 50 & < 100 | ≥ 15 & < 50 | < 15 | 1 |
| | ≥ 150 | ≥ 150 | ≥ 150 | ≥ 100 | ≥ 100 | ≥ 15 & < 50 | ≥ 15 & < 50 | ≥ 15 & < 50 | 1 |
| | ≥ 150 | ≥ 150 | ≥ 150 | ≥ 100 | ≥ 100 | ≥ 100 | ≥ 15 & < 50 | ≥ 15 & < 50 | 1 |
| | ≥ 150 | ≥ 150 | ≥ 150 | ≥ 100 | ≥ 100 | ≥ 100 | ≥ 100 | ≥ 15 & < 50 | 2 |
| | ≥ 150 | ≥ 150 | ≥ 150 | ≥ 100 | ≥ 100 | ≥ 100 | ≥ 100 | ≥ 50 & < 100 | 2 |
| | ≥ 150 | ≥ 150 | ≥ 150 | ≥ 100 | ≥ 100 | ≥ 100 | ≥ 100 | 0 | 1 |
| High-Stakes-On-4-Clients | ≥ 150 | ≥ 150 | ≥ 150 | ≥ 150 | ≥ 100 | ≥ 50 & < 100 | ≥ 50 & < 100 | ≥ 50 & < 100 | 1 |
| | ≥ 150 | ≥ 150 | ≥ 150 | ≥ 150 | ≥ 100 | ≥ 100 | ≥ 15 & < 50 | < 15 | 1 |
| | ≥ 150 | ≥ 150 | ≥ 150 | ≥ 150 | ≥ 100 | ≥ 100 | ≥ 15 & < 50 | 0 | 1 |
| | ≥ 150 | ≥ 150 | ≥ 150 | ≥ 150 | ≥ 100 | ≥ 100 | ≥ 15 & < 50 | ≥ 15 & < 50 | 5 |
| | ≥ 150 | ≥ 150 | ≥ 150 | ≥ 150 | ≥ 100 | ≥ 100 | ≥ 100 | < 15 | 1 |
| | ≥ 150 | ≥ 150 | ≥ 150 | ≥ 150 | ≥ 100 | ≥ 100 | ≥ 100 | ≥ 15 & < 50 | 1 |
| | ≥ 150 | ≥ 150 | ≥ 150 | ≥ 150 | ≥ 100 | ≥ 100 | ≥ 100 | ≥ 50 & < 100 | 3 |
| | ≥ 150 | ≥ 150 | ≥ 150 | ≥ 150 | ≥ 100 | ≥ 100 | ≥ 100 | ≥ 100 | 3 |
| High-Stakes-On-5-Clients | ≥ 150 | ≥ 150 | ≥ 150 | ≥ 150 | ≥ 150 | ≥ 100 | ≥ 50 & < 100 | ≥ 15 & < 50 | 1 |
| | ≥ 150 | ≥ 150 | ≥ 150 | ≥ 150 | ≥ 150 | ≥ 100 | ≥ 15 & < 50 | ≥ 15 & < 50 | 1 |
| | ≥ 150 | ≥ 150 | ≥ 150 | ≥ 150 | ≥ 150 | ≥ 100 | ≥ 100 | ≥ 15 & < 50 | 1 |
| High-Stakes-On-6-Clients | ≥ 150 | ≥ 150 | ≥ 150 | ≥ 150 | ≥ 150 | ≥ 150 | ≥ 50 & < 100 | < 15 | 1 |
| | ≥ 150 | ≥ 150 | ≥ 150 | ≥ 150 | ≥ 150 | ≥ 150 | ≥ 15 & < 50 | ≥ 15 & < 50 | 2 |
| | ≥ 150 | ≥ 150 | ≥ 150 | ≥ 150 | ≥ 150 | ≥ 150 | 0 | 0 | 5 |
| High-Stakes-On-8-Clients | ≥ 100 & < 150 | ≥ 100 & < 150 | ≥ 100 & < 150 | ≥ 100 & < 150 | ≥ 100 & < 150 | ≥ 100 & < 150 | ≥ 100 & < 150 | ≥ 100 & < 150 | 6 |
| | 125 | 125 | 125 | 125 | 125 | 125 | 125 | 125 | 4 |

**Table A5:** Overview on observed allocations and corresponding strategy assignments of Type-1-Audit-Firms in the 1000-600-Treatment

| strategy | audit client | audit client | audit client | audit client | audit client | audit client | audit client | audit client | no. of observed allocations |
|---|---|---|---|---|---|---|---|---|---|
| High-Stake-On-1-Client | ≥ 150 | ≥ 100 | ≥ 15 & < 50 | ≥ 15 & < 50 | ≥ 15 & < 50 | ≥ 15 & < 50 | ≥ 15 & < 50 | ≥ 15 & < 50 | 1 |
| | ≥ 150 | ≥ 100 | ≥ 100 | ≥ 50 & < 100 | ≥ 15 & < 50 | ≥ 15 & < 50 | < 15 | < 15 | 1 |
| | ≥ 150 | ≥ 100 | ≥ 100 | ≥ 100 | ≥ 15 & < 50 | ≥ 15 & < 50 | < 15 | < 15 | 1 |
| High-Stakes-On-2-Clients | ≥ 150 | ≥ 150 | ≥ 100 | ≥ 15 & < 50 | ≥ 15 & < 50 | ≥ 15 & < 50 | ≥ 15 & < 50 | ≥ 15 & < 50 | 1 |
| High-Stakes-On-3-Clients | ≥ 150 | ≥ 150 | ≥ 150 | ≥ 100 | < 15 | 0 | 0 | 0 | 1 |
| | ≥ 150 | ≥ 150 | ≥ 150 | ≥ 100 | < 15 | < 15 | < 15 | < 15 | 1 |
| | ≥ 150 | ≥ 150 | ≥ 150 | ≥ 15 & < 50 | < 15 | < 15 | < 15 | < 15 | 1 |
| | ≥ 150 | ≥ 150 | ≥ 150 | ≥ 15 & < 50 | 0 | 0 | 0 | 0 | 1 |
| | ≥ 150 | ≥ 150 | ≥ 150 | ≥ 50 & < 100 | 0 | 0 | 0 | 0 | 2 |
| | ≥ 150 | ≥ 150 | ≥ 150 | ≥ 75 & < 100 | < 15 | < 15 | < 15 | < 15 | 1 |
| | ≥ 150 | ≥ 150 | ≥ 150 | ≥ 15 & < 50 | ≥ 15 & < 50 | 0 | 0 | 0 | 1 |
| | ≥ 150 | ≥ 150 | ≥ 150 | ≥ 15 & < 50 | ≥ 15 & < 50 | ≥ 15 & < 50 | ≥ 15 & < 50 | < 15 | 2 |
| | ≥ 150 | ≥ 150 | ≥ 150 | < 15 | < 15 | < 15 | < 15 | < 15 | 6 |
| | ≥ 150 | ≥ 150 | ≥ 150 | 0 | 0 | 0 | 0 | 0 | 14 |
| | ≥ 150 | ≥ 150 | ≥ 150 | ≥ 15 & < 50 | ≥ 15 & < 50 | ≥ 15 & < 50 | ≥ 15 & < 50 | ≥ 15 & < 50 | 1 |
| High-Stakes-On-4-Clients | 126 | 126 | 126 | 126 | 93 | 1 | 1 | 1 | 6 |
| | 149 | 149 | 149 | 149 | 1 | 1 | 1 | 1 | 2 |
| | 150 | 150 | 150 | 150 | 0 | 0 | 0 | 0 | 11 |
| High-Stakes-On-6-Clients | ≥ 75 & < 100 | ≥ 75 & < 100 | ≥ 75 & < 100 | ≥ 75 & < 100 | ≥ 75 & < 100 | ≥ 75 & < 100 | < 15 | < 15 | 1 |

**Table A6:** Overview on observed allocations and corresponding strategy assignments of the Type-2-Audit-Firms in the 1000-600-Treatment

## A4 Revealed Strategies in the Accumulation Treatments

| strategy | audit client | audit client | audit client | audit client | audit client | audit client | audit client | audit client | no. of observed allocations |
|---|---|---|---|---|---|---|---|---|---|
| High-Stakes-On-2-Clients | 20% | 17% | 9 – 12% | 9 – 12% | 9 – 12% | 9 – 12% | 9 – 12% | 9 – 12% | 1 |
| | 19% | 14% | 9 – 12% | 9 – 12% | 9 – 12% | 9 – 12% | 9 – 12% | 9 – 12% | 1 |
| | 30% | 20% | 15% | 14% | 9 – 12% | 9 – 12% | 1% | 1% | 1 |
| High-Stakes-On-3-Clients | 16 – 18% | 16 – 18% | 16 – 18% | 11 – 13% | 11 – 13% | 11 – 13% | 11 – 13% | < 5% | 2 |
| | 16% | 16% | 16% | 10% | 10% | 10% | 10% | 10% | 1 |
| High-Stakes-On-4-Clients | 25% | 25% | 25% | 25% | 0% | 0% | 0% | 0% | 4 |
| | 21 – 23% | 21 – 23% | 21 – 23% | 21 – 23% | 4% | 4% | 4% | 4% | 3 |
| | 23% | 23% | 23% | 23% | 7 – 9% | 0% | 0% | 0% | 2 |
| | 20 – 22% | 20 – 22% | 20 – 22% | 20 – 22% | 6 – 9% | 6 – 9% | 0% | 0% | 2 |
| | 19 – 21% | 19 – 21% | 19 – 21% | 19 – 21% | 6 – 10% | 6 – 10% | 3% | 0% | 2 |
| | 16% | 16% | 16% | 16% | 11% | 11% | 11% | 3% | 1 |
| High-Stakes-On-5-Clients | 20% | 20% | 20% | 20% | 20% | 0% | 0% | 0% | 9 |
| | 31% | 15% | 15% | 15% | 15% | 7% | 0% | 0% | 1 |
| | 19 – 22% | 17 – 18% | 14 – 15% | 14 – 15% | 12% | 9% | 5 – 7% | 5 – 7% | 2 |
| | 17% | 17% | 17% | 15% | 15% | 10% | 7% | 2% | 1 |
| | 20% | 17% | 17% | 11% | 11% | 9% | 9% | 6% | 1 |
| | 17% | 17% | 17% | 17% | 17% | 12% | 1% | 1% | 1 |
| | 19% | 19% | 19% | 19% | 19% | 2% | 2% | 2% | 1 |
| High-Stakes-On-6-Clients | 17 – 19% | 17 – 19% | 17 – 19% | 16 – 19% | 12 – 17% | 12 – 17% | 0% | 0% | 6 |
| | 14 – 18% | 14 – 17% | 12 – 15% | 12 – 15% | 12 – 15% | 11 – 15% | 6 – 9% | 6 – 9% | 10 |
| | 15 – 25% | 15 – 21% | 13 – 17% | 13 – 15% | 10 – 15% | 10 – 15% | 6 – 9% | 2 – 4% | 8 |
| | 15 – 18% | 15 – 18% | 15 – 18% | 15 – 18% | 13 – 17% | 11 – 16% | 1 – 4% | 1 – 4% | 7 |
| | 18% | 18% | 18% | 14% | 13% | 12% | 7% | 0% | 1 |
| | 16% | 16% | 16% | 16% | 16% | 16% | 1% | 0% | 1 |
| High-Stakes-On-7-Clients | 14 – 19% | 14 – 19% | 14 – 19% | 11 – 15% | 11 – 15% | 11 – 15% | 11 – 14% | 0% | 11 |
| | 14 – 18% | 13 – 16% | 12 – 15% | 12 – 15% | 11 – 13% | 10 – 13% | 10 – 12% | 6 – 9% | 12 |
| | 14 – 20% | 13 – 18% | 12 – 17% | 12 – 15% | 10 – 14% | 10 – 14% | 10 – 14% | 1 – 5% | 24 |
| High-Stakes-On-8-Clients | 13% | 13% | 13% | 13% | 13% | 13% | 13% | 13% | 6 |
| | 12 – 13% | 12 – 13% | 12 – 13% | 12 – 13% | 12 – 13% | 12 – 13% | 12 – 13% | 12 – 13% | 25 |
| | 13 – 15% | 12 – 14% | 12 – 14% | 12 – 13% | 12 – 13% | 11 – 13% | 11 – 13% | 10 – 12% | 13 |
| | 14 – 15% | 14 – 15% | 14 – 15% | 14 – 15% | 10 – 11% | 10 – 11% | 10 – 11% | 10 – 11% | 2 |
| | 17% | 14% | 11 – 12% | 11 – 12% | 11 – 12% | 11% | 11% | 10 – 11% | 2 |

**Table A7:** Overview on observed allocations and corresponding strategy assignments of Type-1-Audit-Firms in the Accumulation-30-Treatment

*Note:* As the endowment of hours (available at the beginning of a period) varies from period to period in the accumulation treatments, we use the share of endowment assigned to an audit client to categorize each allocation. For example, 20% (see first cell) indicates that 20% of the endowment of hours is assigned to this audit client.

| strategy | audit client | audit client | audit client | audit client | audit client | audit client | audit client | audit client | no. of observed allocations |
|---|---|---|---|---|---|---|---|---|---|
| High-Stakes-On-1-Client | 38% | 13% | 13% | 13% | 13% | 13% | 0% | 0% | 1 |
| High-Stakes-On-2-Clients | 50% | 50% | 0% | 0% | 0% | 0% | 0% | 0% | 12 |
| | 45 – 48% | 45 – 48% | 1 – 3% | 1 – 3% | 1% | 1% | 1% | 1% | 4 |
| | 43% | 43% | 14% | 0% | 0% | 0% | 0% | 0% | 1 |
| | 49% | 49% | 2% | 0% | 0% | 0% | 0% | 0% | 1 |
| | 35% | 35% | 20% | 3% | 3% | 2% | 2% | 0% | 1 |
| High-Stakes-On-3-Clients | 33% | 33% | 33% | 0% | 0% | 0% | 0% | 0% | 38 |
| | 32 – 34% | 32 – 33% | 32 – 33% | 1 – 3% | 0% | 0% | 0% | 0% | 10 |
| | 32 – 39% | 28 – 33% | 27 – 32% | 1 – 4% | 1 – 2% | 0% | 0% | 0% | 4 |
| | 34 – 42% | 31 – 35% | 25 – 33% | 0% | 0% | 0% | 0% | 0% | 11 |
| | 26 – 32% | 26 – 32% | 26 – 32% | 1 – 6% | 1 – 4% | 1 – 4% | 1 – 4% | 1 – 4% | 3 |
| | 26 – 33% | 17 – 33% | 15 – 32% | 1 – 13% | 1 – 13% | 1 – 12% | 1 – 5% | 0% | 4 |
| | 29 – 31% | 29 – 31% | 26 – 31% | 7 – 15% | 0% | 0% | 0% | 0% | 3 |
| | 28% | 28% | 28% | 13% | 2% | 2% | 0% | 0% | 1 |
| | 28% | 28% | 28% | 9% | 7% | 0% | 0% | 0% | 1 |
| | 50% | 25% | 25% | 0% | 0% | 0% | 0% | 0% | 1 |
| High-Stakes-On-4-Clients | 25% | 25% | 25% | 25% | 0% | 0% | 0% | 0% | 23 |
| | 25 – 29% | 24 – 28% | 22 – 25% | 22 – 25% | 0% | 0% | 0% | 0% | 13 |
| | 24 – 28% | 24 – 25% | 23 – 25% | 21 – 25% | 1 – 5% | 0% | 0% | 0% | 5 |
| | 27 – 28% | 27 – 28% | 27 – 28% | 16 – 19% | 0% | 0% | 0% | 0% | 3 |
| | 21 – 22% | 21 – 22% | 21 – 22% | 21 – 22% | 13 – 15% | 0% | 0% | 0% | 2 |
| High-Stakes-On-5-Clients | 20% | 20% | 20% | 20% | 20% | 0% | 0% | 0% | 11 |
| | 21% | 20% | 20% | 20% | 19% | 0% | 0% | 0% | 6 |
| High-Stakes-On-6-Clients | 17% | 17% | 17% | 17% | 16% | 16% | 0% | 0% | 4 |
| | 17% | 17% | 17% | 17% | 17% | 16% | 0% | 0% | 1 |
| | 17% | 17% | 17% | 17% | 17% | 17% | 0% | 0% | 1 |
| High-Stakes-On-7-Clients | 15% | 14% | 14% | 14% | 14% | 14% | 14% | 0% | 1 |

**Table A8:** Overview on observed allocations and corresponding strategy assignments of the Type-2-Audit-Firms in the Accumulation-30-Treatment

| strategy | audit client | audit client | audit client | audit client | audit client | audit client | audit client | audit client | no. of observed allocations |
|---|---|---|---|---|---|---|---|---|---|
| High-Stakes-On-2-Clients | 35% | 35% | 10% | 5% | 5% | 5% | 5% | 0% | 1 |
| High-Stakes-On-3-Clients | 25 – 37% | 24 – 25% | 15 – 25% | 6 – 7% | 6 – 7% | 5 – 7% | 3% | 2 – 3% | 2 |
| | 21 – 24% | 21 – 24% | 15 – 16% | 9 – 10% | 9% | 6 – 9% | 6 – 9% | 5% | 2 |
| High-Stakes-On-4-Clients | 17% | 17% | 16 – 17% | 16 – 17% | 8 – 9% | 8% | 8% | 8% | 3 |
| | 21 – 24% | 17 – 24% | 13 – 17% | 11 – 17% | 8 – 10% | 8 – 10% | 4 – 9% | 4 – 6% | 4 |
| | 27 – 32% | 22 – 25% | 15 – 18% | 12 – 17% | 7% | 4% | 1 – 4% | 1 – 3% | 2 |
| | 24% | 24% | 18% | 17% | 7% | 6% | 5% | 0% | 1 |
| High-Stakes-On-5-Clients | 14 – 15% | 14 – 15% | 14 – 15% | 13 – 15% | 12 – 15% | 8 – 10% | 8 – 10% | 6 – 10% | 7 |
| | 18 – 24% | 16 – 24% | 12 – 19% | 11 – 19% | 10 – 16% | 4 – 9% | 2 – 8% | 1 – 6% | 10 |
| | 20% | 20% | 20% | 20% | 20% | 0% | 0% | 0% | 2 |
| | 19 – 22% | 19 – 21% | 19% | 18 – 19% | 17 – 19% | 3% | 1 – 2% | 0% | 2 |
| | 20% | 20% | 20% | 20% | 18% | 1% | 1% | 1% | 1 |
| | 19% | 19% | 19% | 19% | 19% | 3% | 0% | 0% | 1 |
| High-Stakes-On-6-Clients | 14 – 18% | 14 – 18% | 13 – 15% | 13 – 15% | 13 – 15% | 13 – 14% | 7 – 9% | 5 – 8% | 6 |
| | 15 – 24% | 15 – 20% | 15 – 17% | 12 – 17% | 12 – 17% | 9 – 16% | 1 – 4% | 1 – 4% | 15 |
| | 15 – 19% | 14 – 18% | 14 – 16% | 13 – 15% | 12 – 15% | 10 – 15% | 6 – 10% | 1 – 4% | 5 |
| | 18 – 22% | 18 – 22% | 13 – 16% | 13% | 12 – 13% | 12 – 13% | 6 – 10% | 0% | 2 |
| | 17% | 17% | 17% | 17% | 17% | 17% | 0% | 0% | 1 |
| High-Stakes-On-7-Clients | 14 – 18% | 14 – 16% | 14 – 15% | 13 – 15% | 13 – 14% | 12 – 14% | 12 – 14% | 0% | 9 |
| | 13 – 15% | 13 – 15% | 13 – 15% | 13 – 15% | 13 – 15% | 11 – 14% | 11 – 14% | 5 – 9% | 6 |
| | 14 – 19% | 14 – 17% | 14 – 16% | 13 – 14% | 13 – 14% | 13 – 14% | 9 – 14% | 1 – 4% | 7 |
| | 32% | 10% | 10% | 10% | 10% | 10% | 10% | 6% | 1 |
| High-Stakes-On-8-Clients | 13% | 13% | 13% | 13% | 13% | 13% | 13% | 13% | 14 |
| | 13% | 13% | 13% | 13% | 12% | 12% | 12% | 12% | 16 |
| | 13% | 13% | 13% | 13% | 13% | 12% | 12% | 12% | 8 |
| | 13% | 13% | 13% | 13% | 13% | 13% | 12% | 12% | 8 |
| | 13% | 13% | 13% | 12% | 12% | 12% | 12% | 12% | 5 |
| | 13% | 13% | 13% | 13% | 13% | 13% | 13% | 12% | 4 |
| | 13% | 12% | 12% | 12% | 12% | 12% | 12% | 12% | 5 |
| | 16 – 22% | 11 – 22% | 9 – 14% | 9 – 13% | 9 – 12% | 8 – 12% | 8 – 12% | 8 – 12% | 13 |
| | 13 – 16% | 12 – 16% | 11 – 16% | 11 – 15% | 10 – 13% | 10 – 13% | 10 – 12% | 9 – 12% | 29 |
| | 13% | 13% | 12% | 12% | 12% | 12% | 12% | 12% | 2 |

**Table A9:** Overview on observed allocations and corresponding strategy assignments of Type-1-Audit-Firms in the Accumulation-60-Treatment

| strategy | audit client | audit client | audit client | audit client | audit client | audit client | audit client | audit client | no. of observed allocations |
|---|---|---|---|---|---|---|---|---|---|
| High-Stakes-On-1-Client | 100% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 9 |
| | 42% | 18% | 17% | 10% | 8% | 6% | 0% | 0% | 1 |
| | 21% | 15% | 14% | 13% | 12% | 10% | 9% | 6% | 1 |
| High-Stakes-On-2-Clients | 50% | 50% | 0% | 0% | 0% | 0% | 0% | 0% | 16 |
| | 51 – 61% | 39 – 48% | 0% | 0% | 0% | 0% | 0% | 0% | 11 |
| | 40 – 57% | 38 – 48% | 4 – 20% | 0% | 0% | 0% | 0% | 0% | 9 |
| | 46 – 48% | 44 – 48% | 2 – 5% | 2 – 5% | 0% | 0% | 0% | 0% | 2 |
| | 27 – 46% | 25 – 43% | 5 – 13% | 3 – 13% | 3 – 13% | 3 – 10% | 0% | 0% | 3 |
| | 23 – 50% | 23 – 47% | 1 – 14% | 1 – 11% | 1 – 9% | 1 – 8% | 1 – 6% | 1 – 6% | 6 |
| | 36 – 39% | 33 – 39% | 9 – 14% | 8 – 9% | 4 – 7% | 0% | 0% | 0% | 2 |
| | 39 – 50% | 34 – 44% | 3 – 10% | 1 – 8% | 1 – 5% | 1 – 2% | 1 – 2% | 0% | 2 |
| High-Stakes-On-3-Clients | 33% | 33% | 33% | 0% | 0% | 0% | 0% | 0% | 38 |
| | 36 – 42% | 31 – 37% | 23 – 29% | 0% | 0% | 0% | 0% | 0% | 14 |
| | 29 – 34% | 29 – 31% | 29 – 31% | 5 – 13% | 0% | 0% | 0% | 0% | 6 |
| | 31 – 45% | 28 – 36% | 23 – 31% | 1 – 12% | 1 – 9% | 0% | 0% | 0% | 4 |
| | 32 – 35% | 28 – 32% | 29 – 32% | 1 – 10% | 1 – 3% | 1% | 1% | 1% | 3 |
| | 33% | 22 – 33% | 17 – 33% | 1 – 12% | 1 – 8% | 1 – 8% | 0% | 0% | 2 |
| | 33% | 33% | 33% | 1% | 0% | 0% | 0% | 0% | 1 |
| | 35% | 33% | 32% | 0% | 0% | 0% | 0% | 0% | 1 |
| | 33% | 33% | 21% | 4% | 4% | 4% | 1% | 0% | 1 |
| High-Stakes-On-4-Clients | 25% | 25% | 25% | 25% | 0% | 0% | 0% | 0% | 33 |
| | 26 – 40% | 21 – 28% | 20 – 26% | 18 – 23% | 0% | 0% | 0% | 0% | 10 |
| | 22 – 26% | 17 – 19% | 17 – 18% | 13 – 15% | 9 – 12% | 8 – 10% | 7 – 8% | 0% | 3 |
| | 22 – 28% | 22 – 28% | 22 – 28% | 15 – 25% | 1 – 14% | 0% | 0% | 0% | 6 |
| | 21 – 25% | 21 – 25% | 21 – 25% | 17 – 21% | 1 – 12% | 1 – 3% | 1 – 3% | 1 – 2% | 3 |
| | 22% | 22% | 18% | 18% | 10% | 10% | 0% | 0% | 1 |
| High-Stakes-On-5-Clients | 20 – 21% | 20 – 21% | 19 – 21% | 19 – 21% | 18 – 21% | 0% | 0% | 0% | 5 |
| | 19% | 19% | 19% | 19% | 19% | 4 $ | 1% | 0% | 1 |
| High-Stakes-On-6-Clients | 22% | 21% | 15% | 15% | 15% | 14% | 0% | 0% | 1 |

**Table A10:** Overview on observed allocations and corresponding strategy assignments of the Type-2-Audit-Firms in the Accumulation-60-Treatment

**References**

Alm, J., Bloomquist, K., and McKee, M. (2015). On the external validity of laboratory tax compliance experiments. *Economic Inquiry,* 53: 1170-1186.

Ashton, R. H. and Kramer, S. S. (1980). Students as Surrogates in Behavioral Accounting Research: Some Evidence. *Journal of Accounting Research*, 18: 1-13.

Avrahami, J. and Kareev, Y. (2009). Do the Weak Stand a Chance? Distribution of Resources in a Competitive Environment. *Cognitive Science*, 33: 940-950.

Beattie, V. and Fearnley, S. (1998a). Audit Market Competition: Auditor Changes and the Impact of Tendering. *British Accounting Review*, 30: 261-289.

Beattie, V. and Fearnley, S. (1998b). Auditor changes and tendering – UK interview evidence. *Accounting, Auditing & Accountability Journal*, 11(1): 72-98.

Beck, P. J. and Barefield. R. M. (1986). An Economic Analysis of Competitive Bidding for Public Sector Audit Engagements. *Journal of Accounting and Public Policy*, 5: 143-165.

Becker, C. L., DeFond, M. L., Jiambalvo, J., and Subramanyam, K. R. (1998). The Effect of Audit Quality on Earnings Management. *Contemporary Accounting Research*, 15: 1-24.

Bills, K. L., Cunningham, L. M., and Myers, L. A. (2016). Small Audit Firm Membership in Associations, Networks, and Alliances: Implications for Audit Quality and Audit Fees. *The Accounting Review*, 91(3): 767-792.

Bock, O., Baetge, I., and Nicklisch, A. (2014). Hroot: Hamburg Registration and Organization Online Tool. *European Economic Review*, 71: 117-120.

Boone, J. P., Khurana, I. K., and Raman, K. K. (2010). Do the Big 4 and the Second-tier firms provide audits of similar quality? *Journal of Accounting and Public Policy,* 29(4): 330-352.

Borel, E. (1921): La théorie du jeu et les équations intégrale à noyau symétrique. Translation: The Theory of Play and Integral Equations with Skew Symmetric Kernels. *Econometrica,* 21: 97-100.

Borel, E. and Ville, J. (1938). Application de la theorie des probabilities aux jeux de hazard, Paris: Gauthier-Villars, reprinted in Borel E. and Cheron, A. (1991): Theorie mathematique du bridge a la portee de tous, Paris: Editions Jacques Gabay.

Carey, P. and Simnett, R. (2006). Audit Partner Tenure and Audit Quality. *The Accounting Review*, 81: 653-676.

Carson, E. (2009). Industry Specialization by Global Audit Firm Networks. *The Accounting Review*, 84: 355-382.

Chaney, P. K., Jeter, D. C., and Shivakumar, L. (2004). Self-Selection of Auditors and Audit Pricing in Private Firms. *The Accounting Review,* 79(1): 51-72.

Choi, J., Francis, K., Kim, J., and Zang, Y. (2010). Audit Office Size, Audit Quality and Audit Pricing. *Auditing: A Journal of Practice and Theory*, 29: 73-97.

Chowdhury, S. M., Kovenock, D., and Sheremeta, R. M. (2013). An experimental investigation of Colonel Blotto games. *Economic Theory*, 52: 833-861.

Church, B. K. and Zhang, P. (2011). Nonaudit Services and Independence in Appearance: Decision Context Matters. *Behavioral Research in Accounting,* 23(2): 51-67.

DeAngelo, L. E. (1981a). Auditor Independence, 'Low Balling', and Disclosure Regulation. *Journal of Accounting and Economics,* 3: 113-127.

DeAngelo, L. E. (1981b). Auditor size and audit quality. *Journal of Accounting and Economics,* 3: 183-199.

Depositario, D., Nayga, R., Wu, X., and Laude, T. P. (2009). Should Students be used as Subjects in Experimental Auctions? *Economics Letters*, 102: 122-124.

Dopuch, N. and King, R. R. (1996). The effects of lowballing on audit quality: An experimental markets study. *Journal of Accounting, Auditing & Finance,* 11: 45-68.

Dopuch, N., King, R. R., and Schwartz, R. (2001). An Experimental Investigation of Retention and Rotation Requirement. *Journal of Accounting Research,* 39(1): 93-117.

Dye, R. A. (1993). Auditing Standards, Legal Liability, and Auditor Wealth. *Journal of Political Economy,* 101: 887-914.

Elliot, W., Hodge, F., Kennedy, J., and Pronk, M. (2007). Are M.B.A. Students a Good Proxy for Nonprofessional Investors? *The Accounting Review*, 82: 139-168.

European Commission (EC) (2010). Green Paper – Audit Policy: Lessons from the Crisis. European. Brussels, Internet: http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52010DC0561 (14.05.2017).

Fischbacher, U. (2007). z-Tree – Zurich toolbox for readymade economic experiments. *Experimental Economics,* 10(2): 171-178.

Groos, O. and Wagner, R. (1950). A Continuous Colonel Blotto Game. *Rand Research Memorandum 408.*

Hart, S. (2008). Discrete Colonel Blotto and General Lotto Games. *International Journal of Game Theory*, 36: 441-460.

Hay, D. C., Knechel, W. R., and Wong, N. (2006). Audit Fees: A Meta-Analysis of the Effect of Supply and Demand Attributes. *Contemporary Accounting Research*, 23: 141-191.

Holt, C. A. and Laury, S. K. (2002). Risk Aversion and Incentive Effects. *The American Economic Review*, 92(5): 1644-1655.

Homburg, S. (2011). Colonel Blotto und seine ökonomischen Anwendungen. *Perspektiven der Wirtschaftspolitik*, 12(1): 1-11.

Johnstone, K. M., Bedard, J. C., and Ettredge, M. L. (2004). The Effect of Competitive Bidding on Engagement Planning and Pricing. *Contemporary Accounting Research,* 21(1): 25-53.

Knechel, W. R., Krishnan, G. V., Pevzner, M., Shefchik, L. B., and Velury, U. K. (2013). Audit Quality: Insights from the Academic Literature. *Auditing: A Journal of Practice & Theory,* 32: 385-421.

Krishnan, G. V. (2003). Does Big 6 Auditor Industry Expertise Constrain Earnings Management? *Accounting Horizons,* Supplement: 1-16.

Lennox, C. S. (1999). Audit Quality and Auditor Size: An Evaluation of Reputation and Deep Pockets Hypotheses. *Journal of Business Finance & Accounting*, 26: 779-805.

Lim, C. and Tan, H. (2008). Non-audit Service Fees and Audit Quality: The Impact of Auditor Specialization. *Journal of Accounting Research*, 46: 199-246.

Liyanarachchi, G. A. (2007). Feasibility of Using Student Subjects in Accounting Experiments: A Review. *Pacific Accounting Review*, 19: 47–67.

Maher, M. W., Tiessen, P., Colson, R., and Broman, A. J. (1992). Competition and Audit Fees. *The Accounting Review*, 67: 199-211.

Modzelewski, K., Stein, J., and Yu, J. (2009). An Experimental Study of Classic Colonel Blotto Games. *Working Paper,* MIT.

Myers, J. N., Myers, L. A., and Omer, T. C. (2003). Exploring the Term of the Auditor-Client Relationship and the Quality of Earnings: A Case for Mandatory Auditor Rotation? *The Accounting Review,* 78: 779-799.

Myerson, R. (1993). Incentives to Cultivate Favored Minorities Under Alternative Electoral Systems. *American Political Science Review,* 87: 856-869.

Palmrose, Z. (1988). An Analysis of Auditor Litigation and Audit Service Quality. *The Accounting Review*, 63: 55-73.

Pearson, T. and Trompeter, G. (1994). Competition in the Market for Audit Services: The Effect of Supplier Concentration on Audit Fees. *Contemporary Accounting Research*, 11: 115-135.

Peecher, M. E. and Solomon, I. (2001). Theory and Experimentation in Studies of Audit Judgments and Decisions: Avoiding Common Research Traps. *International Journal of Auditing,* 5: 193-203.

Remus, W. (1996). Will Behavioral Research on Managerial Decision Making Generalize to Managers? *Managerial and Decision Economics*, 17: 93-101.

Reynolds, J. K. and Francis, J. R. (2001). Does size matter? The influence of large clients on office-level auditor reporting decisions. *Journal of Accounting and Economics,* 30: 375-400.

Roberson, B. (2006). The Colonel Blotto Game. *Economic Theory,* 29: 1-24.

Simunic, D. A. (1980). The pricing of audit services: Theory and evidence. *Journal of Accounting Research*, 18: 161-190.

Teoh, S. H. and Wong, T. J. (1993). Perceived Auditor Quality and the Earnings Response Coefficient. *The Accounting Review,* 68: 346-366.

Weber, J., Willenborg, M., and Zhang, J. (2008). Does Auditor Reputation Matter? The Case of KPMG Germany and ComROAD AG. *Journal of Accounting Research,* 46(4): 941-972.

Willekens, M. and Achmadi, C. (2003). Pricing and supplier concentration in the private client segment of the audit market: Market power or competition? *The International Journal of Accounting*, 38: 431-455.

Wirtschaftsprüferkammer (2015). Ergebnisse der Honorarumfrage 2015 der WPK, Internet: http://www.wpk.de/mitglieder/praxishinweise/honorarumfrage-der-wpk/ (06.12.2016).

# Beitrag III

## Titel

Joint Audits: Does the Allocation of Audit Work Affect Audit Quality and Audit Fees?

Joint Audits: Beeinflusst die Verteilung der Prüfungsarbeit die Prüfungsqualität und die Prüfungskosten?

## Koautoren

Dr. Michelle Muraz, Prof. Dr. Roland Zieseniß

## Anmerkungen

Dieser Beitrag wurde in der Fachzeitschrift *Accounting in Europe* zur Ve4röffentlichung angenommen. Der Beitrag findet sich online unter folgenden permanenten Link: https://doi.org/10.1080/17449480.2018.1440611.

# Beitrag IV

## Titel

Branchenspezialisierung und Marktkonzentration auf dem Abschlussprüfungsmarkt von kommunalen Unternehmen

Industry Specialization and Market Concentration on the Audit Market for Municipal Entities

## Anmerkungen

Dieser Beitrag wurde von der Fachzeitschrift *Zeitschrift für öffentliche und gemeinnützige Unternehmen (ZögU)* zur Veröffentlichung angenommen. Der Beitrag ist im Heft 2-3/2017 erschienen und kann unter folgenden permanenten Link abgerufen werden: https://www.nomos-elibrary.de/10.5771/0344-9777-2017-2-3-199/branchenspezialisierung-und-marktkonzentration-auf-dem-abschlusspruefungsmarkt-von-kommunalen-unternehmen-jahrgang-40-2017-heft-2-3?page=1.

# Beitrag V

## Titel

Auswirkungen einer Umstellung der kommunalen Rechnungslegung vom Neuen Kommunalen Finanzmanagement auf Internationale Rechnungslegungsstandards

Effects of converting the municipal accounting from the North Rhine-Westphalian municipal accounting to International Accounting Standards

## Koautor

M.Sc. Moritz Casper

## Anmerkungen

Dieser Beitrag wurde bei der Fachzeitschrift *Der Moderne Staat (DMS)* eingereicht und befindet sich in der ersten Begutachtungsrunde.

# Auswirkungen einer Umstellung der kommunalen Rechnungslegung vom Neuen Kommunalen Finanzmanagement auf Internationale Rechnungslegungsstandards


## ZUSAMMENFASSUNG

Ziel des vorliegenden Beitrages ist, beispielhaft eine Umrechnung der Jahresabschlüsse vom Neuen Kommunalen Finanzmanagement (NKF) auf die International Public Sector Accounting Standards (IPSAS) von 20 Städten aus Nordrhein-Westfalen vorzunehmen. Dabei sollen insbesondere Auswirkungen einer solchen Umstellung auf die Rückstellungen, das Jahresergebnis, das Eigenkapital, die Bilanzsumme und die Eigenkapitalquoten dargelegt werden.

Der Grund für die Notwendigkeit einer solchen Untersuchung ist, dass die Europäische Union (EU) die Einführung einheitlicher europäischer Rechnungslegungsstandards für das öffentliche Rechnungswesen plant. Diese European Public Sector Accounting Standards (EPSAS) sollen auf den IPSAS basieren. Dementsprechend ist in Ermangelung der Existenz von EPSAS eine Umrechnung von NKF auf IPSAS sinnvoll, um die Auswirkungen der Umstellung des Rechnungslegungssystems aufzuzeigen.

Die Ergebnisse zeigen gravierende Veränderungen der Rückstellungen, des Jahresergebnisses sowie der Eigenkapitalquoten. Dagegen ist die Veränderung der Bilanzsumme eher gering.

## 1 Einleitung

In 2011 ist die Europäische Kommission durch die Richtlinie 2011/85/EU zur Prüfung der Anwendbarkeit der International Public Sector Accounting Standards (IPSAS) in den EU-Mitgliedsstaaten beauftragt worden (Artikel 16 Abs. 3 der Richtlinie 2011/85/EU). Nach Durchführung dieser Prüfung gelten die IPSAS nicht für unmittelbar anwendbar. Jedoch sind sie als Referenzrahmen zur Entwicklung von European Public Sector Accounting Standards (EPSAS) geeignet (Europäische Kommission, 2013, S. 10). Adam (2016) geht von einer unumkehrbaren Entwicklung zu internationalen Standards aus, da die Implementierung innerhalb von zehn Jahren erfolgen soll (Working Group EPSAS, 2015, S. 3). Allerdings ist eine tatsächliche Einführung trotzdem noch ungewiss, da notwendige Mitteilungen der EU-Kommission zur Einführung der EPSAS auf unbestimmte Zeit verschoben wurden (Lorson et al., 2017, S. 578).

Das kommunale Rechnungswesen befindet sich in Deutschland derzeit bereits in einem grundsätzlichen Umbruch, da überwiegend die Kameralistik durch die erweitere Kameralistik oder die Doppik abgelöst wird (Hilgers, 2016; Wirtz, 2008, S. 1). Dies ist Folge der Reform des Haushaltsgemeinderechts von 2003. Diese empfiehlt die Umstellung auf eine ressourcenorientierte Darstellungsform und eine Abkehr von der bisherigen zahlungsorientierten Darstellung (Innenministerkonferenz, 2003, S. 2).

Die Entwicklung zu internationalen Rechnungslegungsstandards könnte gravierende Veränderungen in den Jahresabschlüssen auslösen. Adam (2013) zeigt für die Gemeinde Hiddenhausen, dass nach IPSAS der Jahresfehlbetrag des konsolidierten Jahresabschlusses 2010 um 19% im Vergleich zum in NRW anzuwendenden Neuen Kommunalen Finanzmanagement (NKF) ansteigt (Adam, 2013, S. 114). Eine solche Änderung des Jahresergebnisses würde für Hiddenhausens Bürgermeister Ulrich Rolfsmeyer „zu einem politischen Erdbeben führen, denn sie ist praktisch nicht erklärbar“ (Der Neue Kämmerer, 2013, S. 3).

Das Ziel des vorliegenden Artikels ist es, weitere Erkenntnisse über die Auswirkungen einer Umstellung auf internationale Standards für die Jahresabschlüsse deutscher Kommunen aufzuzeigen. Der Fokus liegt auf den Auswirkungen auf das Eigenkapital, dem Jahresergebnis und der Bilanzsumme, da diese Bilanzposten von kommunalpolitischer Bedeutung sind.

In der Fallstudie zu Hiddenhausen führt die Bilanzierung der Sonderposten, Instandhaltungsrückstellungen und Pensionsrückstellungen zu den wesentlichen Veränderungen bei der Umrechnung des Jahresabschlusses (Adam, 2013, S. 114f.). Deshalb werden diese Bilanzpositionen auch in der vorliegenden Untersuchung vorwiegend betrachtet.

Die Untersuchung betrachtet Städte aus Nordrhein-Westfalen, um eine Vergleichbarkeit der Jahresabschlüsse gewährleisten zu können, da diese Städte einheitlich nach dem Neuen Kommunalen Finanzmanagement (NKF) zu bilanzieren haben. Andere Untersuchungen zur kommunalen Rechnungslegung verwenden ebenfalls NRW mit dem NKF als Referenzland (Henkes, 2008, S. 72). Diese Analyse umfasst die nach Einwohnern 20 größten Städte aus Nordrhein-Westfalen, für die der Einzelabschluss[1] 2013 mit den benötigten Informationen zugänglich ist.[2] Ein weiterer Grund für die Wahl dieser Städte ist, dass Teile dieser Städte bereits finanzielle Schwierigkeiten haben und die Folgen einer IPSAS-Umstellung für diese Städte interessant sind.

Die Ergebnisse dieser Untersuchung zeigen deutliche Veränderungen durch eine IPSAS-Umstellung für das Jahresergebnis. Die Eigenkapitalquoten 1 und 2 verringern sich nach IPSAS-Umstellung deutlich. Ein Wechsel von NKF zu IPSAS führt dazu, dass die Pensionsrückstellungen nicht mehr mit dem Teilwertverfahren sondern mit dem Verfahren der laufenden Einmalprämien bestimmt werden. Dies löst einen hohen Umstellungseffekt aus. Aufgrund dieses hohen Umstellungseffektes bei der Bewertung der Pensionsrückstellungen sollte eine Übergangsregel bei EPSAS-Einführung nach Vorbild der Übergangsregel bei der BilMoG-Einführung zugelassen werden. Damit kann der Umstellungsaufwand über mehrere Jahre verteilt werden und eine einmalige Belastung der kommunalen Ergebnisrechnung vermieden werden.

Der Artikel stellt zunächst in Kapitel 2 die rechtlichen Grundlagen und die Entwicklung der kommunalen Rechnungslegung in Deutschland dar. In Kapitel 3 werden die

[1] Die Gesamtabschlüsse waren häufig nicht zugänglich.

[2] Aachen, Bochum, Bonn, Bottrop, Dortmund, Duisburg, Essen, Gelsenkirchen, Hagen, Hamm, Herne, Leverkusen, Moers, Mühlheim an der Ruhr, Münster, Oberhausen, Paderborn, Recklinghausen, Siegen, Solingen. Köln und Düsseldorf sind nicht enthalten, da wesentliche Informationen nicht zugänglich sind. Im Internet ist für Düsseldorf lediglich Bilanz und Ergebnisrechnung für 2013 ohne Anhang zugänglich. Somit fehlen notwendige Informationen (z. B. aus dem Rückstellungsspiegel). Für Köln war der Jahresabschluss 2013 (Stand 15.06.2016) noch nicht festgestellt.

Hintergründe der IPSAS und EPSAS betrachtet. Kapitel 4 erläutert die Grundlagen und Unterschiede der Rechnungslegung nach NKF und IPSAS. Anschließend werden in Kapitel 5 die relevanten Bilanzpositionen betrachtet, die Umrechnung beispielhaft für die Stadt Leverkusen gezeigt sowie die Ergebnisse für die 20 Städte präsentiert. In Kapitel 6 werden die Umstellungseffekte auf die Rückstellungen, das Jahresergebnis, das Eigenkapital und die Bilanzsumme gezeigt sowie die Veränderungen der Eigenkapitalquoten 1 und 2 dargestellt. Der Artikel schließt in Kapitel 7 mit einer Diskussion und einem Fazit.

## 2 Die kommunale Rechnungslegung in Deutschland

Art. 28 Abs. 2 GG garantiert die kommunale Selbstverwaltung. Die Bundesländer dürfen aufgrund Art. 70 GG Gemeindeverfassungen erlassen. Diese Gemeindeordnungen (GO) enthalten Regelungen zu Aufbau, Zuständigkeit, Struktur, Rechten und Pflichten der Kommunen. In Verbindung mit den Gemeindehaushaltsverordnungen (GemHVO) geben sie Regeln zum kommunalen Rechnungswesen vor (Heiling und Wirtz, 2010, S. 14f.). Die GO NRW und die GemHVO NRW stellen die wesentlichen rechtlichen Grundlagen der zu untersuchenden Jahresabschlüsse dar (Wirtz, 2008, S. 83).

Die Bundesländer haben unabhängige Reformprojekte umgesetzt, da sie zwischen Doppik, erweiterten Kameralistik und einem Optionsmodell für beide Systeme frei entscheiden können (Henkes, 2008, S. 72; Lasar, 2010, S. 8). Unterschiede bestehen neben den Rechnungsstils[3] auch bei den Bilanzierungs- und Bewertungsgrundsätzen (Budäus et al., 2014, S. 153), da das Handelsgesetzbuch (HGB) in jedem Bundesland spezifisch angepasst wurde (Blab, 2014, S. 119).[4] Konsequenterweise gilt das deutsche kommunale Rechnungswesen als heterogen (Budäus et al., 2014, S. 153).

Die traditionelle Kameralistik betrachtet die Gegenüberstellung von Einnahmen und Ausgaben. Es handelt sich um ein Geldverbrauchskonzept (Hurlebaus. 2013, S. 1; Budäus et al., 2014, S. 153). Ressourcenverbrauch sowie Vermögen und Schulden der Kommunen finden in der Kameralistik keine Berücksichtigung (Raupach und

[3] Welches System in welchen Bundesland angewendet wird, stellt Blab (2014) auf Seite 119ff. dar.
[4] Ein Beispiel ist der Abzinsungssatz (z. B. 5% in Niedersachsen und 6% in Hessen) für die Berechnung von Pensionsrückstellungen (Lasar, 2010, S. 11).

Stangenberg, 2009, S. 15f.). Die erweiterte Kameralistik enthält zusätzlich eine Kosten- und Leistungsrechnung sowie eine Vermögensrechnung. Die Doppik berücksichtigt den Ressourcenverbrauch. Zentrale Rechengrößen der Doppik sind Vermögen, Schulden, Erträge, Aufwendungen, Einnahmen und Ausgaben (Budäus et al., 2014, S. 154; Blab, 2014, S. 95 und S. 100). Transaktionen in der Doppik werden zum Zeitpunkt ihrer Entstehung und nicht bei Zu- oder Abfluss von Zahlungsmitteln erfasst (Saliterer et al., 2016, S. 30f.).

## 3 Vorstellung der IPSAS und EPSAS

Herausgeber der IPSAS ist das International Public Sector Accounting Standards Board (IPSASB) (Köhrmann, 2009, S. 163). Die Zielsetzung ist die Entwicklung von Rechnungslegungsstandards für den öffentlichen Sektor zur Erhöhung der Qualität und Einheitlichkeit der weltweiten Berichterstattung (Müller-Marques Berger, 2008, S. 3). Das IPSASB kann keine rechtlich bindenden Standards verabschieden. Die nationalen Gesetzgeber sollen bei der Umsetzung der IPSAS in nationales Recht unterstützt werden (Schuster, 2015, S. 1708).

Grundlage sind die IFRS-Standards. Das IPSASB verändert diese, wenn Eigenheiten des öffentlichen Sektors dies erfordern. Besonderheiten des öffentlichen Sektors führen zur Entwicklung von IPSAS ohne zugrundeliegenden IFRS-Standard (Müller-Marques Berger, 2008, S. 5). Derzeit umfasst das IPSAS-Regelwerk ein Framework, 38 Standards nach dem Konzept der Doppik und einen Standard nach dem Konzept der Kameralistik.[5]

Brasilien, Österreich oder die Schweiz sowie einige andere Länder wenden die IPSAS vollständig oder teilweise an. Supranationale Organisationen (z. B. EU-Kommission, NATO oder UN) nutzen die IPSAS ebenfalls (Schuster, 2015, S. 1709).

Die EPSAS sind eine EU-Initiative zur Einführung einheitlicher Rechnungslegungsstandards für öffentliche Einheiten in den Mitgliedsstaaten (Schuster, 2013, S. 1707). Hintergrund ist die heterogene Situation des öffentlichen Haushalts- und Rechnungswesen in den EU-Mitgliedsstaaten (Budäus et al., 2013, S. 289; Klein, 2015,

[5] Eine Übersicht über die Standards findet sich bei Adam (2016) oder IPSASB (2016), S. 1ff.

S. 643). Die Folge ist eine fehlende Vergleichbarkeit der Finanzberichterstattung (Makaronidis, 2015, S. 4).

Die EPSAS sollen nicht von den Regelungen der IPSAS abweichen (Makaronidis, 2015, S. 5), aber müssen im Sinne einer europäischen Harmonisierung hinsichtlich Wahlrechten und Auslegungsspielräumen konkretisiert werden (Müller-Marques Berger und Heiling, 2015, S. 11). Entwicklung und Implementierung soll innerhalb von zehn Jahren erfolgen (Working Group EPSAS, 2015, S. 3). Derzeit befindet sich der Prozess der EPSAS-Einführung in der Vorbereitungsphase. In dieser Phase werden die Auswirkungen einer EPSAS-Einführung analysiert. Ab 2020 sollen die EPSAS Schritt für Schritt eingeführt werden. Die vollständige Einführung ist bis Ende 2025 geplant. Allerdings wurden wesentliche Mitteilungen in der Vorbereitungsphase auf unbestimmte Zeit verschoben, weshalb Experten eine EPSAS-Einführung anzweifeln (Lorson et al., 2017, S. 577f.).

Eine EPSAS-Einführung würde das heterogene öffentliche Rechnungswesen der EU-Mitgliedsstaaten harmonisieren (Heintges, 2015, S. 26) und somit für längere Zeit die letzte Möglichkeit zur Harmonisierung des heterogenen deutschen öffentlichen Haushalts- und Rechnungswesen sein (Budäus et al., 2013, S. 295).

## 4 Grundlagen und Unterschiede der Rechnungslegung nach IPSAS und NKF

Der Anwendungsbereich der IPSAS umfasst gemäß IPSAS 1.2 die allgemeinen Abschlüsse von öffentlichen Einheiten. Der Begriff öffentliche Einheit ist weitestgehend deckungsgleich mit dem deutschen Begriff der öffentlichen Verwaltung (Müller-Marques Berger, 2008, S. 8). Die Rechnungslegung öffentlicher Unternehmen richtet sich hingegen nach den privatwirtschaftlichen Standards (Saliterer et al., 2016, S. 27).

Zwei wesentliche Rechnungszwecke liegen der IPSAS-Rechnungslegung zugrunde. Dies sind Rechenschaftslegung über die Verwendung der Ressourcen durch eine öffentliche Einheit und die Bereitstellung von entscheidungsnützlichen Informationen für die Adressaten der Rechnungslegung (Adam, 2013, S. 27). Die Rechnungslegung nach NKF hat die Rechnungszwecke Dokumentation, Rechenschaft und Kapitalerhaltung

(Köhrmann, 2009, S. 75ff.). Die unterschiedliche Stellung des Vorsichtsprinzips[6] in den beiden Rechnungslegungssystemen führt zu grundlegenden Unterschieden. Die Folge wären umfangreiche Anpassungen (Adam, 2014, S. 28).

NKF und IPSAS unterscheiden sich auch darin, dass eine Gliederung der Bilanzpositionen nach Fristigkeit in kurz- und langfristige Vermögenswerte und Schulden nur nach IPSAS nicht aber nach NKF notwendig ist (Adam, 2014, S. 28f.).

# 5 Die Umrechnung der Jahresabschlüsse von NKF auf IPSAS

Um die möglichen Auswirkungen einer Umrechnung der Jahresabschlüsse von NKF auf IPSAS aufzuzeigen, müssen die Positionen identifiziert werden, die Veränderungen in den Jahresabschlüssen bei der Umrechnung von NKF auf IPSAS hervorrufen. Adam (2013) zeigt für den Jahresabschluss der Gemeinde Hiddenhausen, dass die größten Effekte bei den Positionen Sonderposten, Instandhaltungsrückstellungen und Pensionsrückstellungen auftreten. Lorson et al. (2017) halten ebenfalls die Rückstellungen für wesentlich.

Deshalb werden diese genannten Positionen herangezogen und im Folgenden jeweils getrennt voneinander in einem eigenen Unterabschnitt betrachtet. Zunächst werden die wesentlichen Bilanzierungsunterschiede zwischen NKF und IPSAS dargelegt. Anschließend wird am Beispiel der Stadt Leverkusen die Umrechnung von NKF auf IPSAS mit Hilfe der Buchungssätze gezeigt. Danach werden die Veränderungen bzw. Anpassungseffekte für die 20 untersuchten Städte präsentiert.

## 5.1 Die Umrechnung der Sonderposten

### 5.1.1 Die Bilanzierung der Sonderposten nach NKF und IPSAS

Sonderposten sind Passiva der kommunalen Bilanzen und werden aufgrund ihres Eigenkapital- und Fremdkapitalcharakters zwischen Eigenkapital und Rückstellungen ausgewiesen (Fudalla et al., 2011, S. 155). Gemäß § 41 Abs. 4 GemHVO NRW gibt es

[6] Eine Diskussion über die Notwendigkeit und Sinnhaftigkeit des Vorsichtsprinzips in der kommunalen Rechnungslegung findet sich bei Kiamann und Wielenberg (2010).

(1) Sonderposten für Zuwendungen, (2) Sonderposten für Beiträge, (3) Sonderposten für den Gebührenausgleich und (4) sonstige Sonderposten.

Ein durch Zuwendungen finanzierter Vermögensgegenstand ist mit den Anschaffungs- und Herstellungskosten (AHK) zu aktivieren. Eine Verrechnung der erhaltenen Zuwendung mit den AHK ist nicht zulässig. Gemäß § 43 Abs. 5 GemHVO NRW werden zweckgebundene Zuwendungen für Investitionen erfolgsneutral als Sonderposten passiviert. Der Sonderposten für Zuwendungen ist parallel zur Abschreibung des Vermögensgegenstandes erfolgswirksam als Ertrag aufzulösen (Fudalla et al., 2011, S. 155f.; Henkes, 2008, S. 336).

Die Bilanzierung von Sonderposten für Beiträge entspricht nach § 43 Abs. 5 GemHVO NRW der Vorgehensweise bei Zuwendungen. Beiträge sind gemäß § 8 Abs. 2 KAG für NRW Geldleistungen zum Aufwandsersatz für Herstellung, Anschaffung und Erweiterung öffentlicher Einrichtungen und Anlagen und stellen die Gegenleistung der anliegenden Grundstückseigentümer für deren Inanspruchnahme dar. Beiträge fallen nach § 127 BauGB für Straßen, Wege und Plätze an und werden gemäß § 8 Abs. 1 KAG erhoben (Henkes, 2008, S. 346f.; Fudalla et al., 2011, S. 156).

Die Sonderposten für den Gebührenausgleich sind gemäß § 43 Abs. 6 GemHVO NRW zu bilden. Bei kostenüberdeckenden Gebühren von Gebührenzahlern sind diese anzusetzen, wenn eine kostenrechnende Einheit (z. B. Stadtwerke) diese erhebt. Im Jahr der Überdeckung ist ein Sonderposten für Gebührenausgleich in Höhe der Kostenüberdeckung anzusetzen, der in den folgenden Jahren durch kostenunterdeckend kalkulierte Gebühren ertragswirksam aufgelöst wird (Henkes, 2008, S. 350; Kußmaul und Henkes, 2009, S. 47; Fudalla et al., 2011, S. 156).

Die sonstigen Sonderposten sind Sammelposten für Sachverhalte, die deren Bildung erfordern (Henkes, 2008, S. 351).[7]

IPSAS 23 regelt die Bilanzierung von Sonderposten. Ziel dieses Standards sind Reglungen zur Bilanzierung von Erträgen aus Transaktionen ohne Gegenleistungen (Adam, 2013, S. 80).

[7] Passivierte Ablösebeträge für Stellplätze in Parkhäusern und Tiefgaragen könnten Beispiele sein (Stadt Paderborn, 2014, S. 467).

Bei Transaktionen ohne Gegenleistungen erbringt (erhält) eine Einheit eine Leistung an (von) eine(r) andere(n) Einheit, ohne eine dem Wert entsprechende Gegenleistung zu erhalten (zu erbringen) (Müller-Marques Berger und Wirtz, 2016, S. 397). Als Beispiele nennt IPSAS 23.5 u. a. Steuern und Transfers einschließlich Zuwendungen, Geldbußen oder Spenden. Sonderposten nach NKF sind somit Transaktionen ohne Gegenleistungen.

Zunächst muss bei einem resultierenden Zufluss aus einer Transaktion ohne Gegenleistung die Definition eines Vermögengegenstandes nach IPSAS 1.7 erfüllt sein (Adam, 2013, S. 80). Nach IPSAS 23.31 hat der Zufluss eines wirtschaftlichen Nutzens überwiegend wahrscheinlich zu sein. Dies ist gemäß IPSAS 23.33 der Fall, wenn die empfangende Einheit Dritten den Zugang zum Nutzungspotenzial des Vermögensgegenstandes verwehren oder reglementieren kann. Die Sonderposten nach NKF erfüllen die IPSAS-Definition eines Vermögensgegenstandes.

Der Zufluss aus Transaktionen ohne Gegenleistung ist auf rechtliche Bestimmungen in Form von Bedingungen (IPSAS 23.17) und Beschränkungen (IPSAS 23.19) zur Festlegung der Verwendung zu prüfen (Adam, 2013, S. 80). Bedingungen verpflichten bei nicht vorgesehener Verwendung des Vermögensgegenstandes zur Rückgabe. Beschränkungen verlangen keine Rückgabepflicht bei abweichender Nutzung des Vermögensgegenstandes (Müller-Marques Berger, 2008, S. 117). Existiert eine Bedingung, ist gemäß IPSAS 23.50 i. V. m. IPSAS 23.55 der damit verbundene Vermögensgegenstand zu aktivieren sowie eine Verbindlichkeit zu passivieren. Ein Ertrag ist vorerst nicht zu erfassen. Nach IPSAS 23.49 ist diese Verbindlichkeit erfolgswirksam aufzulösen, wenn die Bedingung erfüllt und eine Rückabwicklung nicht mehr möglich ist. Ist ein Zufluss mit keiner Bedingung oder mit einer Beschränkung verbunden, darf keine Verbindlichkeit passiviert werden. Im Zugangszeitpunkt ist ein Ertrag zu realisieren (Müller-Marques Berger und Wirtz, 2016, S. 401).

Für NKF-Sonderposten ist eine Prüfung auf das Vorliegen von Bedingungen nach IPSAS 23.17 nötig. Nur bei deren Existenz ist auch nach IPSAS ein Sonderposten zu passivieren. Für einen IPSAS-konformen Abschluss sind Sonderposten unverzüglich ertragswirksam aufzulösen, falls eine solche Bedingung nicht vorliegt (Adam, 2013, S. 127f.).

Die Vorschriften der Bilanzierung von Sonderposten unterscheiden sich grundlegend zwischen NKF und IPSAS. Die IPSAS versuchen einen „richtigen“ Ausweis der Schuld

darzustellen, weshalb erhaltene Mittel ohne Rückzahlungsverpflichtung nicht als Schuld ausgewiesen werden. Die Passivierung der erhaltenen Mittel als Sonderposten nach NKF dient hingegen der Periodisierung der damit verbundenen Erträge (Adam, 2014, S. 72f.).

Sonderposten für Zuwendungen sind lediglich zum Teil mit einer Rückzahlungsverpflichtung bei nicht vertragsgemäßer Verwendung verbunden. Bspw. ist die allgemeine Investitionspauschale zur Unterstützung der Investitionstätigkeit der Kommunen zur Erfüllung ihrer Aufgaben (erhalten NRW-Kommunen auf Basis des GFG) nicht mit einer solchen Bedingung verknüpft (Adam, 2013, S. 127f.; Ministerium für Inneres und Kommunales des Landes Nordrhein-Westfalen, 2014, S. 715 und S. 3118). Zur Erstellung eines IPSAS-konformen Abschlusses ist der Teil der Sonderposten für Zuwendungen aufzulösen, der aus der allgemeinen Investitionspauschale resultiert (Adam, 2013, S. 128).

Für die nach BauGB und KAG NRW erhobenen Beiträge besteht keine Rückzahlungspflicht bei nicht vereinbarungsgemäßer Verwendung, sodass für einen IPSAS-konformen Jahresabschluss die Sonderposten für Beiträge vollständig aufzulösen sind (Adam, 2013, S. 128f.).

Die Sonderposten für den Gebührenausgleich bilden die kostenüberdeckend erhobenen Gebühren einer kostenrechnenden Einheit ab. Diese Sonderposten erfüllen den Tatbestand einer Rückstellung gemäß IPSAS 19.22, weil: (1) in Folge der zu hoch erhobenen Gebühren eine gesetzliche Erstattungsverpflichtung aus dem KAG abgeleitet werden kann, (2) durch Anrechnung der Kostenüberdeckung die zukünftigen niedrigeren Gebühren einen Abfluss von Ressourcen zum Ausgleich der Verpflichtung wahrscheinlich machen, (3) der Betrag dem im Sonderposten enthaltenen Überschuss schätzungsweise entspricht. Die Sonderposten für den Gebührenausgleich sind somit in die sonstigen Rückstellungen umzubuchen (Adam, 2013, S. 129).

### 5.1.2 Die Umrechnung der Sonderposten für die Stadt Leverkusen

Die Jahresabschlüsse geben keine Auskunft über die Zusammensetzung der Sonderposten für Zuwendungen. Beispielsweise ist in den Abschlüssen nicht ersichtlich, wie hoch der Anteil aus der allgemeinen Investitionspauschale ist. Diese Pauschale ist ein Beispiel für

Zuwendungen ohne Rückzahlungsverpflichtung. Dementsprechend kann der aufzulösende Anteil der Sonderposten für Zuwendungen aus den Abschlüssen nicht ermittelt werden. Um verschiedene Möglichkeiten für den aufzulösenden Anteil aufzuzeigen, werden drei verschiedene Szenarien betrachtet: (1) für sämtliche Sonderposten, (2) für die Hälfte der Sonderposten und (3) für keine der Sonderposten besteht eine Rückzahlungsverpflichtung bei nicht vertragsgemäßer Verwendung.

Die gebildeten Sonderposten für Zuwendungen der Stadt Leverkusen betragen laut Tabelle 1 zum 31.12.2013 (Stadt Leverkusen, 2014, S. 109):

| | |
|---|---|
| Sonderposten Zuwendungen 01.01.2013: | 262.803.505,52 € |
| Zuführung: | 16.304.730,31 € |
| Auflösung / Abgänge: | - 14.015.358,77 € |
| Sonderposten Zuwendungen 31.12.2013: | 265.092.877,06 € |

**Tabelle 1:** Sonderposten für Zuwendungen von Leverkusen nach NKF

In Szenario 1 sind die Anforderungen der IPSAS zur Passivierung von Sonderposten erfüllt. Eine Auflösung der Sonderposten ist nicht notwendig.

In Szenario 2 erfüllen die Hälfte der Sonderposten für Zuwendungen die Voraussetzungen der IPSAS. Für diese Hälfte ist eine Auflösung oder Anpassung nicht nötig. Die andere Hälfte ist aufgrund der fehlenden Bedingung aufzulösen. Die Hälfte der zum 01.01.2013 gebildeten Sonderposten für Zuwendungen werden erfolgsneutral in die Neubewertungsrücklage gebucht. Nach IPSAS wären diese bereits im Zugangszeitpunkt des damit finanzierten Vermögensgegenstandes als Ertrag zu erfassen gewesen. Die Hälfte der erfolgten ertragswirksamen Auflösung ist erfolgswirksam als Aufwand zu korrigieren. Zum Zeitpunkt der Aktivierung der finanzierten Vermögensgegenstände wäre dieser Betrag ertragswirksam erfasst worden und ist damit bereits in der erfolgsneutralen Umbuchung in die Neubewertungsrücklage enthalten. Die Hälfte der Zuführungen ist erfolgswirksam als Ertrag umzubuchen, da eine Passivierung als Sonderposten nach IPSAS aufgrund der fehlenden Bedingung für die Hälfte der Zuführungen ausgeschlossen ist.

In Szenario 3 besteht für sämtliche Sonderposten keine Rückzahlungsverpflichtung bei nicht vertragsgemäßer Verwendung, sodass die Voraussetzungen zur Passivierung von Sonderposten nach IPSAS nicht vorliegen. Alle Sonderposten für Zuwendungen sind

aufzulösen. Somit sind beispielhaft für Szenario 3 die folgenden Umbuchungen vorzunehmen:

| | | |
|---|---|---|
| Sonderposten für Zuwendungen | 262.803.505,52 € | |
| an Neubewertungsrücklage | | 262.803.505,52 € |

| | | |
|---|---|---|
| Sonderposten für Zuwendungen | 16.304.730,31 € | |
| an Ertrag | | 16.304.730,31 € |

| | | |
|---|---|---|
| Aufwand | 14.015.358,77 € | |
| an Sonderposten für Zuwendungen | | 14.015.358,77 € |

Für Leverkusen steigt durch die Umstellung das Jahresergebnis 2013, da die Zuführungen die Auflösungen übersteigen.

Als nächstes werden die Sonderposten für Beiträge für Leverkusen betrachtet. Diese betragen gemäß Tabelle 2 zum 31.12.2013 (Stadt Leverkusen, 2014, S. 110):

| | |
|---|---|
| Sonderposten für Beiträge 01.01.2013: | 17.066.794,04 € |
| Zuführung: | 1.271.348,76 € |
| Auflösung / Abgänge: | - 863.648,04 € |
| Sonderposten Beiträge 31.12.2013: | 17.474.494,76 € |

**Tabelle 2:** Sonderposten für Beiträge von Leverkusen nach NKF

Das Vorgehen zur Auflösung der Sonderposten für Beiträge ist exakt das Gleiche wie bei der Auflösung der Sonderposten für Zuwendungen.

| | | |
|---|---|---|
| Sonderposten für Beiträge | 17.066.794,04 € | |
| an Neubewertungsrücklage | | 17.066.794,04 € |

| | | |
|---|---|---|
| Sonderposten für Beiträge | 1.271.348,76 € | |
| an Ertrag | | 1.271.348,76 € |

| | | |
|---|---|---|
| Aufwand | 863.648,04 € | |
| an Sonderposten für Beiträge | | 863.648,04 € |

Für Leverkusen steigt das Jahresergebnis im Zuge der Auflösung der Sonderposten für Beiträge an, da die Erträge die Aufwendungen übersteigen.

Es folgt die Umrechnung der Sonderposten für den Gebührenausgleich. Leverkusen hatte laut Tabelle 3 zum 31.12.2013 folgende Sonderposten für den Gebührenausgleich und sonstige Rückstellungen gebildet (Stadt Leverkusen, 2014, S. 28 und S. 110):

| | |
|---|---|
| Sonderposten Gebührenausgleich 31.12.2013: | 1.475.583,79 € |
| Sonstige Rückstellungen 31.12.2013: | 35.659.278,68 € |

**Tabelle 3:** Sonderposten für Gebührenausgleich und sonstige Rückstellungen von Leverkusen nach NKF

Der Umbuchung stellt einen Passivtausch dar. Der Buchungssatz lautet:

| | | |
|---|---|---|
| Sonderposten für Gebührenausgleich | 1.475.583,79 € | |
| an Sonstige Rückstellungen | | 1.475.583,79 € |

### 5.1.3 Ergebnisse der Umrechnung der Sonderposten für die 20 Städte

Die Sonderposten für Zuwendungen sind ein wesentlicher Bilanzposten. Die Jahresabschlüsse enthalten nach NKF Sonderposten für Zuwendungen von durchschnittlich 454.488.473,41 € (Median: 341.820.162,76 €). Den größten Sonderposten für Zuwendungen hat Duisburg. Die Stadt Paderborn hat den niedrigsten.

Die Umbuchung in die Neubewertungsrücklage beträgt im Durchschnitt bei Szenario 3 460.981.167,00 € (Median: 350.294.847,86 €). Bei 14 von 20 Städten führt die Umstellung auf IPSAS zu einem zusätzlichen Aufwand, da die Zuführungen geringer als die Auflösungen sind. Der durchschnittliche Aufwand liegt im Szenario 2 bei 3.246.346,80 € (Median: 1.391.532,32 €) und bei Szenario 3 bei 6.492.693,59 € (Median: 2.783.064,64 €). Im Durchschnitt belastet die Umstellung somit das Jahresergebnis. Dortmund hat den größten Aufwand, Gelsenkirchen den größten Ertrag. Tabelle 4 stellt die Auswirkungen der Umrechnung dar.

Tabelle 5 zeigt die Ergebnisse pro Einwohner. Den höchsten Aufwand pro Einwohner hat Dortmund, während Gelsenkirchen den höchsten Ertrag pro Einwohner erzielen kann. Diese Ergebnisse pro Einwohner bestätigen somit die vorherigen Ergebnisse. Der durchschnittliche Aufwand pro Einwohner beträgt in Szenario 3 26,41 € (Median: 11,32 €). Durchschnittlich sind pro Einwohner 1.874,78 € (Median: 1.424,63 €) in Szenario 3 in die Neubewertungsrücklage umzubuchen.

| Stadt | NKF / IPSAS Szenario 1 | IPSAS Szenario 2 – Auflösung zu 50% | | | IPSAS Szenario 3 – Auflösung zu 100% | | |
|---|---|---|---|---|---|---|---|
| | Sonderposten (in €) | In NBR (in €) | Aufwand / Ertrag (in €) | Sonderposten (in €) | In NBR (in €) | Aufwand / Ertrag (in €) | Sonder-posten (in €) |
| Aachen | 139.369.505,76 | 69.934.629,44 | - 249.876,56 | 69.684.752,88 | 139.869.258,88 | - 499.753,12 | 0,00 |
| Bochum | 586.205.047,90 | 298.094.492,74 | - 4.991.968,79 | 293.102.523,95 | 596.188.985,47 | - 9.983.937,57 | 0,00 |
| Bonn | 820.124.518,86 | 414.695.262,16 | - 4.633.002.73 | 410.062.259,43 | 829.390.524,32 | - 9.266.005,46 | 0,00 |
| Bottrop | 291.411.322,95 | 151.149.867,81 | - 5.444.206,34 | 145.705.661,48 | 302.299.735,62 | - 10.888.412,67 | 0,00 |
| Dortmund | 1.069.524.338,28 | 555.502.341,04 | - 20.740.171,90 | 534.762,169,14 | 1.111.004.682,08 | - 41.480.343,80 | 0,00 |
| Duisburg | 1.471.517.959,35 | 754.935.271,90 | - 19.176.292,23 | 735.758.979,68 | 1.509.870.543,80 | - 38.352.584,45 | 0,00 |
| Essen | 726.994.867,20 | 360.854.516,03 | 2.642.917,57 | 363.497.433,60 | 721.709.032,06 | 5.285.835,14 | 0,00 |
| Gelsenkirchen | 421.582.373.78 | 205.149.833,21 | 5.641.353,68 | 210.791.186,89 | 410.299.666,42 | 11.282.707,36 | 0,00 |
| Hagen | 378.925.209,96 | 194.786.831,28 | - 5.324.226,30 | 189.462.604,98 | 389.573.662,55 | - 10.648.452,59 | 0,00 |
| Hamm | 443.982.067,36 | 220.759.163,37 | 1.231.870,32 | 221.991.033,68 | 441.518.326,73 | 2.463.740,63 | 0,00 |
| Herne | 304.715.115,56 | 155.508.016,58 | - 3.150.458,80 | 152.357.557,78 | 311.016.033,16 | - 6.300.917,60 | 0,00 |
| Leverkusen | 265.092.877,06 | 131.401.752,76 | 1.144.685,77 | 132.546.438,53 | 262.803.505,52 | 2.289.371,54 | 0,00 |
| Moers | 141.046.356,31 | 71.568.436,89 | - 1.045.258,73 | 70.523.178,16 | 143.136.873,77 | - 2.090.517,46 | 0,00 |
| Mülheim | 273.971.645.,33 | 137.278.365,91 | - 292.543,25 | 136.985.822,67 | 274.556.731,82 | - 585.086,49 | 0,00 |
| Münster | 637.729.645,06 | 323.274.136,47 | - 4.409.313,94 | 318.864.822,53 | 646.548.272,93 | - 8.818.627,87 | 0,00 |
| Oberhausen | 381.542.350,58 | 196.165.738,16 | - 5.394.562,87 | 190.771.175,29 | 392.331.476,31 | - 10.789.125,73 | 0,00 |
| Paderborn | 113.596.401,09 | 58.536.006,45 | - 1.737.805,91 | 56.798.200,55 | 117.072.012,90 | - 3.475.611,81 | 0,00 |
| Recklinghausen | 200.918.166,54 | 100.262.069,24 | 197.014,03 | 100.459.083,27 | 200.524.138,47 | 394.028,07 | 0,00 |
| Siegen | 263.372.932,53 | 132.007.628,23 | - 321.161,97 | 131.686.466,27 | 264.015.256,46 | - 642.323,93 | 0,00 |
| Solingen | 158.146.766,68 | 77.947.310,36 | 1.126.072,99 | 79.073.383,34 | 155.894.620,71 | 2.252.145,97 | 0,00 |
| Arithm. Mittel | 454.488.473,41 | 230.490.583,50 | - 3.246.346,80 | 227.244.236,70 | 460.981.167,00 | - 6.492.693,59 | 0,00 |
| Standardabweichung | 348.198.089,82 | 179,021,458,91 | 6,477,726,20 | 174,099,044,91 | 358,042,917,81 | 12,955,452,39 | 0,00 |
| Median | 341.820.162,76 | 175.147.423,93 | - 1.391.532,32 | 170.910.081,38 | 350.294.847,86 | - 2.783.064,64 | 0,00 |
| Max | 1.471.517.959,35 | 754.935.271,90 | 5.641.353,68 | 735.758.979,68 | 1.509.870.543,80 | 11.282.707,36 | 0,00 |
| Min | 113.596.401,09 | 58.536.006,45 | - 20.740.171,90 | 56.798.200,55 | 117.072.012,90 | - 41.480.343,80 | 0,00 |

**Tabelle 4:** Umrechnung der Sonderposten für Zuwendungen

| Stadt | NKF / IPSAS Szenario 1 | IPSAS Szenario 2 – Auflösung zu 50% | | | IPSAS Szenario 3 – Auflösung zu 100% | | |
|---|---|---|---|---|---|---|---|
| | Sonderposten (in €/Einw.) | In NBR (in €/Einw.) | Aufwand / Ertrag (in €/Einw.) | Sonderposten (in €/Einw.) | In NBR (in €/Einw.) | Aufwand / Ertrag (in €/Einw.) | Sonder-posten (in €/Einw.) |
| Aachen | 566,81 € | 284,42 € | - 1,02 € | 283,40 € | 568,84 € | - 2,03 € | 0,00 € |
| Bochum | 1.607,18 € | 817,27 € | - 20,30 € | 1.192,03 € | 2.424,67 € | - 40,60 € | 0,00 € |
| Bonn | 2.572,46 € | 1.300,76 € | - 18,84 € | 1.667,70 € | 3.373,08 € | - 37,68 € | 0,00 € |
| Bottrop | 2.487,65 € | 1.290,30 € | - 22,14 € | 592,58 € | 1.229,44 € | - 44,28 € | 0,00 € |
| Dortmund | 1.824,56 € | 947,66 € | - 84,35 € | 2.174,85 € | 4.518,39 € | - 168,70 € | 0,00 € |
| Duisburg | 2.995,57 € | 1.536,82 € | - 77,99 € | 2.992,29 € | 6.140,56 € | - 155,98 € | 0,00 € |
| Essen | 1.247,79 € | 619,36 € | 10,75 € | 1.478,32 € | 2.935,15 € | 21,50 € | 0,00 € |
| Gelsenkirchen | 1.619,18 € | 787,92 € | 22,94 € | 857,28 € | 1.668,66 € | 45,89 € | 0,00 € |
| Hagen | 2.004,43 € | 1.030,38 € | - 21,65 € | 770,53 € | 1.584,37 € | - 43,31 € | 0,00 € |
| Hamm | 2.474,86 € | 1.230,56 € | 5,01 € | 902,82 € | 1.795,63 € | 10,02 € | 0,00 € |
| Herne | 1.955,17 € | 997,80 € | - 12,81 € | 619,63 € | 1.264,88 € | - 25,63 € | 0,00 € |
| Leverkusen | 1.621,49 € | 803,74 € | 4,66 € | 539,06 € | 1.068,81 € | 9,31 € | 0,00 € |
| Moers | 1.349,35 € | 684,68 € | - 4,25 € | 286,81 € | 582,13 € | - 8,50 € | 0,00 € |
| Mülheim | 1.618,47 € | 810,96 € | - 1,19 € | 557,11 € | 1.116,61 € | - 2,38 € | 0,00 € |
| Münster | 2.056,93 € | 1.042,69 € | - 17,93 € | 1.296,80 € | 2.629,47 € | - 35,86 € | 0,00 € |
| Oberhausen | 1.808,82 € | 929,99 € | - 21,94 € | 775,86 € | 1.595,59 € | - 43,88 € | 0,00 € |
| Paderborn | 766,89 € | 395,18 € | - 7,07 € | 230,99 € | 476,13 € | - 14,14 € | 0,00 € |
| Recklinghausen | 1.757,35 € | 876,95 € | 0,80 € | 408,56 € | 815,52 € | 1,60 € | 0,00 € |
| Siegen | 2.573,13 € | 1.289,70 € | - 1,31 € | 535,56 € | 1.073,73 € | - 2,61 € | 0,00 € |
| Solingen | 999,18 € | 492,48 € | 4,58 € | 321,59 € | 634,01 € | 9,16 € | 0,00 € |
| Arithm. Mittel | 1.795,36 € | 908,48 € | - 13,20 € | 924,19 € | 1.874,78 € | - 26,41 € | 0,00 € |
| Standardabweichung | 630,71 € | 323,66 € | 26,34 € | 708,05 € | 1.456,14 € | 52,69 € | 0,00 € |
| Median | 1.783,09 € | 903,47 € | - 5,66 € | 695,08 € | 1.424,63 € | - 11,32 € | 0,00 € |
| Max | 2.995,57 € | 1.536,82 € | 22,94 € | 2.992,29 € | 6.140,56 € | 45,89 € | 0,00 € |
| Min | 566,81 € | 284,42 € | - 84,35 € | 230,99 € | 476,13 € | - 168,70 € | 0,00 € |

**Tabelle 5:** Umrechnung der Sonderposten für Zuwendungen pro Einwohner

Im Vergleich zu den Sonderposten für Zuwendungen ist bei einem Großteil der Städte der Sonderposten für Beiträge niedriger. Dennoch stellt dieser Sonderposten bei einigen Städten einen relevanten Bilanzposten dar. Nach NKF betragen die Sonderposten für Beiträge durchschnittlich 111.661.936,82 € (Median: 71.254.086,10 €). Münster weist absolut den höchsten und Solingen den geringsten Sonderposten für Beiträge aus.

Im Rahmen der Auflösung werden im arithmetischen Mittel 114.742.426,35 € (Median: 75.000.525,64 €) in die Neubewertungsrücklage umgebucht. Für 18 der 20 Städte entsteht durch die Auflösung ein Aufwand, da die Auflösungen die Zuführungen übersteigen. Münster hat absolut den größten Aufwand zu tragen. Leverkusen und Siegen erzielen einen Ertrag. Im Durchschnitt ergibt sich ein Aufwand von 3.080.489,54 € (Median: 1.926.211,52 €). Diese Ergebnisse werden in Tabelle 6 dargestellt.

| **Stadt** | **NKF** | **IPSAS – Auflösung zu 100 %** | | |
|---|---|---|---|---|
| | Sonderposten (in €) | In NBR (in €) | Aufwand / Ertrag (in €) | Sonderposten (in €) |
| Aachen | 44.275.450,39 | 44.300.246,14 | - 24.795,75 | 0,00 |
| Bochum | 144.116.730,72 | 150.356.826,28 | - 6.240.095,56 | 0,00 |
| Bonn | 178.356.030,21 | 180.476.512,81 | - 2.120.482,60 | 0,00 |
| Bottrop | 17.760.525,82 | 18.978.044,64 | - 1.217.518,82 | 0,00 |
| Dortmund | 29.691.219,96 | 29.940.041,39 | - 248.821,43 | 0,00 |
| Duisburg | 171.117.739,75 | 176.951.849,12 | - 5.834.109,37 | 0,00 |
| Essen | 49.008.019,20 | 49.951.821,85 | - 943.802,65 | 0,00 |
| Gelsenkirchen | 81.965.153,11 | 85.420.496,14 | - 3.455.343,03 | 0,00 |
| Hagen | 115.963.623,80 | 118.675.813,27 | - 2.712.189,47 | 0,00 |
| Hamm | 101.357.628,64 | 103.115.582,24 | - 1.757.953,60 | 0,00 |
| Herne | 17.172.737,25 | 17.349.975,67 | - 177.238,42 | 0,00 |
| Leverkusen | 17.474.494,76 | 17.066.794,04 | 407.700,72 | 0,00 |
| Moers | 75.874.504,35 | 81.272.913,99 | - 5.398.409,64 | 0,00 |
| Mülheim | 58.938.201,60 | 60.593.552,56 | - 1.655.350,96 | 0,00 |
| Münster | 689.680.808,85 | 709.312.097,81 | - 19.631.288,96 | 0,00 |
| Oberhausen | 66.633.667,85 | 68.728.137,28 | - 2.094.469,43 | 0,00 |
| Paderborn | 171.681.636,26 | 176.049.666,24 | - 4.368.029,98 | 0,00 |
| Recklinghausen | 151.019.269,93 | 155.089.274,86 | - 4.070.004,93 | 0,00 |
| Siegen | 39.073.260,22 | 38.233.692,20 | 839.568,02 | 0,00 |
| Solingen | 12.078.033,68 | 12.985.188,53 | - 907.154,85 | 0,00 |
| Arithm. Mittel | 111.661.936,82 | 114.742.426,35 | - 3.080.489,54 | 0,00 |
| Standard-abweichung | 147.322.940,41 | 151.535.142,20 | 4.422.029,49 | 0,00 |
| Median | 71.254.086,10 | 75.000.525,64 | - 1.926.211,52 | 0,00 |
| Max | 689.680.808,85 | 709.312.097,81 | 839.568,02 | 0,00 |
| Min | 12.078.033,68 | 12.985.188,53 | - 19.631.288,96 | 0,00 |

**Tabelle 6:** Umrechnung der Sonderposten für Beiträge

Die Ergebnisse pro Einwohner bestätigen die vorherigen Ergebnisse. Den größten

Aufwand pro Einwohner hat nach IPSAS die Stadt Münster. Siegen würde den höchsten Ertrag pro Einwohner erzielen. Die höchste Umbuchung in die Neubewertungsrücklage pro Einwohner hat ebenfalls Münster, während Dortmund pro Einwohner die geringste Umbuchung in die Neubewertungsrücklage hat. Durchschnittlich liegt ein Aufwand pro Einwohner von 14,08 € (Median: 9,86 €) vor. Die Umbuchung in die Neubewertungsrücklage beträgt im Durchschnitt pro Einwohner 515,68 € (Median: 359,09 €). Diese Ergebnisse stellt Tabelle 7 dar.

| Stadt | NKF | IPSAS – Auflösung zu 100% | | |
|---|---|---|---|---|
| | Sonderposten (in €/Einw.) | In NBR (in €/Einw.) | Aufwand / Ertrag (in €/Einw.) | Sonderposten (in €/Einw.) |
| Aachen | 180,07 € | 180,17 € | - 0,10 € | 0,00 € |
| Bochum | 395,12 € | 412,23 € | - 17,11 € | 0,00 € |
| Bonn | 559,44 € | 566,10 € | - 6,65 € | 0,00 € |
| Bottrop | 151,61 € | 162,01 € | - 10,39 € | 0,00 € |
| Dortmund | 50,65 € | 51,08 € | - 0,42 € | 0,00 € |
| Duisburg | 348,34 € | 360,22 € | - 11,88 € | 0,00 € |
| Essen | 84,12 € | 85,74 € | - 1,62 € | 0,00 € |
| Gelsenkirchen | 314,81 € | 328,08 € | - 13,27 € | 0,00 € |
| Hagen | 613,42 € | 627,77 € | - 14,35 € | 0,00 € |
| Hamm | 564,99 € | 574,79 € | - 9,80 € | 0,00 € |
| Herne | 110,19 € | 111,32 € | - 1,14 € | 0,00 € |
| Leverkusen | 106,89 € | 104,39 € | 2,49 € | 0,00 € |
| Moers | 725,87 € | 777,52 € | - 51,65 € | 0,00 € |
| Mülheim | 348,17 € | 357,95 € | - 9,78 € | 0,00 € |
| Münster | 2.224,50 € | 2.287,82 € | - 63,32 € | 0,00 € |
| Oberhausen | 315,90 € | 325,83 € | - 9,93 € | 0,00 € |
| Paderborn | 1.159,02 € | 1.188,51 € | - 29,49 € | 0,00 € |
| Recklinghausen | 1.320,91 € | 1.356,51 € | - 35,60 € | 0,00 € |
| Siegen | 381,74 € | 373,54 € | 8,20 € | 0,00 € |
| Solingen | 76,31 € | 82,04 € | - 5,73 € | 0,00 € |
| Arithm. Mittel | 501,60 € | 515,68 € | - 14,08 € | 0,00 € |
| Standard-abweichung | 532,00 € | 547,61 € | 18,09 € | 0,00 € |
| Median | 348,26 € | 359,09 € | - 9,86 € | 0,00 € |
| Max | 2.224,50 € | 2.287,82 € | 8,20 € | 0,00 € |
| Min | 50,65 € | 51,08 € | - 63,32 € | 0,00 € |

**Tabelle 7:** Umrechnung der Sonderposten für Beiträge pro Einwohner

Die Umbuchung der Sonderposten für Zuwendungen und Beiträge in die Neubewertungsrücklage führt zu einem Anstieg des Eigenkapitals (Passivtausch) oder zu einem Sinken des Eigenkapitalfehlbetrags (Bilanzverkürzung). Die Höhe ist vom Anteil der aufzulösenden Sonderposten für Zuwendungen abhängig. Die Auflösung dieser zwei Sonderposten verändert das Jahresergebnis, deren Veränderung von der Höhe der ertrags-

und aufwandswirksamen Umbuchungen abhängt.

Es folgen die Anpassungseffekte für den Sonderposten für den Gebührenausgleich. Aachen hat nach NKF den größten Sonderposten für den Gebührenausgleich. Der Durchschnitt beträgt 2.928.163,83 € (Median: 2.072.697,90 €). Dieser Sonderposten erfüllt nach IPSAS die Ansetzungskriterien einer Rückstellung. Die sonstigen Rückstellungen nach NKF betragen im Durchschnitt 56.778.683,64 € (Median: 39.562.602,12 €). Diese erhöhen sich nach IPSAS auf durchschnittlich 59.706.847,46 € (Median: 40.978.047,63 €). Es liegt eine durchschnittliche prozentuale Steigerung der sonstigen Rückstellungen um 7,53% (Median: 3,46%) vor.

Die absolut höchsten sonstigen Rückstellungen nach NKF und IPSAS hat Dortmund. Siegen ist die Stadt mit den niedrigsten sonstigen Rückstellungen nach NKF. Moers weist nach IPSAS die geringsten sonstigen Rückstellungen auf. Die größte prozentuale Veränderung der sonstigen Rückstellungen von NKF zu IPSAS lässt sich für Siegen feststellen. Tabelle 8 zeigt diese Ergebnisse.

| Stadt | NKF | | IPSAS | | Prozentuale Veränderung von NKF zu IPSAS |
|---|---|---|---|---|---|
| | Sonderposten Gebührenausgleich (in €) | sonstige Rückstellungen (in €) | Sonderposten Gebührenausgleich (in €) | Sonstige Rückstellungen (in €) | |
| Aachen | 12.702.819,86 | 83.139.089,47 | 0,00 | 95.841.909,33 | 15,28% |
| Bochum | 2.035.882,00 | 73.363.620,83 | 0,00 | 75.399.502,83 | 2,78% |
| Bonn | 12.585.873,03 | 47.544.605,78 | 0,00 | 60.130.478,81 | 26,47% |
| Bottrop | 86.865,17 | 16.019.789,77 | 0,00 | 16.106.654,94 | 0,54% |
| Dortmund | 2.479.480,96 | 265.291.273,21 | 0,00 | 267.770.754,17 | 0,93% |
| Duisburg | 0,00 | 88.536.590,25 | 0,00 | 88.536.590,25 | 0,00% |
| Essen | 6.933.105,72 | 110.513.722,43 | 0,00 | 117.446.828,15 | 6,27% |
| Gelsenkirchen | 832.448,00 | 34.227.730,56 | 0,00 | 35.060.178,56 | 2,43% |
| Hagen | 2.887.501,34 | 32.280.361,67 | 0,00 | 35.167.863,01 | 8,95% |
| Hamm | 721.377,23 | 40.932.886,35 | 0,00 | 41.654.263,58 | 1,76% |
| Herne | 0,00 | 25.309.205,56 | 0,00 | 25.309.205,56 | 0,00% |
| Leverkusen | 1.475.583,79 | 35.659.278,68 | 0,00 | 37.134.862,47 | 4,14% |
| Moers | 0,00 | 8.720.083,13 | 0,00 | 8.720.083,13 | 0,00% |
| Mülheim | 734.735,91 | 72.751.526,22 | 0,00 | 73.486.262,13 | 1,01% |
| Münster | 2.314.608,57 | 52.621.001,85 | 0,00 | 54.935.610,42 | 4.40% |
| Oberhausen | 3.827.440,90 | 56.875.536,16 | 0,00 | 60.702.977,06 | 6,73% |
| Paderborn | 2.925.483,25 | 17.148.721,16 | 0,00 | 20.074.204,41 | 17,06% |
| Recklinghausen | 2.109.513,79 | 38.192.317,88 | 0,00 | 40.301.831,67 | 5,52% |
| Siegen | 3.910.557,00 | 8.436.811,98 | 0,00 | 12.347.368,98 | 46,35% |
| Solingen | 0,00 | 28.009.519,79 | 0,00 | 28.009.519,79 | 0,00% |
| Arithm. Mittel | 2.928.163,83 | 56.778.683,64 | 0,00 | 59.706.847,46 | 7,53% |
| Standard-abweichung | 3.750.277,06 | 56.451.567,70 | 0,00 | 57.190.925,12 | 11,45% |
| Median | 2.072.697,90 | 39.562.602,12 | 0,00 | 40.978.047,63 | 3,46% |
| Max | 12.702.819,86 | 265.291.273,21 | 0,00 | 267.770.754,17 | 46,35% |
| Min | 0,00 | 8.436.811,98 | 0,00 | 8.720.083,13 | 0,00% |

**Tabelle 8:** Umrechnung der Sonderposten für den Gebührenausgleich

Auf die Einwohnerzahl runtergebrochen bestätigen sich diese Ergebnisse. Es zeigt sich, dass Dortmund pro Einwohner die höchsten sonstigen Rückstellungen sowohl nach NKF als auch IPSAS aufweist. Die geringsten sonstigen Rückstellungen pro Einwohner hat nach NKF Siegen und nach IPSAS Moers. Im Durchschnitt betragen die sonstigen Rückstellungen pro Einwohner nach NKF 211,02 € (Median: 178,60 €) und nach IPSAS 223,59 € (Median: 187,32 €) Diese Ergebnisse sind in Tabelle 9 dargestellt.

| Stadt | NKF | | IPSAS | | Prozentuale Veränderung von NKF zu IPSAS |
|---|---|---|---|---|---|
| | Sonderposten Gebührenausgleich (in €/Einw.) | sonstige Rückstellungen (in €/Einw.) | Sonderposten Gebührenausgleich (in €/Einw.) | Sonstige Rückstellungen (in €/Einw.) | |
| Aachen | 51,66 | 338,12 | 0,00 | 389,78 | 15,28% |
| Bochum | 5,58 | 201,14 | 0,00 | 206,72 | 2,78% |
| Bonn | 39,48 | 149,13 | 0,00 | 188,61 | 26,47% |
| Bottrop | 0,74 | 136,75 | 0,00 | 137,50 | 0,54% |
| Dortmund | 4,23 | 452,58 | 0,00 | 456,81 | 0,93% |
| Duisburg | 0,00 | 180,23 | 0,00 | 180,23 | 0,00% |
| Essen | 11,90 | 189,68 | 0,00 | 201,58 | 6,27% |
| Gelsenkirchen | 3,20 | 131,46 | 0,00 | 134,66 | 2,43% |
| Hagen | 15,27 | 170,76 | 0,00 | 186,03 | 8,95% |
| Hamm | 4,02 | 228,17 | 0,00 | 232,19 | 1,76% |
| Herne | 0,00 | 162,39 | 0,00 | 162,39 | 0,00% |
| Leverkusen | 9,03 | 218,12 | 0,00 | 227,14 | 4,14% |
| Moers | 0,00 | 83,42 | 0,00 | 83,42 | 0,00% |
| Mülheim | 4,34 | 429,78 | 0,00 | 434,12 | 1,01% |
| Münster | 7,47 | 169,72 | 0,00 | 177,19 | 4,40% |
| Oberhausen | 18,15 | 269,64 | 0,00 | 287,78 | 6,73% |
| Paderborn | 19,75 | 115,77 | 0,00 | 135,52 | 17,06% |
| Recklinghausen | 18,45 | 334,05 | 0,00 | 352,50 | 5,52% |
| Siegen | 38,21 | 82,43 | 0,00 | 120,63 | 46,35% |
| Solingen | 0,00 | 176,97 | 0,00 | 176,97 | 0,00% |
| Arithm. Mittel | 12,57 € | 211,02 € | 0,00 € | 223,59 € | 7,53% |
| Standard-abweichung | 14,85 € | 104,43 € | 0,00 € | 106,09 € | 11,45% |
| Median | 6,52 € | 178,60 € | 0,00 € | 187,32 € | 3,46% |
| Max | 51,66 € | 452,58 € | 0,00 € | 456,81 € | 46,35% |
| Min | 0,00 € | 82,43 € | 0,00 € | 83,42 € | 0,00% |

**Tabelle 9:** Umrechnung der Sonderposten für den Gebührenausgleich pro Einwohner

Einige der betrachteten Städte haben nach NKF sonstige Sonderposten gebildet. Es wird angenommen, dass diese sonstigen Sonderposten die Passivierungsvoraussetzungen nach IPSAS erfüllen und somit unverändert bleiben.[8]

## 5.2 Die Umrechnung der Instandhaltungsrückstellungen von NKF auf IPSAS

### 5.2.1 Die Bilanzierung von Instandhaltungsrückstellungen nach NKF und IPSAS

Nach der GemHVO NRW können Rückstellungen für unterlassene Instandhaltung von Sachanlagen gebildet werden. Diese Instandhaltungsrückstellungen zeichnen sich durch

[8] Sollten die Passivierungsvoraussetzungen nicht gegeben sein, würde der Umstellungseffekt höher ausfallen.

eine fehlende Außenverpflichtung aus. Die IPSAS verlangen aber eine Außenverpflichtung für die Bildung von Rückstellungen, weshalb nach NKF gebildete Rückstellungen für Instandhaltungen nach IPSAS aufzulösen sind (Adam, 2013, S. 129; Fudalla et al., 2011, S. 169).

Unterlassene Instandhaltungen können nach IPSAS ein Indiz für eine mögliche außerplanmäßige Wertminderung der Vermögensgegenstände sein. Wenn der erzielbare Betrag eines Vermögensgegenstandes niedriger als dessen Buchwert ist, ist eine außerplanmäßige Abschreibung durchzuführen (Müller, 2016a, S. 306; Müller-Marques Berger, 2008, S. 110; Köhrmann, 2009, S. 193). Nach IPSAS können für einen Impairment-Test von zahlungsmittelgenerierenden Vermögenswerten Cash-Generating Units gebildet werden, um die erzielbaren Beträge zu ermitteln (Lorson et al., 2017, S. 584).[9]

Aus Vereinfachungsgründen wird – wie bei der Umrechnung der Gemeinde Hiddenhausen durch Adam (2013) – ein außerplanmäßiger Wertminderungsbedarf in Folge einer unterlassenen Instandhaltung angenommen, da die Ermittlung der erzielbaren Beträge aus den vorhandenen Daten der untersuchten Abschlüssen nicht möglich ist. In Folge dieser Annahme entspricht die außerplanmäßige Abschreibung wertmäßig der Instandhaltungsrückstellung (Adam, 2013, S. 122 und S. 129).

### 5.2.2 Die Umrechnung der Instandhaltungsrückstellungen für die Stadt Leverkusen

Für Leverkusen betragen die Instandhaltungsrückstellungen in 2013 laut Tabelle 10 (Stadt Leverkusen, 2014, S. 112):

| | |
|---|---|
| Instandhaltungsrückstellungen 01.01.2013: | 11.701.435,92 € |
| Zuführung: | 2.216.000,00 € |
| Inanspruchnahme: | 3.688.661,80 € |
| Auflösung: | 1.686.470,08 € |
| Instandhaltungsrückstellungen 31.12.2013: | 8.542.304,04 € |

**Tabelle 10:** Instandhaltungsrückstellungen Stadt Leverkusen nach NKF

[9] Für die unterschiedliche Vorgehensweise der Ermittlung des Wertminderungsbedarf und der Durchführung der Impairment-Tests von nicht-zahlungsmittelgenierenden und zahlungsmittelgeniereden Vermögenswerten siehe Köhrmann (2009), S. 193-199.

Bei der beschriebenen Vorgehensweise ist die zum 01.01.2013 vorliegende Instandhaltungsrückstellung erfolgsneutral gegen das Sachanlagevermögen aufzulösen sowie die Zuführungen zu den Instandhaltungsrückstellungen erfolgswirksam gegen das Sachanlagevermögen zu verrechnen (Adam, 2013, S. 122). Im Umkehrschluss ist eine erfolgte Auflösung eine Wertaufholung des Sachanlagevermögens.

Durch Auflösung der Instandhaltungsrückstellungen kann der eingestellte Betrag nicht mehr für die anfallenden Instandhaltungsmaßnahmen verwendet werden. Gemäß IPSAS 17.23 sind Instandhaltungsmaßnahmen als sofortiger Aufwand zu erfassen. Der Instandhaltungsaufwand belastet das Jahresergebnis. Die Aufhebung der Instandhaltungsrückstellung für einen IPSAS-konformen Abschluss führt zu einer Bilanzverkürzung, da Fremdkapital und Sachanlagevermögen sinken. Die Umbuchung der Auflösung der Instandhaltung als Zuschreibung zum Sachanlagevermögen ist eine Bilanzverlängerung.

Für 2013 ist die Inanspruchnahme als Instandhaltungsaufwand zu verbuchen. Somit fallen die folgenden schematischen Umrechnungen an:

| | | |
|---|---|---|
| Instandhaltungsrückstellungen | 11.701.435,92 € | |
| an Sachanlagevermögen (erfolgsneutral) | | 11.701.435,92 € |

| | | |
|---|---|---|
| Instandhaltungsrückstellungen | 2.216.000,00 € | |
| an Sachanlagevermögen (erfolgswirksam) | | 2.216.000,00 € |

| | | |
|---|---|---|
| Instandhaltungsaufwand | 3.688.661,80 € | |
| an Instandhaltungsrückstellungen | | 3.688.661,80 € |

| | | |
|---|---|---|
| Sachanlagevermögen | 1.686.470,08 € | |
| an Instandhaltungsrückstellungen | | 1.686.470,08 € |

### 5.2.3 Ergebnisse der Umrechnung der Instandhaltungsrückstellungen für die 20 Städte

Die entstehenden Veränderungen aus der Umbuchung der Instandhaltungsrückstellungen für die 20 betrachteten Städte sind der Tabelle 11 zu entnehmen.

Die Höhe der Instandhaltungsrückstellungen in der Bilanz ist eher gering. Die durchschnittliche Höhe der Instandhaltungsrückstellungen nach NKF beträgt

5.273.958,15 € (Median: 3.047.783,93 €). Bochum hat die größte Instandhaltungsrückstellung und hat konsequenterweise die größte Wertminderung (33.751.729,88 €) des Sachanlagevermögens. Die außerplanmäßige Wertminderung des Sachanlagevermögens beträgt durchschnittlich 7.312.252,17 € (Median: 4.061.944,08 €). Für Städte ohne Instandhaltungsrückstellungen zum 31.12.2013 fallen keine außerplanmäßigen Wertminderungen an. Die durchschnittliche Wertaufholung beträgt 648.235,26 € (Median: 130.336,17 €).

Nach NKF liegt ein durchschnittliches Sachanlagevermögen von 1.760.685.928,20 € (Median: 1.405.197.314,34 €) vor. In Folge der Umrechnung sinkt das Sachanlagevermögen im Durchschnitt auf 1.754.021.911,29 € (Median: 1.395.814.430,03 €). Dies bedeutet eine durchschnittlich prozentuale Abnahme von 0,38% (Median: 0,26%). Insgesamt sind die Auswirkungen durch Auflösung der Instandhaltungsrückstellungen gering.

Bochum hat den größten Instandhaltungsaufwand (9.828.141,25 €). Für Oberhausen entsteht als einzige Stadt mit Instandhaltungsrückstellungen kein Instandhaltungsaufwand in Folge der Umrechnung, da die Instandhaltungsrückstellung in 2013 nicht in Anspruch genommen wird. Bottrop hat die zum 01.01.2013 gebildete Instandhaltungsrückstellung vollständig in Anspruch genommen, sodass in gleicher Höhe ein Instandhaltungsaufwand entsteht.

Tabelle 12 zeigt, dass auch pro Einwohner der höchste Instandhaltungsaufwand im Jahr 2013 in Bochum vorliegt. Die höchste Instandhaltungsrückstellung pro Einwohner wurde in Mühlheim an der Ruhr gebildet. Mülheim an der Ruhr hat auch die höchste Wertminderung pro Einwohner. Pro Einwohner gerechnet hat Recklinghausen das höchste Sachanlagevermögen. Dies gilt sowohl für NKF mit 10.575,07 € als auch für IPSAS mit 10.505,36 €. Hingegen hat die Stadt Paderborn das niedrigste Sachanlagevermögen pro Einwohner mit 4.531,83 € nach NKF und 4.526,90 € nach IPSAS.

| Stadt | NKF | IPSAS – keine Instandhaltungsrückstellung | | | Sachanlagevermögen | | |
|---|---|---|---|---|---|---|---|
| | Instandhaltungsrück-stellung zum 31.12.2013 (in €) | Wert-minderungen (in €) | Wert-aufholungen (in €) | Instandhaltungs-aufwand (in €) | NKF (in €) | IPSAS (in €) | Prozentuale Veränderung |
| Aachen | 1.464.358,89 | 1.789.271,20 | 0,00 | 324.912,31 | 1.501.055.859,38 | 1.499.266.588,18 | - 0,12% |
| Bochum | 22.599.597,32 | 33.751.729,88 | 1.323.991,31 | 9.828.141,25 | 2.974.316.404,11 | 2.941.888.665,54 | - 1,09% |
| Bonn | 0,00 | 0,00 | 0,00 | 0,00 | 3.227.170.016,89 | 3.227.170.016,89 | 0,00% |
| Bottrop | 0,00 | 163.876,97 | 0,00 | 163.876,97 | 894.400.357,67 | 894.236.480,70 | - 0,02% |
| Dortmund | 18.727.241,82 | 26.744.797,22 | 3.522.137,70 | 4.495.417,70 | 3.925.637.696,81 | 3.902.415.037,29 | - 0,59% |
| Duisburg | 1.352.252,28 | 1.885.116,24 | 12.163,36 | 520.700,60 | 2.976.160.871,77 | 2.974.287.918,89 | - 0,06% |
| Essen | 6.857.681,07 | 10.184.622,40 | 1.393.918,81 | 1.933.022,52 | 3.284.602.250,97 | 3.275.811.547,38 | - 0,27% |
| Gelsenkirchen | 0,00 | 0,00 | 0,00 | 0,00 | 1.637.749.353,07 | 1.637.749.353,07 | 0,00% |
| Hagen | 5.460.276,18 | 7.845.206,43 | 2.384.930,25 | 0,00 | 1.644.750.041,84 | 1.639.289.765,66 | - 0,33% |
| Hamm | 596.700,00 | 941.000,00 | 0,00 | 344.300,00 | 1.083.619.952,57 | 1.082.678.952,57 | - 0,09% |
| Herne | 0,00 | 0,00 | 0,00 | 0,00 | 1.095.475.552,68 | 1.095.475.552,68 | 0,00% |
| Leverkusen | 8.542.304,04 | 13.917.435,92 | 1.686.470,08 | 3.688.661,80 | 980.523.260,62 | 968.292.294,78 | - 1,25% |
| Moers | 650.281,85 | 1.817.922,59 | 192.672,34 | 974.968,40 | 843.236.670,31 | 841.611.420,06 | - 0,19% |
| Mülheim | 15.954.547,43 | 17.684.326,43 | 707.829,00 | 1.021.950,00 | 1.309.338.769,30 | 1.292.362.271,87 | - 1,30% |
| Münster | 6.530.302,67 | 7.276.168,50 | 0,00 | 745.865,83 | 2.813.337.667,77 | 2.806.061.499,27 | - 0,26% |
| Oberhausen | 3.860.875,00 | 3860.875,00 | 0,00 | 0,00 | 1.516.344.774,60 | 1.512.483.899,60 | - 0,25% |
| Paderborn | 375.225,54 | 798.637,23 | 68.000,00 | 355.411,69 | 671.281.500,93 | 670.550.863,70 | - 0,11% |
| Recklinghausen | 6.411.951,14 | 8.895.576,38 | 924.642,07 | 1.558.983,17 | 1.209.048.268,85 | 1.201.077.334,54 | - 0,66% |
| Siegen | 2.457.989,65 | 4.425.467,90 | 532.290,21 | 1.435.188,04 | 849.836.261,58 | 845.943.083,89 | - 0,46% |
| Solingen | 3.637.578,21 | 4.263.013,15 | 215.660,07 | 409.774,87 | 775.833.032,31 | 771.785.679,23 | - 0,52% |
| Arithm. Mittel | 5.273.958,15 | 7.312.252,17 | 648.235,26 | 1.390.058,76 | 1.760.685.928,20 | 1.754.021.911,29 | - 0,38% |
| Standardabweichung | 6.618.754,45 | 9.327.761,33 | 972.166,13 | 2.332.340,80 | 1.025.210.506,51 | 1.021.197.727,57 | 0,41% |
| Median | 3.047.783.93 | 4.061.944,08 | 130.336,17 | 465.237,74 | 1.405.197.314,34 | 1.395.814.430,03 | - 0,26% |
| Max | 22.599.597,32 | 33.751.729,88 | 3.522.137,70 | 9.828.141,25 | 3.925.637.696,81 | 3.902.415.037,29 | 0,00% |
| Min | 0,00 | 0,00 | 0,00 | 0,00 | 671.281.500,93 | 670.550.863,70 | - 1,30% |

**Tabelle 11:** Umrechnung der Instandhaltungsrückstellungen und des Sachanlagevermögens

| Stadt | NKF | IPSAS – keine Instandhaltungsrückstellung | | | Sachanlagevermögen | | |
|---|---|---|---|---|---|---|---|
| | Instandhaltungsrück-stellung 31.12.2013 (in €/Einw.) | Wert-minderungen (in €/Einw.) | Wert-aufholungen (in €/Einw.) | Instandhaltungs-aufwand (in €/Einw.) | NKF (in €/Einw.) | IPSAS (in €/Einw.) | Prozentuale Veränderung |
| Aachen | 5,96 € | 7,28 € | 0,00 € | 1,32 € | 6.104,71 € | 6.097,43 € | -0,12% |
| Bochum | 61,96 € | 92,54 € | 3,63 € | 26,95 € | 8.154,58 € | 8.065,67 € | -1,09% |
| Bonn | 0,00 € | 0,00 € | 0,00 € | 0,00 € | 10.122,58 € | 10.122,58 € | 0,00% |
| Bottrop | 0,00 € | 1,40 € | 0,00 € | 1,40 € | 7.635,12 € | 7.633,72 € | -0,02% |
| Dortmund | 31,95 € | 45,63 € | 6,01 € | 7,67 € | 6.696,97 € | 6.657,36 € | -0,59% |
| Duisburg | 2,75 € | 3,84 € | 0,02 € | 1,06 € | 6.058,58 € | 6.054,76 € | -0,06% |
| Essen | 11,77 € | 17,48 € | 2,39 € | 3,32 € | 5.637,60 € | 5.622,51 € | -0,27% |
| Gelsenkirchen | 0,00 € | 0,00 € | 0,00 € | 0,00 € | 6.290,13 € | 6.290,13 € | 0,00% |
| Hagen | 28,88 € | 41,50 € | 12,62 € | 0,00 € | 8.700,36 € | 8.671,47 € | -0,33% |
| Hamm | 3,33 € | 5,25 € | 0,00 € | 1,92 € | 6.040,35 € | 6.035,10 € | -0,09% |
| Herne | 0,00 € | 0,00 € | 0,00 € | 0,00 € | 7.028,99 € | 7.028,99 € | 0,00% |
| Leverkusen | 52,25 € | 85,13 € | 10,32 € | 22,56 € | 5.997,56 € | 5.922,75 € | -1,25% |
| Moers | 6,22 € | 17,39 € | 1,84 € | 9,33 € | 8.067,01 € | 8.051,46 € | -0,19% |
| Mülheim | 94,25 € | 104,47 € | 4,18 € | 6,04 € | 7.734,84 € | 7.634,56 € | -1,30% |
| Münster | 21,06 € | 23,47 € | 0,00 € | 2,41 € | 9.074,14 € | 9.050,67 € | -0,26% |
| Oberhausen | 18,30 € | 18,30 € | 0,00 € | 0,00 € | 7.188,72 € | 7.170,41 € | -0,25% |
| Paderborn | 2,53 € | 5,39 € | 0,46 € | 2,40 € | 4.531,83 € | 4.526,90 € | -0,11% |
| Recklinghausen | 56,08 € | 77,81 € | 8,09 € | 13,64 € | 10.575,07 € | 10.505,36 € | -0,66% |
| Siegen | 24,01 € | 43,24 € | 5,20 € | 14,02 € | 8.302,83 € | 8.264,79 € | -0,46% |
| Solingen | 22,98 € | 26,93 € | 1,36 € | 2,59 € | 4.901,77 € | 4.876,20 € | -0,52% |
| Arithm. Mittel | 22,21 € | 30,85 € | 2,81 € | 5,83 € | 7.242,19 € | 7.214,14 € | -0,38% |
| Standardabweichung | 25,86 € | 33,84 € | 3,83 € | 7,81 € | 1.626,44 € | 1.617,99 € | 0,41% |
| Median | 15,04 € | 17,89 € | 0,91 € | 2,40 € | 7.108,85 € | 7.099,70 € | -0,26% |
| Max | 94,25 € | 104,47 € | 12,62 € | 26,95 € | 10.575,07 € | 10.505,36 € | 0,00% |
| Min | 0,00 € | 0,00 € | 0,00 € | 0,00 € | 4.531,83 € | 4.526,90 € | -1,30% |

**Tabelle 12:** Umrechnung der Instandhaltungsrückstellungen und des Sachanlagevermögens pro Einwohner

## 5.3 Die Umrechnung der Pensionsrückstellungen von NKF auf IPSAS

### 5.3.1 Die Bilanzierung von Pensionsrückstellungen nach NKF und IPSAS

Aufgrund der zu erwartenden Belastungen der Kommunalhaushalte durch Beamtenpensionen sind Pensionsrückstellungen von hoher Bedeutung (Raupach und Stangenberg, 2009, S. 134).

Pensionsrückstellungen sind gemäß § 36 Abs. 1 GemHVO NRW zu passivieren und werden mit Hilfe des Teilwertverfahrens berechnet (Fudalla et al., 2011, S. 165).

IPSAS 25 regelt die Bilanzierung von Pensionsrückstellungen (Müller, 2016b, S. 431) und unterscheidet gemäß IPSAS 25.50 zwischen beitragsorientierten[10] und leistungsorientierten[11] Plänen (Müller-Marques Berger, 2008, S. 126). Pensionsrückstellungen werden ausschließlich für leistungsorientierte Pläne angesetzt (Müller, 2016b, S. 435). Die Altersversorgungsansprüche von Kommunalbeamten sind leistungsorientierte Pläne nach IPSAS 25.50. Die Bilanzierung erfolgt nach dem Verfahren der laufenden Einmalprämien, welches zum Anwartschaftsbarwertverfahren gehört (Adam, 2014, S. 79; Adam, 2013, S. 131).[12]

Während beim Anwartschaftsbarwertverfahren die erwarteten Lohn- und Gehaltssteigerungen zu beachten sind, finden diese im Teilwertverfahren (gehört zum Anwartschaftsdeckungsverfahren) nach § 36 Abs. 1 GemHVO NRW keine Berücksichtigung. Ein weiterer Unterschied besteht beim Abzinsungssatz. Dieser beträgt nach NKF stets fünf Prozent. Im Gegensatz soll der Zinssatz nach IPSAS den Zeitwert des Geldes wiederspiegeln (Adam, 2014, S. 80ff.).

Versicherungsmathematische Gewinne und Verluste entstehen lediglich nach dem in den IPSAS anzuwenden Verfahren. Folglich regelt die GemHVO NRW deren Behandlung nicht. Nach IPSAS ist das zum Zeitwert bewertete Planvermögen mit dem Bestand der Pensionsrückstellungen zu saldieren. Gemäß § 41 Abs. 2 GemHVO NRW besteht aber

---

[10] Für Erläuterungen zu beitragsorientierten Plänen siehe z. B. Adam, 2013, S. 86f.

[11] Für Erläuterungen zu leistungsorientierten Plänen siehe z. B. Müller, 2016b, S. 435.

[12] Eine nähere Betrachtung der Bilanzierung gemäß leistungsorientierten Plänen findet sich u. a. bei Adam, 2013, S. 87-89 und S. 131, Müller-Marques Berger, 2008, S. 131ff., Müller, 2016b, S. 436ff. und S. 442-448 und Baetge und Haenelt, 2006.

ein Saldierungsverbot (Adam, 2014, S. 80-82). Diese Unterschiede zwischen NKF und IPSAS wirken sich auf die Bilanzierung der Pensionsrückstellungen aus,

Aufgrund der Nichtzugänglichkeit der versicherungsmathematischem Daten für die jeweiligen Städte muss in dieser Untersuchung die Ermittlung der Höhe der Pensionsrückstellungen näherungsweise für die Umrechnung der Abschlüsse von NKF auf IPSAS erfolgen. Es ist ein kapitalmarktabhängiger Diskontierungszinssatz sowie eine Gehalts- und Rentendynamik zu berücksichtigen. Die Tabelle 13 zeigt die versicherungsmathematischen Annahmen.[13]

| | **01.01.2013** | **31.12.2013** |
|---|---|---|
| Zinssatz (GemHVO NRW): | 5,00% | 5,00% |
| Zinssatz (IPSAS): | 3,60% | 3,70% |
| Gehalts- bzw. Rentendynamik (GemHVO NRW): | - | - |
| Gehalts- bzw. Rentendynamik (IPSAS): | 2,00% | 1,90% |

**Tabelle 13:** Versicherungsmathematische Annahmen (NKF und IPSAS)

Diese Unterschiede wirken sich auf die Höhe der Pensionsrückstellungen aus und lassen sich mit folgenden Annahmen annähernd schätzen: (1) Das Absinken des Zinssatzes um einen Prozentpunkt führt bei gemischten Beständen aus Anwärtern und Rentnern zu einer Erhöhung der Pensionsrückstellungen um 15-20% (Höfer et al., 2014, S. 2663). (2) Die Einrechnung einer Gehalts- bzw. Rentendynamik von einem Prozent lässt die Pensionsrückstellungen um 10% ansteigen (Allianz Global Investors, 2010, S. 7). Im Folgenden wird mit diesen linearen Annahmen gearbeitet.[14]

Die Differenz zwischen den Diskontierungszinssätzen zwischen NKF und IPSAS beträgt zum 01.01.2013 1,4%-Punkte (31.12.2013: 1,3%-Punkte). Aus dieser Zinsänderung resultiert ein Effekt auf die Pensionsrückstellungen nach IPSAS zum 01.01.2013 von 21,00% (= 1,4 x 15%) und zum 31.12.2013 von 19,50% (= 1,3 x 15%).

Die Gehalts- und Rentendynamik von 2,0% (01.01.2013) bzw. von 1,9% (31.12.2013) ist zu berücksichtigen. Die Pensionsrückstellungen steigen aufgrund der getroffenen Annahme daher um 20% bzw. 19%.

[13] Die Annahmen für die IPSAS sind der konsolidierten EU-Jahresrechnung 2013 entnommen (Europäische Kommission, 2014, S. 48; Adam, 2013, S. 132).

[14] Es ist anzumerken, dass auch andere Verläufe als ein linearer Verlauf möglich wären. Ein genauer Zusammenhang ist nicht bekannt, weshalb als Hilfsmittel der lineare Zusammenhang angenommen wird.

Der Gesamteffekt beträgt zum 01.01.2013 45,20% (= 1,210 x 1,20) und zum 31.12.2013 42,205% (1,195 x 1,19). Im Vergleich zum NKF kommt es zu einer starken Erhöhung der Pensionsrückstellungen.[15]

### 5.3.2 Die Umrechnung der Pensionsrückstellungen für die Stadt Leverkusen

Für Leverkusen liegen 2013 folgende Pensionsrückstellungen gemäß Tabelle 14 vor (Stadt Leverkusen, 2014, S. 112):

| | |
|---|---|
| Pensionsrückstellungen 01.01.2013: | 281.131.452,94 € |
| Zuführung: | 8.839.672,19 € |
| Inanspruchnahme: | 13.177.168,02 € |
| Umbuchung: | - 238.070,57 € |
| Auflösung: | 6.782.131,54 € |
| Pensionsrückstellungen 31.12.2013: | 269.773.755,00 € |

**Tabelle 14:** Pensionsrückstellungen Stadt Leverkusen nach NKF

Zunächst ist der zum 01.01.2013 berechnete Wert der Pensionsrückstellungen mit dem errechneten Gesamteffekt zum 01.01.2013 (45,20%) zu multiplizieren:

281.131.452,94 € x 1,45200 = 408.202.869,67 €)

Die Differenz zwischen NKF und IPSAS (127.071.416,73 €) wird über die Neubewertungsrücklage gebucht (Adam, 2013, S. 112).

Zum Periodenbeginn ist nach IPSAS ein Erwartungswert über die Pensionsrückstellungen am Periodenende zu ermitteln (Adam, 2013, S. 131), d. h. die versicherungsmathematischen Annahmen zum Jahresende sind bereits zu Jahresanfang zu treffen. Die Pensionsrückstellungen nach NKF zum 31.12.2013 sind mit den versicherungsmathematischen Annahmen vom Jahresanfang (45,20%) umzurechnen. Der Erwartungswert der Pensionsrückstellungen nach IPSAS zum 31.12.2013 beträgt:

269.773.755,00 € x 1,45200 = 391.711.492,26 €

[15] Die IPSAS verlangen eine Saldierung der Pensionsverpflichtungen mit dem Planvermögen. Ein eventuell vorhandenes Planvermögen kann in den untersuchten Jahresabschlüsse nicht identifiziert werden, sodass auf eine Saldierung verzichtet werden muss. Somit führt die in dieser Untersuchung dargestellte Umrechnung auf IPSAS zu einer Überschätzung des Umstellungseffektes bei den Pensionsrückstellungen.

Damit dieser Erwartungswert erreicht wird, müssen die Zuführungen nach NKF angepasst werden. Die in 2013 erfolgte Inanspruchnahme, Umbuchung und Auflösung bleiben unverändert. Für Leverkusen ergibt sich:

408.202.869,67 € - 391.711.492,26 - 13.177.168,02 € - 238.070,57 € - 6.782.131,54 €
= - 3.705.992,72 €

Der Betrag für die Zuführungen beträgt 3.705.992,72 €. Die aufwandswirksame Zuführung von 8.839.672,19 € nach NKF ist folglich zu hoch. Eine ertragswirksame Korrektur in Höhe der Differenz von 5.133.679,47 € ist fällig.

Zum Jahresende ist die tatsächliche Höhe der Pensionsrückstellungen zu ermitteln, da sich die versicherungsmathematischen Annahmen im Laufe des Jahres verändert haben. Die Differenz zwischen erwarteten und tatsächlichen Pensionsrückstellungen ergibt ein versicherungsmathematisches Ergebnis. Zur Bestimmung der tatsächlichen Pensionsrückstellung ist die Pensionsrückstellung nach NKF zum 31.12.2013 mit den versicherungsmathematischen Annahmen zum 31.12.2013, d. h. dem Gesamteffekt zum 31.12.2013 (42,205%), umzurechnen:

269.773.755,00 € x 1,42205 = 383.631.768,30 €

Da für Leverkusen die Pensionsrückstellungen zum erwarteten Wert um 8.079.723,96 € (= 391.711.492,26 € - 383.631.768,30 €) gesunken sind, liegt ein versicherungsmathematischer Gewinn vor, der erfolgsneutral in die Rücklage für Neubewertungen aus leistungsorientierten Plänen gebucht wird (Adam, 2013, S. 117 und S. 132). Die Buchungen lauten:

| | | |
|---|---|---|
| Neubewertungsrücklage | 127.071.416,73 € | |
| an Pensionsrückstellungen | | 127.071.416,73 € |

| | | |
|---|---|---|
| Pensionsrückstellungen | 5.133.679,47 € | |
| an Ertrag | | 5.133.679,47 € |

| | | |
|---|---|---|
| Pensionsrückstellungen | 8.079.723,96 € | |
| an Rücklage für Neubewertungen aus leistungsorientierten Plänen | | 8.079.723,96 € |

Die Pensionsrückstellungen steigen in Folge der Anpassung an. Diese Erhöhung ist durch den nach IPSAS niedrigeren Abzinsungssatz und durch die Einbeziehung einer Gehalts-

und Rentendynamik zu erklären. Die ertragswirksame Korrektur der erfolgten Zuführung steigert in Leverkusen das Jahresergebnis.

### 5.3.3 Ergebnisse der Umrechnung der Pensionsrückstellungen für die 20 Städte

Das arithmetische Mittel der Pensionsrückstellungen nach NKF beträgt für die betrachteten Städte zum 31.12.2013 444.549.505,52 € (Median: 342.169.873,74 €). Der durchschnittliche Wert der Pensionsrückstellungen ist nach IPSAS 632.171.625,27 € (Median: 486.582.668,97 €). Im arithmetischen Mittel sinkt die Neubewertungsrücklage um 195.616.933,80 € (Median: 152.359.836,47 €).

In Folge der Anpassung der Zuführungen ergibt sich ausschließlich für Leverkusen ein Ertrag. Alle anderen Städte verzeichnen einen Aufwand. Es ergibt sich ein durchschnittlicher Aufwand von 5.319.443,65 € (Median: 3.638.360,58 €). Essen hat den höchsten Aufwand nach IPSAS.

Durch die Veränderung der versicherungsmathematischen Annahmen entsteht durchschnittlich ein versicherungsmathematischer Gewinn von 13.314.257,69 € (Median: 10.247.987,72 €). Essen hat den höchsten versicherungsmathematischen Gewinn, während Siegen den niedrigsten versicherungsmathematischen Gewinn ausweist.

Der Anpassungseffekt bei den Pensionsrückstellungen ist bedeutsam. Insbesondere das Eigenkapital von Städten mit hohen Pensionsrückstellungen (z. B. Essen) ist durch die Umstellung erheblich betroffen. Die Tabelle 15 zeigt die Effekte aus der Anpassung.

Auch pro Einwohner hat Essen die höchsten Pensionsverpflichtungen nach IPSAS. Hingegen sind die Versorgungsansprüche für die Kommunalbeamten in Paderborn am niedrigsten pro Einwohner. Essen weist auch den höchsten versicherungsmathematischen Gewinn pro Einwohner aus, während Paderborn den niedrigsten pro Einwohner hat. Tabelle 16 fasst diese Ergebnisse zusammen. Durchschnittlich lässt sich ein Aufwand von 19,15 € pro Einwohner (Median: 21,98 €) feststellen. Im Durchschnitt ergibt sich ein versicherungsmathematischer Gewinn von 50,52 € (Median: 52,80 €) pro Einwohner.

| Stadt | NKF | IPSAS | | | |
|---|---|---|---|---|---|
| | Pensionsrückstellung (in €) | In NBR (in €) | Ertrag / Aufwand (in €) | Versicherungsmathematischer Gewinn / Verlust (in €) | Pensionsrückstellung (in €) |
| Aachen | 453.575.485,60 | 201.321.203,18 | - 3.694.916,31 | 13.584.585,79 | 645.007.019,30 |
| Bochum | 634.884.289,96 | 283.679.721,87 | - 3.287.977,20 | 19.014.784,84 | 902.837.204,54 |
| Bonn | 604.375.600,29 | 266.201.400,04 | - 6.976.371,30 | 18.101.049,23 | 859.452.322,39 |
| Bottrop | 225.254.235,07 | 98.392.222,81 | - 3.422.691,44 | 6.746.364,34 | 320.322.784,98 |
| Dortmund | 1.079.076.059,70 | 472.000.989,33 | - 15.741.389,66 | 32.318.327,99 | 1.534.500.110,70 |
| Duisburg | 995.483.719,00 | 441.611.346,81 | - 8.347.294,18 | 29.814.737,38 | 1.415.627.622,60 |
| Essen | 1.272.224.911,63 | 549.733.239,40 | - 25.312.420,65 | 38.103.136,10 | 1.809.167.435,58 |
| Gelsenkirchen | 486.441.653,04 | 213.276.141,71 | - 6.595.485,46 | 14.568.927,51 | 691.744.352,71 |
| Hagen | 324.705.008,00 | 145.993.904,53 | - 772.759,09 | 9.724.914,99 | 461.746.756,63 |
| Hamm | 228.348.197,00 | 100.900.085,20 | - 2.313.299,84 | 6.839.028,50 | 324.722.553,54 |
| Herne | 272.781.607,00 | 119.360.714,40 | - 3.936.571,96 | 8.169.809,13 | 387.909.084,23 |
| Leverkusen | 269.773.755,00 | 127.071.416,73 | 5.133.679,47 | 8.079.723,96 | 383.631.768,30 |
| Moers | 139.410.791,43 | 59.929.073,59 | - 3.084.604,13 | 4.175.353,20 | 198.249.115,95 |
| Mülheim | 359.634.739,48 | 158.725.768,41 | - 3.829.133,86 | 10.771.060,45 | 511.418.581,31 |
| Münster | 463.101.653,00 | 201.613.383,22 | - 7.708.563,94 | 13.869.894,51 | 658.553.705,65 |
| Oberhausen | 380.833.090,11 | 168.554.751,89 | - 3.581.804,84 | 11.405.951,05 | 541.563.695,79 |
| Paderborn | 148.647.254,00 | 63.917.426,22 | - 3.271.151,59 | 4.451.985,26 | 211.383.846,55 |
| Recklinghausen | 158.989.011,00 | 70.246.297,25 | - 1.616.735,73 | 4.761.720,88 | 226.090.323,09 |
| Siegen | 112.394.090,00 | 49.811.804,48 | - 990.324,20 | 3.366.203,00 | 159.830.015,68 |
| Solingen | 281.054.960,00 | 119.997.784,90 | - 7.039.057,02 | 8.417.596,05 | 399.674.205,87 |
| Arithm. Mittel | 444.549.505,52 | 195.616.933,80 | - 5.319.443,65 | 13.314.257,69 | 632.171.625,27 |
| Standardabweichung | 327.264.483,78 | 142.784.647,13 | 6.192.853,85 | 9.801.571,29 | 465.386.458,25 |
| Median | 342.169.873,74 | 152.359.836,47 | - 3.638.360,58 | 10.247.987,72 | 486.582.668,97 |
| Max | 1.272.224.911,63 | 549.733.239,40 | 5.133.679,47 | 38.103.136,10 | 1.809.167.435,58 |
| Min | 112.394.090,00 | 49.811.804,48 | - 25.312.420,65 | 3.366.203,00 | 159.830.015,68 |

**Tabelle 15:** Umrechnung der Pensionsrückstellungen

| Stadt | NKF | IPSAS | | | |
|---|---|---|---|---|---|
| | Pensionsrückstellung (in €/Einw.) | In NBR (in €/Einw.) | Ertrag / Aufwand (in €/Einw.) | Versicherungsmathematischer Gewinn / Verlust (in €/Einw.) | Pensionsrückstellung (in €/Einw.) |
| Aachen | 1.844,67 € | 818,76 € | - 15,03 € | 55,25 € | 2.623,21 € |
| Bochum | 1.740,64 € | 777,75 € | - 9,01 € | 52,13 € | 2.475,28 € |
| Bonn | 1.895,73 € | 834,99 € | - 21,88 € | 56,78 € | 2.695,82 € |
| Bottrop | 1.922,90 € | 839,93 € | - 29,22 € | 57,59 € | 2.734,46 € |
| Dortmund | 1.840,86 € | 805,21 € | - 26,85 € | 55,13 € | 2.617,79 € |
| Duisburg | 2.026,51 € | 898,99 € | - 16,99 € | 60,69 € | 2.881,80 € |
| Essen | 2.183,61 € | 943,55 € | - 43,45 € | 65,40 € | 3.105,21 € |
| Gelsenkirchen | 1.868,29 € | 819,13 € | - 25,33 € | 55,96 € | 2.656,79 € |
| Hagen | 1.717,62 € | 772,27 € | - 4,09 € | 51,44 € | 2.442,54 € |
| Hamm | 1.272,87 € | 562,44 € | - 12,89 € | 38,12 € | 1.810,08 € |
| Herne | 1.750,27 € | 765,86 € | - 25,26 € | 52,42 € | 2.488,97 € |
| Leverkusen | 1.650,12 € | 777,26 € | 31,40 € | 49,42 € | 2.346,56 € |
| Moers | 1.333,70 € | 573,32 € | - 29,51 € | 39,94 € | 1.896,59 € |
| Mülheim | 2.124,52 € | 937,66 € | - 22,62 € | 63,63 € | 3.021,18 € |
| Münster | 1.493,69 € | 650,28 € | - 24,86 € | 44,74 € | 2.124,10 € |
| Oberhausen | 1.805,46 € | 799,09 € | - 16,98 € | 54,07 € | 2.567,46 € |
| Paderborn | 1.003,52 € | 431,51 € | - 22,08 € | 30,06 € | 1.427,05 € |
| Recklinghausen | 1.390,61 € | 614,42 € | - 14,14 € | 41,65 € | 1.977,52 € |
| Siegen | 1.098,08 € | 486,66 € | - 9,68 € | 32,89 € | 1.561,53 € |
| Solingen | 1.775,73 € | 758,16 € | - 44,47 € | 53,18 € | 2.525,17 € |
| Arithm. Mittel | 1.686,97 € | 743,36 € | - 19,15 € | 50,52 € | 2.398,96 € |
| Standardabweichung | 324,49 € | 143,66 € | 15,73 € | 9,72 € | 461,43 € |
| Median | 1.763,00 € | 777,51 € | - 21,98 € | 52,80 € | 2.507,07 € |
| Max | 2.183,61 € | 943,55 € | 31,40 € | 65,40 € | 3.105,21 € |
| Min | 1.003,52 € | 431,51 € | - 44,47 € | 30,06 € | 1.427,05 € |

**Tabelle 16:** Umrechnung der Pensionsrückstellungen pro Einwohner

# 6 Präsentation der Ergebnisse der Untersuchung

Im Folgenden werden die Auswirkungen der Umstellung der Jahresabschlüsse von NKF auf IPSAS auf die gesamten Rückstellungen, das Jahresergebnis, das Eigenkapital, die Bilanzsumme und die Eigenkapitalquoten (EKQ) dargestellt.

## 6.1 Auswirkungen auf die Rückstellungen

Die Veränderung der gesamten Rückstellungen ist interessant, da es durch die Umrechnung der Jahresabschlüsse von NKF zu IPSAS zu Veränderungen bei Pensionsrückstellungen, Instandhaltungsrückstellungen sowie sonstigen Rückstellungen kommt. Die Auswirkungen zeigt Tabelle 17 insgesamt und Tabelle 18 pro Einwohner.

Der Durchschnitt der gesamten Rückstellungen beträgt nach NKF 508.267.998,37 € (Median: 402.497.573,56 €). Eine IPSAS-Umstellung führt zu einem erheblichen Anstieg der Rückstellungen. In Folge der Umstellung erhöhen sich die Rückstellungen durchschnittlich um 36,63% (Median: 36,88%). Bonn hat die größte prozentuale Anpassung der Rückstellungen, während Mülheim die niedrigste Anpassung hat. Die gebildeten Rückstellungen steigen im Durchschnitt auf 693.544.323,80 € (Median: 541.977.231,54 €) an. Essen hat jeweils die höchsten Rückstellungen, während Siegen die niedrigsten Rückstellungen aufweist.

Die Effekte aus der Anpassung der Sonderposten für den Gebührenausgleich und der Pensionsrückstellungen übersteigen den Effekt aus der Auflösung der Instandhaltungsrückstellungen deutlich.

| Stadt | NKF | IPSAS | Prozentuale Veränderung zwischen NKF und IPSAS |
|---|---|---|---|
| | Rückstellungen insgesamt (in €) | Rückstellungen insgesamt (in €) | |
| Aachen | 558.994.768,97 | 761.664.763,64 | 36,26% |
| Bochum | 730.903.796,61 | 978.292.995,87 | 33,85% |
| Bonn | 651.920.206,07 | 919.582.801,20 | 41,06% |
| Bottrop | 243.352.129,48 | 338.507.544,56 | 39,10% |
| Dortmund | 1.365.507.608,78 | 1.804.683.898,92 | 32,16% |
| Duisburg | 1.085.372.561,53 | 1.504.164.212,85 | 38,59% |
| Essen | 1.389.596.315,13 | 1.926.614.263,73 | 38,65% |
| Gelsenkirchen | 520.669.383,60 | 726.804.531,27 | 39,59% |
| Hagen | 362.825.645,85 | 497.294.619,64 | 37,06% |
| Hamm | 270.150.841,34 | 366.649.875,11 | 35,72% |
| Herne | 298.090.812,56 | 413.218.289,79 | 38,62% |
| Leverkusen | 313.975.337,72 | 420.766.630,77 | 34,01% |
| Moers | 148.781.156,41 | 206.969.199,08 | 39,11% |
| Mülheim | 450.095.813,13 | 586.659.843,44 | 30,34% |
| Münster | 522.252.957,52 | 713.489.316,07 | 36,62% |
| Oberhausen | 442.169.501,27 | 602.866.672,85 | 36,34% |
| Paderborn | 170.585.762,65 | 235.872.612,91 | 38,27% |
| Recklinghausen | 203.593.280,02 | 266.392.154,76 | 30,85% |
| Siegen | 123.288.891,63 | 172.177.384,66 | 39,65% |
| Solingen | 313.233.197,19 | 428.214.864,85 | 36,71% |
| Arithm. Mittel | 508.267.998,37 | 693.544.323,80 | 36,63% |
| Standardabweichung | 375.416.911,58 | 511.215.266,71 | 3,02% |
| Median | 402.497.573,56 | 541.977.231,54 | 36,88% |
| Max | 1.389.596.315,13 | 1.926.641.263,73 | 41,06% |
| Min | 123.288.891,63 | 172.177.384,66 | 30,34% |

**Tabelle 17:** Umrechnung der Rückstellungen insgesamt

Durchschnittlich betragen die Rückstellungen pro Einwohner nach NKF 1.928,03 € (Median: 1.989,39 €) und nach IPSAS 2.630,37 € (Median: 2.693,82 €). Die höchsten Rückstellungen pro Einwohner hat Mühlheim, während Paderborn die niedrigsten Rückstellungen pro Einwohner hat. Dies gilt sowohl für NKF als auch IPSAS.

| Stadt | NKF | IPSAS | Prozentuale Veränderung zwischen NKF und IPSAS |
|---|---|---|---|
| | Rückstellungen insgesamt (in €/Einw.) | Rückstellungen insgesamt (in €/Einw.) | |
| Aachen | 2.273,40 € | 3.097,65 € | 36,26% |
| Bochum | 2.003,89 € | 2.682,15 € | 33,85% |
| Bonn | 2.044,86 € | 2.884,43 € | 41,06% |
| Bottrop | 2.077,39 € | 2.889,70 € | 39,10% |
| Dortmund | 2.329,50 € | 3.078,71 € | 32,16% |
| Duisburg | 2.209,50 € | 3.062,03 € | 38,59% |
| Essen | 2.385,07 € | 3.306,79 € | 38,65% |
| Gelsenkirchen | 1.999,74 € | 2.791,45 € | 39,59% |
| Hagen | 1.919,27 € | 2.630,58 € | 37,06% |
| Hamm | 1.505,88 € | 2.043,79 € | 35,72% |
| Herne | 1.912,67 € | 2.651,37 € | 38,62% |
| Leverkusen | 1.920,49 € | 2.573,70 € | 34,01% |
| Moers | 1.423,35 € | 1.980,02 € | 39,11% |
| Mülheim | 2.658,91 € | 3.465,66 € | 30,34% |
| Münster | 1.684,48 € | 2.301,29 € | 36,62% |
| Oberhausen | 2.096,25 € | 2.858,08 € | 36,34% |
| Paderborn | 1.151,63 € | 1.592,38 € | 38,27% |
| Recklinghausen | 1.780,75 € | 2.330,03 € | 30,85% |
| Siegen | 1.204,52 € | 1.682,16 € | 39,65% |
| Solingen | 1.979,03 € | 2.705,49 € | 36,71% |
| Arithm. Mittel | 1.928,03 € | 2.630,37 € | 36,63% |
| Standardabweichung | 385,33 € | 509,11 € | 3,02% |
| Median | 1.989,39 € | 2.693,82 € | 36,88% |
| Max | 2.658,91 € | 3.465,66 € | 41,06% |
| Min | 1.151,63 € | 1.592,38 € | 30,34% |

**Tabelle 18:** Umrechnung der Rückstellungen insgesamt pro Einwohner

## 6.2 Auswirkungen auf das Jahresergebnis

Die Auswirkungen der Umrechnung auf das Jahresergebnis 2013 zeigen Tabelle 19 und 20. Die Städte erzielen in 2013 ein durchschnittliches NKF-Jahresergebnis von -47.925.234,87 € (Median: -45.247.413,02 €). Einzig Münster und Paderborn erzielen einen Jahresüberschuss.

Nach einer IPSAS-Umstellung erhöht sich der Jahresfehlbetrag. Wenn für alle Sonderposten für Zuwendungen eine Rückzahlungsverpflichtung (Szenario 1) existiert, kann lediglich Münster einen Jahresüberschuss erzielen. In den zwei anderen Szenarien kann keine Stadt einen Jahresüberschuss erwirtschaften. Essen hat jeweils den höchsten Jahresfehlbetrag. Das Jahresergebnis beträgt im Durchschnitt in Szenario 1

-57.715.226,81 € (Median: -51.360.001,79 €), in Szenario 2 -60.961.573,61 € (Median: -53.459.078,45 €) und in Szenario 3 -64.207.920,40 € (Median: -55.558.155,10 €). Die prozentualen Veränderungen zeigen eine hohe Veränderung des Jahresergebnisses.

Nach NKF und den Szenarien 1 und 2 nach IPSAS hat Münster das beste Jahresergebnis sowohl absolut als auch pro Einwohner. In Szenario 3 nach IPSAS ist dies hingegen Hamm. Das schlechteste Jahresergebnis pro Einwohner hat nach NKF und Szenario 1 nach IPSAS die Stadt Mühlheim, während in den Szenarien 2 und 3 nach IPSAS Herne das schlechteste Jahresergebnis pro Einwohner ausweist.

Im Durchschnitt würde das Jahresergebnis pro Einwohner nach IPSAS in Szenario 1 -254,66 € (Median: -254,05 €), Szenario 2 -265,46 € (Median: -266,42 €) und in Szenario 3 -276,26 € (Median: -275,77 €) betragen.

| Stadt | NKF | IPSAS – Szenario 1 | | IPSAS – Szenario 2 | | IPSAS – Szenario 3 | |
|---|---|---|---|---|---|---|---|
| | Jahresergebnis (in €) | Jahresergebnis (in €) | Prozentuale Veränderung | Jahresergebnis (in €) | Prozentuale Veränderung | Jahresergebnis (in €) | Prozentuale Veränderung |
| Aachen | - 36.066.745,58 | - 40.444.369,95 | - 11,21% | - 40.361.246,51 | - 11,91% | - 40.611.123,07 | - 12,60% |
| Bochum | - 105.245.006,20 | - 124.601.220,21 | - 18,39% | - 129.593.188,99 | - 23,13% | - 134.585.157,78 | - 27,88% |
| Bonn | - 70.091.567,67 | - 79.188.421,57 | - 12,98% | - 83.821.424,30 | - 19,59% | - 88.454.427,03 | - 26,20% |
| Bottrop | - 21.370.359,28 | - 26.174.446,51 | - 22,48% | - 31.618.652,84 | - 47,96% | - 37.062.859,18 | - 73,43% |
| Dortmund | - 70.766.553,27 | - 91.252.182,06 | - 28,95% | - 111.992.353,96 | - 58,26% | - 132.732.525,86 | - 87,56% |
| Duisburg | - 50.767.266,37 | - 65.469.370,52 | - 28,96% | - 84.645.662,75 | - 66,73% | - 103.821.954,97 | - 104,51% |
| Essen | - 123.126.529,81 | - 151.315.775,63 | - 22,89% | - 148.672.858,06 | - 20,75% | - 146.029.940,49 | - 18,60% |
| Gelsenkirchen | - 70.389.060,33 | - 80.439.888,82 | - 14,28% | - 74.798.535,14 | - 6,26% | - 69.157.181,46 | 1,75% |
| Hagen | - 39.727.559,66 | - 43.212.508,22 | - 8,77% | - 48.536.734,51 | - 22,17% | - 53.860.960,81 | - 35,58% |
| Hamm | - 1.486.999,62 | - 5.902.553,06 | - 296,94% | - 4.670.682,74 | - 214,10% | - 3,438,812,43 | - 131,26% |
| Herne | - 72.725.760,98 | - 76.839.571,36 | - 5,66% | - 79.990.030,16 | - 9,99% | - 83.140.488,96 | - 14,32% |
| Leverkusen | - 36.104.709,84 | - 34.251.991,45 | 5,13% | - 33.107.305,68 | 8,30% | - 31.962.619,91 | 11,47% |
| Moers | - 31.597.543,72 | - 41.055.525,89 | - 29,93% | - 42.100.784,62 | - 33,24% | - 43.146.043,35 | - 36,55% |
| Mülheim | - 79.265.339,61 | - 85.771.774,44 | - 8,21% | - 86.064.317,69 | - 8,58% | - 86.356.860,93 | - 8,95% |
| Münster | 28.894.653,04 | 808.934,31 | - 97,20% | - 3.600.379,62 | - 112,46% | - 8.009.693,56 | - 127,72% |
| Oberhausen | - 72.567.023,15 | - 78.243.297,42 | - 7,82% | - 83.637.860,29 | - 15,26% | - 89.032.423,15 | -- 22,69% |
| Paderborn | 5.654.777,01 | - 2.339.816,25 | - 141,38% | - 4.077.622,15 | - 172,11% | - 5.815.428,06 | - 202,84% |
| Recklinghausen | - 34.778.768,06 | - 42.024.491,89 | - 20,83% | - 41.827.477,85 | - 20,27% | - 41.630.463,82 | - 19,70% |
| Siegen | - 25.825.825,67 | - 27.411.769,89 | - 6,14% | - 27.732.931,85 | - 7,38% | - 28.054.093,82 | - 8,63% |
| Solingen | - 51.151.508,63 | - 59.507.495,37 | - 16,34% | - 58.381.422,39 | - 14,13% | - 57.255.349,40 | - 11,93% |
| Arithm. Mittel | - 47.925.234,87 | - 57.715.226,81 | - 39,71% | - 60.961.573,61 | - 43,80% | - 64.207.920,40 | -47,89% |
| Standard-abweichung | 36.699.777,65 | 39.509.069,91 | 69,40% | 40.738.019,15 | 58,11% | 42,920,014,88 | 55,68% |
| Median | - 45.247.413,02 | -51.360.001,79 | - 17,36% | - 53.459.078,45 | - 20,51% | - 55.558.155,10 | -24,44% |
| Max | 28.894.653,04 | 808.934,31 | 5,13% | - 3.600.379,62 | 8,30% | - 3.438.812,43 | 11,47% |
| Min | - 123.126.529,81 | - 151.315.775,63 | - 296,94% | - 148.672.858,06 | - 214,10% | - 146.029.940,49 | - 202,84% |

**Tabelle 19:** Veränderung Jahresergebnis nach Szenarien

| Stadt | NKF | IPSAS – Szenario 1 | | IPSAS – Szenario 2 | | IPSAS – Szenario 3 | |
|---|---|---|---|---|---|---|---|
| | Jahresergebnis (in €/Einw.) | Jahresergebnis (in €/Einw.) | Prozentuale Veränderung | Jahresergebnis (in €/Einw.) | Prozentuale Veränderung | Jahresergebnis (in €/Einw.) | Prozentuale Veränderung |
| Aachen | -146,68 € | - 163,13 € | - 11,21% | - 164,15 € | - 11,91% | - 165,16 € | - 12,60% |
| Bochum | -288,55 € | - 341,61 € | - 18,39% | - 355,30 € | - 23,13% | - 368,99 € | - 27,88% |
| Bonn | -219,85 € | - 248,39 € | - 12,98% | - 262,92 € | - 19,59% | - 277,45 € | - 26,20% |
| Bottrop | -182,43 € | - 223,44 € | - 22,48% | - 269,91 € | - 47,96% | - 316,39 € | - 73,43% |
| Dortmund | -120,72 € | - 155,67 € | - 28,95% | - 191,05 € | - 58,26% | - 226,44 € | - 87,56% |
| Duisburg | -103,35 € | - 133,28 € | - 28,96% | - 172,31 € | - 66,73% | - 211,35 € | - 104,51% |
| Essen | -211,33 € | - 259,71 € | - 22,89% | - 255,18 € | - 20,75% | - 250,64 € | - 18,60% |
| Gelsenkirchen | -270,34 € | - 308,95 € | - 14,28% | - 287,28 € | - 6,26% | - 265,61 € | 1,75% |
| Hagen | -210,15 € | - 228,58 € | - 8,77% | - 256,75 € | - 22,17% | - 284,91 € | - 35,58% |
| Hamm | -8,29 € | - 32,90 € | - 296,94% | - 26,04 € | - 214,10% | - 19,17 € | - 131,26% |
| Herne | -466,64 € | - 493,03 € | - 5,66% | - 513,25 € | - 9,99% | - 533,46 € | - 14,32% |
| Leverkusen | -220,84 € | - 209,51 € | 5,13% | - 202,51 € | 8,30% | - 195,51 € | 11,47% |
| Moers | -302,28 € | - 392,77 € | - 29,93% | - 402,77 € | - 33,24% | - 412,77 € | - 36,55% |
| Mülheim | -468,26 € | - 506,69 € | - 8,21% | - 508,42 € | - 8,58% | - 510,15 € | - 8,95% |
| Münster | 93,20 € | 2,61 € | - 97,20% | - 11,61 € | - 112,46% | - 25,83 € | - 127,72% |
| Oberhausen | -344,03 € | - 370,94 € | - 7,82% | - 396,51 € | - 15,26% | - 422,09 € | - 22,69% |
| Paderborn | 38,18 € | - 15,80 € | - 141,38% | - 27,53 € | - 172,11% | - 39,26 € | - 202,84% |
| Recklinghausen | -304,20 € | - 367,57 € | - 20,83% | - 365,85 € | - 20,27% | - 364,13 € | - 19,70% |
| Siegen | -252,32 € | - 267,81 € | - 6,14% | - 270,95 € | - 7,38% | - 274,09 € | - 8,63% |
| Solingen | -323,18 € | - 375,97 € | - 16,34% | - 368,86 € | - 14,13% | - 361,74 € | - 11,93% |
| Arithm. Mittel | -215,60 € | - 254,66 € | - 39,71% | - 265,46 € | - 43,80% | - 276,26 € | - 47,89% |
| Standard-abweichung | 146,94 € | 145,13 € | 69,40% | 143,79 € | 58,11% | 144,62 € | 55,68% |
| Median | -220,35 € | - 254,05 € | - 17,36% | - 266,42 € | - 20,51% | - 275,77 € | - 24,44% |
| Max | 93,20 € | 2,61 € | 5,13% | - 11,61 € | 8,30% | -19,17 € | 11,47% |
| Min | -468,26 € | - 506,69 € | - 296,94% | - 513,25 € | - 214,10% | - 533,46 € | - 202,84% |

**Tabelle 20:** Veränderung Jahresergebnis nach Szenarien pro Einwohner

Durchschnittlich sinkt das Jahresergebnis in Szenario 1 um 39,71% (Median: 17,36%), in Szenario 2 um 43,80% (Median: 20,51%) und in Szenario 3 um 47,89% (Median: 24,44%). Abbildung 1 zeigt die prozentualen Veränderungen des Jahresergebnisses für die einzelnen Städte je Szenario.

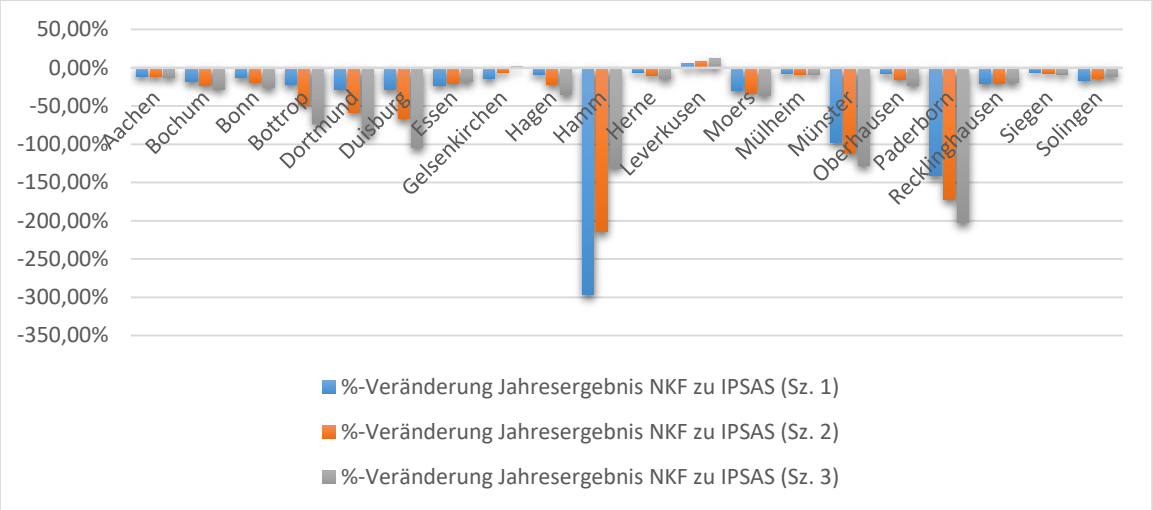


**Abbildung 1:** Prozentuale Veränderung des Jahresergebnisses für die 20 Städte von NKF zu IPSAS

Das IPSAS-Jahresergebnis ist für viele Städte teilweise erheblich niedriger als das NKF-Jahresergebnis. Lediglich Leverkusen kann immer einen Anstieg des Jahresergebnisses verzeichnen (siehe Abbildung 1 und Tabelle 19). Der Jahresfehlbetrag von Leverkusen sinkt zum NKF um 5,13% (Szenario 1), 8,30% (Szenario 2) und 11,47% (Szenario 3).

## 6.3 Auswirkungen auf das Eigenkapital[16]

Die Anpassung der Pensionsrückstellungen senkt das Eigenkapital, während die Auflösung der Sonderposten für Zuwendungen und für Beiträge das Eigenkapital erhöht. In Szenario 1 wird aufgrund der nicht aufgelösten Sonderposten für Zuwendungen der Effekt aus der Anpassung der Pensionsrückstellungen nicht kompensiert. In den Szenarien 2 und 3 kann der Effekt aus der Anpassung der Pensionsrückstellungen überwiegend aufgefangen werden. Bei vielen Städten ist dann ein Anstieg des Eigenkapitals zu beobachten. Die Veränderung des Eigenkapitals ist maßgeblich von dem nach IPSAS aufzulösendem Anteil der Sonderposten für Zuwendungen abhängig. Je

[16] Kiaman (2011) zeigt auf, dass Fehlinterpretationen begünstigt werden, wenn die Größe Eigenkapital in Kommunen ermittelt wird (Kiaman, 2011, S. E1-E27).

höher dieser Anteil, desto positiver ist die Veränderung des Eigenkapitals bei Existenz dieses Sonderposten. Die Veränderung des Eigenkapitals in Folge der Umrechnung von NKF auf IPSAS zeigt Tabelle 21 insgesamt und Tabelle 22 pro Einwohner.

Duisburg, Hagen, Mühlheim und Oberhausen besitzen kein positives Eigenkapital. Im Durchschnitt beträgt das Eigenkapital 326.021.744,54 € (Median: 169.985.799,41 €). Nach IPSAS verfügt Dortmund über das absolut größte Eigenkapital. Oberhausen hat den größten Eigenkapitalfehlbetrag. Durchschnittlich sinkt das Eigenkapital in Szenario 1 um 212,39% (Median: 20,80%). Eine Umstellung auf IPSAS ergibt für Bottrop, Essen, Solingen ein nicht durch Eigenkapital gedeckten Fehlbetrag. In Szenario 1 weisen sieben Städte einen Eigenkapitalfehlbetrag aus. Einen Anstieg des Eigenkapitals verzeichnen Hamm, Moers, Münster, Paderborn, und Recklinghausen.

Das Eigenkapital steigt in Szenario 2 und Szenario 3 im Vergleich zum NKF bei vielen Städten an. In Szenario 2 wächst das Eigenkapital durchschnittlich zum NKF um 46,30% (Median: 43,10%). Den größten Anstieg verzeichnet Hagen. Lediglich für Aachen, Essen, Solingen sinkt das Eigenkapital bzw. steigt der Eigenkapitalfehlbetrag in Szenario 2. Das durchschnittliche Eigenkapital beträgt 475.915.739,55 € (Median: 313.806.356,25 €). Essen, Mühlheim, Oberhausen und Solingen weisen ein negatives Eigenkapital aus. Duisburg und Hagen verfügen nach IPSAS in diesem Szenario im Vergleich zu NKF über Eigenkapital.

In Szenario 3 beträgt das Eigenkapital im Durchschnitt 703.159.976,26 € (Median: 496.565.795,32 €). Das Eigenkapital wächst durchschnittlich um 304,99% (Median: 162,73%) im Vergleich zum NKF. Mühlheim verfügt ausschließlich in Szenario 3 über Eigenkapital. Solingen hat in Szenario 3 Eigenkapital nach IPSAS. Oberhausen ist die einzige Stadt ohne positives Eigenkapital nach NKF und IPSAS, während Aachen die einzige Stadt mit negativer Eigenkapitalveränderung in allen Szenarien ist.

| Stadt | NKF | IPSAS – Szenario 1 | | IPSAS – Szenario 2 | | IPSAS – Szenario 3 | |
|---|---|---|---|---|---|---|---|
| | Eigenkapital (in €) | Eigenkapital (in €) | Prozentuale Veränderung | Eigenkapital (in €) | Prozentuale Veränderung | Eigenkapital (in €) | Prozentuale Veränderung |
| Aachen | 840.175.425,74 | 692.694.430,12 | - 17,55% | 762.379.183,00 | - 9,26% | 832.063.935,88 | - 0,97% |
| Bochum | 1.255.180.198,79 | 1.121.515.873,68 | - 10,65% | 1.414.618.397,63 | 12,70% | 1.707.720.921,58 | 36,05% |
| Bonn | 1.261.054.452,80 | 1.184.333.760,91 | - 6,08% | 1.594.396.020,34 | 26,43% | 2.004.458.279,77 | 58,95% |
| Bottrop | 53.872.454,05 | - 23.599.447,01 | - 143,81% | 122.106.214,46 | 126,66% | 267.811.875,94 | 397,12% |
| Dortmund | 1.789.769.715,86 | 1.359.541.467,12 | - 24,04% | 1.894.303.636,26 | 5,84% | 2.429.065.805,40 | 35,72% |
| Duisburg | - 308.996.194,76 | - 558.513.059,21 | - 80,77% | 177,245,920,46 | 157,37% | 913.004.900,14 | 395,50% |
| Essen | 15.174.700,90 | - 474.692.826,37 | - 3.228,19% | - 111.195.392,77 | - 832,77% | 252.302.040,83 | 1.562,65% |
| Gelsenkirchen | 183.082.603,09 | 59.745.056,53 | - 67,37% | 270.536.243,42 | 47,77% | 481.327.430,31 | 162,90% |
| Hagen | - 32.535.528,72 | - 53.613.653,55 | - 64,78% | 135.848.951,43 | 517,54% | 325.311.556,41 | 1.099,87% |
| Hamm | 165.713.187,69 | 170.352.159,79 | 2,80% | 292.343.193,47 | 136,76% | 614.334.227,15 | 270,72% |
| Herne | 126.475.193,07 | 28.520.453,09 | - 77,45% | 180.878.010,87 | 43,01% | 333.235.568,65 | 163,48% |
| Leverkusen | 346.783.463,61 | 246.711.283,27 | - 28,86% | 379.257.721,80 | 9,36% | 511.804.160,33 | 47,59% |
| Moers | 17.172.693,97 | 33.233.905,40 | 93,53% | 103.757.083,55 | 504,20% | 174.280.261,71 | 914,87% |
| Mülheim | - 96.184.324,89 | - 190.051.915,12 | - 97,59% | - 53.066.092,45 | 44,83% | 83.919.730,21 | 187,25% |
| Münster | 714.792.283,53 | 1.208.275.173,90 | 69,04% | 1.527.139.996,43 | 113,65% | 1.846.004.818,96 | 158,26% |
| Oberhausen | - 963.794.060,95 | - 1.057.890.998,78 | - 9,76% | - 867.119.823,49 | 10,03% | - 676.348.648,20 | 29,82% |
| Paderborn | 678.739.300,08 | 787.328.932,10 | 16,00% | 844.127.132,64 | 24,37% | 900.925.333,19 | 32,74% |
| Recklinghausen | 174.258.411,13 | 256.617.385,80 | 47,26% | 357.076.469,07 | 104,91% | 457.535.552,34 | 162,56% |
| Siegen | 282.307.965,69 | 272.510.112,19 | - 3,47% | 404.196.578,45 | 43,18% | 535.883.044,72 | 89,82% |
| Solingen | 17.362.950,17 | - 89.588.036,89 | - 615,97% | - 10.514.653,55 | - 160,56% | 68.558.729,49 | 294,86% |
| Arithm. Mittel | 326.021.744,54 | 248.671.502,85 | - 212,39% | 475.915.739,55 | 46,30% | 703.159.976,26 | 304,99% |
| Standardabweichung | 618.419.638,37 | 639.537.531,50 | 724,31% | 679.199.707,34 | 260,73% | 757.784.392,55 | 414,27% |
| Median | 169.985.799,41 | 115.048.608,16 | - 20,80% | 313.806.356,25 | 43,10% | 496.565.795,32 | 162.73% |
| Max | 1.789.769.715,86 | 1.359.541.467,12 | 93,53% | 1.894.303.636,26 | 517,54% | 2.429.065.805,40 | 1.562,65% |
| Min | - 963.794.060,95 | - 1.057.890.998,78 | - 3.228,19% | - 867.119.823,46 | - 832,77% | - 676.348.648,20 | - 0,97% |

**Tabelle 21:** Veränderung Eigenkapital nach Szenarien

| Stadt | NKF | IPSAS – Szenario 1 | | IPSAS – Szenario 2 | | IPSAS – Szenario 3 | |
|---|---|---|---|---|---|---|---|
| | Eigenkapital (in €/Einw.) | Eigenkapital (in €/Einw.) | Prozentuale Veränderung | Eigenkapital (in €/Einw.) | Prozentuale Veränderung | Eigenkapital (in €/Einw.) | Prozentuale Veränderung |
| Aachen | 3.416,94 € | 2.817,15 € | - 17,55% | 3.100,55 € | - 9,26% | 3.383,96 € | - 0,97% |
| Bochum | 3.441,28 € | 3.074,82 € | - 10,65% | 3.878,41 € | 12,70% | 4.682,00 € | 36,05% |
| Bonn | 3.955,52 € | 3.714,87 € | - 6,08% | 5.001,10 € | 26,43% | 6.287,33 € | 58,95% |
| Bottrop | 459,89 € | -201,46 € | - 143,81% | 1.042,37 € | 126,66% | 2.286,20 € | 397,12% |
| Dortmund | 3.053,27 € | 2.319,32 € | - 24,04% | 3.231,60 € | 5,84% | 4.143,88 € | 35,72% |
| Duisburg | - 628,96 € | -1.136,97 € | - 80,77% | 360,82 € | 157,37% | 1.858,61 € | 395,50% |
| Essen | 26,05 € | -814,75 € | - 3.228,19% | -190,85 € | - 832,77% | 433,04 € | 1.562,65% |
| Gelsenkirchen | 703,17 € | 229,46 € | - 67,37% | 1.039,05 € | 47,77% | 1.848,64 € | 162,90% |
| Hagen | - 172,11 € | -283,60 € | - 64,78% | 718,61 € | 517,54% | 1.720,82 € | 999,87% |
| Hamm | 923,72 € | 949,58 € | 2,80% | 2.187,01 € | 136,76% | 3.424,44 € | 270,72% |
| Herne | 811,51 € | 183,00 € | - 77,45% | 1.160,58 € | 43,01% | 2.138,17 € | 163,48% |
| Leverkusen | 2.121,17 € | 1.509,06 € | - 28,86% | 2.319,80 € | 9,36% | 3.130,55 € | 47,59% |
| Moers | 164,29 € | 317,94 € | 93,53% | 992,62 € | 504,20% | 1.667,29 € | 914,87% |
| Mülheim | - 568,20 € | -1.122,72 € | - 97,59% | -313,48 € | 44,83% | 495,75 € | 187,25% |
| Münster | 2.305,49 € | 3.897,17 € | 69,04% | 4.925,64 € | 113,65% | 5.954,11 € | 158,26% |
| Oberhausen | - 4.569,17 € | -5.015,27 € | - 9,76% | -4.110,86 € | 10,03% | - 3.206,45 € | 29,82% |
| Paderborn | 4.582,18 € | 5.315,26 € | 16,00% | 5.698,71 € | 24,37% | 6.082,16 € | 32,74% |
| Recklinghausen | 1.524,17 € | 2.244,53 € | 47,26% | 3.123,21 € | 104,91% | 4.001,89 € | 162,56% |
| Siegen | 2.758,13 € | 2.662,40 € | - 3,47% | 3.948,97 € | 43,18% | 5.235,53 € | 89,82% |
| Solingen | 109,70 € | -566,02 € | - 615,97% | -66,43 € | - 160,56% | 433,16 € | 294,86% |
| Arithm. Mittel | 1.220,90 € | 1.004,69 € | - 212,39% | 1.902,37 € | 46,30% | 2.800,05 € | 304,99% |
| Standardabweichung | 2.093,83 € | 2.341,01 € | 724,31% | 2.318,84 € | 260,73% | 2.339,36 € | 414,27% |
| Median | 867,62 € | 633,76 € | - 20,80% | 1.673,80 € | 43,10% | 2.708,37 € | 162,73% |
| Max | 4.582,18 € | 5.315,26 € | 93,53% | 5.698,71 € | 517,54% | 6.287,33 € | 1.562,65% |
| Min | -4.569,17 € | -5.015,27 € | - 3.228,19% | -4.110,86 € | - 832,77% | - 3.206,45 € | - 0,97% |

**Tabelle 22:** Veränderung Eigenkapital nach Szenarien pro Einwohner

Das Eigenkapital pro Einwohner beträgt im Durchschnitt 1.004,69 € (Median: 633,76 €) in Szenario 1. Es steigt in Szenario 2 auf 1.902,37 € (Median: 1.673,80 €) und in Szenario 3 auf 2.800,05 € (Median: 2.708,37 €). Nach NKF ist das durchschnittliche Eigenkapital pro Einwohner 1.220,90 € (Median: 867,62 €). Oberhausen hat sowohl nach NKF als auch in allen Szenarien nach IPSAS das niedrigste Eigenkapital pro Einwohner. Hingegen hat bis auf Szenario 3 (Bonn) immer Paderborn das größte Eigenkapital pro Einwohner.

### 6.4 Auswirkungen auf die Bilanzsumme

Die Tabellen 23 und 24 zeigen die Bilanzsummen der Städte zum 31.12.2013 insgesamt und pro Einwohner gerechnet.

Das arithmetische Mittel der Bilanzsumme nach NKF beträgt 2.721.191.009,42 € (Median: 2.194.247.779,96 €). Nach NKF und IPSAS hat Dortmund immer die größte Bilanzsumme. Die niedrigste Bilanzsumme weist in Szenario 1 Moers und in den Szenarien 2 und 3 sowie nach NKF Bottrop aus. Die durchschnittliche Bilanzsumme steigt in Szenario 1 auf 2.766.911.159,61 € (Median: 2.240.502.250,68 €), sinkt in Szenario 2 auf 2.693.843.802,34 € (Median: 2.145.202.512,57 €) und in Szenario 3 auf 2.675.508.317,38 € (Median: 2.118.669.466,35 €).

Für zehn Städte sinkt die Bilanzsumme in allen drei Szenarien um denselben Betrag. Dies ist Folge der außerplanmäßigen Abschreibung des Sachanlagevermögens, die zu einer Bilanzverkürzung führt. Bonn, Gelsenkirchen und Herne haben keine Instandhaltungsrückstellungen aufzulösen, weshalb in allen Szenarien eine unveränderte Bilanzsumme vorliegt. Die weiteren Anpassungen bei der IPSAS-Anwendung führen bei 13 Städten ausschließlich zu Passivtäuschen, da diese Städte sowohl nach NKF sowie nach allen IPSAS-Szenarien über ein positives Eigenkapital verfügen.

Für Bottrop, Duisburg, Essen, Hagen, Mühlheim, Oberhausen und Solingen unterscheidet sich die Bilanzsumme je nach Szenarien. Diese Städte weisen entweder nach NKF und/oder in einigen IPSAS-Szenarien einen Eigenkapitalfehlbetrag aus. Die Eigenkapitalveränderungen führen zu einer Bilanzverlängerung bzw. -verkürzung. Die Bilanzsumme verändert sich abhängig vom Anteil der aufzulösenden Sonderposten für Zuwendungen.

| Stadt | NKF | IPSAS – Szenario 1 | | IPSAS – Szenario 2 | | IPSAS – Szenario 3 | |
|---|---|---|---|---|---|---|---|
| | Bilanzsumme (in €) | Bilanzsumme (in €) | Prozentuale Veränderung | Bilanzsumme (in €) | Prozentuale Veränderung | Bilanzsumme (in €) | Prozentuale Veränderung |
| Aachen | 2.862.504.682,00 | 2.860.715.410,80 | - 0,06% | 2.860.715.410,80 | - 0,06% | 2.860.715.410,80 | - 0,06% |
| Bochum | 4.526.514.697,39 | 4.494.086.958,82 | - 0,72% | 4,494,086,958,82 | - 0,72% | 4.494.086.958,82 | - 0,72% |
| Bonn | 4.620.434.701,17 | 4.620.434.701,17 | 0,00% | 4.620.434.701,17 | 0,00% | 4.620.434.701,17 | 0,00% |
| Bottrop | 1.028.137.275,12 | 1.051.623.974,35 | 2,28% | 1.027.973.398,15 | - 0,02% | 1.027.973.398,15 | - 0,02% |
| Dortmund | 6.764.037.861,20 | 6.740.815201,68 | - 0,34% | 6.740.815.201,68 | - 0,34% | 6.740.815.201,68 | - 0,34% |
| Duisburg | 5.268.049.468,27 | 5.515.723.379,84 | 4,70% | 4.901.968.279,14 | - 6,95% | 4.901.968.279,14 | - 6,95% |
| Essen | 5.749.926.159,80 | 6.216.339.574,46 | 8,11% | 5.852.842.140,86 | 1,79% | 5.741.135.456,21 | - 0,15% |
| Gelsenkirchen | 2.536.059.848,65 | 2.536.059.848,65 | 0,00% | 2.536.059.848,65 | 0,00% | 2.536.059.848,65 | 0,00% |
| Hagen | 2.350.851.261,46 | 2.366.469.110,11 | 0,66% | 2.312.855.456,56 | - 1,62% | 2.312.855.456,56 | - 1,62% |
| Hamm | 1.456.304.864,88 | 1.455.363.864,88 | - 0,06% | 1.455.363.864,88 | - 0,06% | 1.455.363.864,88 | - 0,06% |
| Herne | 1.489.748.265,17 | 1.489.748.265,17 | 0,00% | 1.489.748.265,17 | 0,00% | 1.489.748.265,17 | 0,00% |
| Leverkusen | 1.423.515.569,25 | 1.411.284.603,41 | - 0,86% | 1.411.284.603,41 | - 0,86% | 1.411.284.603,41 | - 0,86% |
| Moers | 1.037.117.190,55 | 1.035.491.940,30 | - 0,16% | 1.035.491.940,30 | - 0,16% | 1.035.491.940,30 | - 0,16% |
| Mülheim | 2.037.644.298,45 | 2.114.535.391,25 | 3,77% | 1.977.549.568,58 | - 2,95% | 1.924.483.476,13 | - 5,55% |
| Münster | 3.472.256.986,16 | 3.464.980.817,66 | - 0,21% | 3.464.980.817,66 | - 0,21% | 3.464.980.817,66 | - 0,21% |
| Oberhausen | 2.782.345.590,99 | 2.872.581.653,82 | 3,24% | 2.681.810.478,53 | - 3,61% | 2.491.039.303,24 | - 10,47% |
| Paderborn | 1.381.073.657,15 | 1.380.343.019,92 | - 0,05% | 1.380.343.019,92 | - 0,05% | 1.380.343.019,92 | - 0,05% |
| Recklinghausen | 1.305.246.329,26 | 1.297.275.394,95 | - 0,61% | 1.297.275.394,95 | - 0,61% | 1.297.275.394,95 | - 0,61% |
| Siegen | 1.068.215.860,30 | 1.064.322.682,61 | - 0,36% | 1.064.322.682,61 | - 0,36% | 1.064.322.682,61 | - 0,36% |
| Solingen | 1.263.835.621,16 | 1.350.027.398,26 | 6,82% | 1.270.954.014,92 | 0,56% | 1.259.788.268,08 | - 0,32% |
| Arithm. Mittel | 2.721.191.009,42 | 2.766.911.159,61 | 1,31% | 2.693.843.802,34 | - 0,81% | 2.675.508.317,38 | - 1,43% |
| Standardabweichung | 1.766.010.028,08 | 1.819.911017,48 | 2,64% | 1.747.193.118,18 | 1,85% | 1.738.915.373,50 | 2,84% |
| Median | 2.194.247.779,96 | 2.240.502.250,68 | - 0,03% | 2.145.202.512,57 | - 0,18% | 2.118.669.466,35 | - 0,26% |
| Max | 6.764.037.861,20 | 6.740.815.201,68 | 8,11% | 6.740.815.201,68 | 1,79% | 6.740.815.201,68 | 0,00% |
| Min | 1.028.137.275,12 | 1.035.491.940,30 | - 0,86% | 1.027.973.398,15 | - 6,95% | 1.027.973.398,15 | - 10,47% |

**Tabelle 23:** Veränderung der Bilanzsumme nach Szenarien

In Szenario 1 steigt für diese sieben Städte die Bilanzsumme. Der Eigenkapitalfehlbetrag wächst und führt zu einer Bilanzverlängerung. Dieser Effekt übersteigt den bilanzverkürzenden Effekt aus der Auflösung der Instandhaltungsrückstellungen. In den anderen zwei Szenarien existieren gegenläufige Effekte, die die Höhe der Bilanzsumme beeinflussen.

Folglich steigt die Bilanzsumme in Szenario 1 um durchschnittlich 1,31% (Median: -0,03%), sinkt in Szenario 2 um durchschnittlich 0,81% (Median: 0,18%) und sinkt im Szenario 3 um durchschnittlich 1,43% (Median: 0,26%). Die größte Reduzierung in Szenario 2 ergibt sich für Duisburg (-6,95%) und in Szenario 3 für Oberhausen (-10,47%).

Für die Städte mit positiven Eigenkapital nach NKF und IPSAS folgt aus der Auflösung der Instandhaltungsrückstellungen eine niedrigere Bilanzsumme. Insgesamt sind diese Veränderungen gering. Größere Veränderungen sind bei Städten zu beobachten, die entweder nach NKF und/oder IPSAS über kein Eigenkapital verfügen.

Sowohl nach NKF als auch nach IPSAS hat Bonn die höchste Bilanzsumme pro Einwohner. Die geringste Bilanzsumme pro Einwohner weist Solingen nach NKF und den Szenarien 2 und 3 nach IPSAS aus. In Szenario 1 hat Hamm die niedrigste Bilanzsumme pro Einwohner.

Durchschnittlich sinkt die Bilanzsumme von 10.808,54 € pro Einwohner (Median: 10.922,75 €) in Szenario 1, auf 10.579,94 € (Median: 10.222,00 €) in Szenario 2 und auf 10.505,93 € (Median: 10.188,65 €) in Szenario 3. Die Bilanzsumme pro Einwohner nach NKF ist mit 10.676,20 € (Median: 10.580,28 €) größer als in den Szenarien 2 und 3 nach IPSAS.

| Stadt | NKF | IPSAS – Szenario 1 | | IPSAS – Szenario 2 | | IPSAS – Szenario 3 | |
|---|---|---|---|---|---|---|---|
| | Bilanzsumme (in €/Einw.) | Bilanzsumme (in €/Einw.) | Prozentuale Veränderung | Bilanzsumme (in €/Einw.) | Prozentuale Veränderung | Bilanzsumme (in €/Einw.) | Prozentuale Veränderung |
| Aachen | 11.641,64 € | 11.634,36 € | - 0,06% | 11.634,36 € | - 0,06% | 11.634,36 € | - 0,06% |
| Bochum | 12.410,18 € | 12.321,28 € | - 0,72% | 12.321,28 € | - 0,72% | 12.321,28 € | - 0,72% |
| Bonn | 14.492,80 € | 14.492,80 € | 0,00% | 14.492,80 € | 0,00% | 14.492,80 € | 0,00% |
| Bottrop | 8.776,77 € | 8.977,27 € | 2,28% | 8.775,37 € | - 0,02% | 8.775,37 € | - 0,02% |
| Dortmund | 11.539,16 € | 11.499,55 € | - 0,34% | 11.499,55 € | - 0,34% | 11.499,55 € | - 0,34% |
| Duisburg | 10.724,18 € | 11.228,37 € | 4,70% | 9.978,95 € | - 6,95% | 9.978,95 € | - 6,95% |
| Essen | 9.869,02 € | 10.669,56 € | 8,11% | 10.045,66 € | 1,79% | 9.853,93 € | - 0,15% |
| Gelsenkirchen | 9.740,29 € | 9.740,29 € | 0,00% | 9.740,29 € | 0,00% | 9.740,29 € | 0,00% |
| Hagen | 12.435,47 € | 12.518,09 € | 0,66% | 12.234,48 € | - 1,62% | 12.234,48 € | - 1,62% |
| Hamm | 8.117,78 € | 8.112,53 € | - 0,06% | 8.112,53 € | - 0,06% | 8.112,53 € | - 0,06% |
| Herne | 9.558,80 € | 9.558,80 € | 0,00% | 9.558,80 € | 0,00% | 9.558,80 € | 0,00% |
| Leverkusen | 8.707,21 € | 8.632,40 € | - 0,86% | 8.632,40 € | - 0,86% | 8.632,40 € | - 0,86% |
| Moers | 9.921,81 € | 9.906,26 € | - 0,16% | 9.906,26 € | - 0,16% | 9.906,26 € | - 0,16% |
| Mülheim | 12.037,27 € | 12.491,50 € | 3,77% | 11.682,26 € | - 2,95% | 11.368,77 € | - 5,55% |
| Münster | 11.199,42 € | 11.175,95 € | - 0,21% | 11.175,95 € | - 0,21% | 11.175,95 € | - 0,21% |
| Oberhausen | 13.190,60 € | 13.618,39 € | 3,24% | 12.713,98 € | - 3,61% | 11.809,57 € | - 10,47% |
| Paderborn | 9.323,64 € | 9.318,71 € | - 0,05% | 9.318,71 € | - 0,05% | 9.318,71 € | - 0,05% |
| Recklinghausen | 11.416,48 € | 11.346,76 € | - 0,61% | 11.346,76 € | - 0,61% | 11.346,76 € | - 0,61% |
| Siegen | 10.436,38 € | 10.398,35 € | - 0,36% | 10.398,35 € | - 0,36% | 10.398,35 € | - 0,36% |
| Solingen | 7.985,01 € | 8.529,58 € | 6,82% | 8.029,99 € | 0,56% | 7.959,44 € | - 0,32% |
| Arithm. Mittel | 10.676,20 € | 10.808,54 € | 1,31% | 10.579,94 € | - 0,81% | 10.505,93 € | - 1,43% |
| Standardabweichung | 1.744,90 € | 1.743,38 € | 2,64% | 1.683,70 € | 1,85% | 1.633,91 € | 2,84% |
| Median | 10.580,28 € | 10.922,75 € | - 0,03% | 10.222,00 € | - 0,18% | 10.188,65 € | - 0,26% |
| Max | 14.492,80 € | 14.492,80 € | 8,11% | 14.492,80 € | 1,79% | 14.492,80 € | 0,00% |
| Min | 7.985,01 € | 8.112,53 € | - 0,86% | 8.029,99 € | - 6,95% | 7.959,44 € | - 10,47% |

**Tabelle 24:** Veränderung der Bilanzsumme nach Szenarien pro Einwohner

## 6.5 Auswirkungen auf die Eigenkapitalquoten

Die EKQ 1 zeigt den Anteil des Eigenkapitals an der Bilanzsumme, während mit der EKQ 2 der Anteil des „wirtschaftlichen Eigenkapitals“ am Gesamtvermögen dargestellt wird:

$$EKQ\ 1 = \frac{Eigenkapital\ x\ 100}{Bilanzsumme}$$

$$EKQ\ 2 = \frac{(Eigenkapital + Sonderposten\ für\ Zuwendungen; Beiträge)\ x\ 100}{Bilanzsumme}$$

Beide Formeln werden vom Innenministerium des Landes Nordrhein-Westfalen als Indikatoren für die kommunale Substanz zur Deckung haushaltwirtschaftlicher Fehlbeträge angesehen. Je höher die jeweilige EKQ ist, desto solider sei die Finanzierung, desto stabiler sei die Finanzierung in Krisen und desto geringer sei die Abhängigkeit von Banken (Ministerium für Inneres und Kommunales des Landes Nordrhein-Westfalen, 2008, S. 17f. und S. 22f.). Die Auflösung der Sonderposten für Zuwendungen und Beiträge sorgt bei der Berechnung der EKQ 2 ausschließlich für einen Tausch mit dem Eigenkapital. Der Anteil der aufzulösenden Sonderposten für Zuwendungen ist daher unerheblich, d. h. die Betrachtung der Szenarien wäre für die EKQ 2 nicht notwendig.

Duisburg, Hagen, Mühlheim und Oberhausen haben nach NKF eine negative EKQ 1. Das arithmetische Mittel der EKQ 1 liegt laut Tabelle 25 bei 11,69% (Median: 9,93%).

| Stadt | NKF | IPSAS – Szenario 1 | | IPSAS – Szenario 2 | | IPSAS – Szenario 3 | |
|---|---|---|---|---|---|---|---|
| | EKQ 1 | EKQ 1 | Prozentuale Veränderung | EKQ 1 | Prozentuale Veränderung | EKQ 1 | Prozentuale Veränderung |
| Aachen | 29,35% | 24,21% | - 17,50% | 26,65% | - 9,20% | 29,09% | - 0,90% |
| Bochum | 27,73% | 24,96% | - 10,00% | 31,48% | 13,52% | 38,00% | 37,04% |
| Bonn | 27,29% | 25,63% | - 6,08% | 34,51% | 26,43% | 43,38% | 58,95% |
| Bottrop | 5,24% | - 2,24% | - 142,83% | 11,88% | 126,69% | 26,05% | 397,20% |
| Dortmund | 26,46% | 20,17% | - 23,78% | 28,10% | 6,21% | 36,04% | 36,19% |
| Duisburg | - 5,86% | - 10,13% | - 72,65% | 3,62% | 161,65% | 18,63% | 417,57% |
| Essen | 0,26% | - 7,64% | - 2.993,48% | - 1,90% | - 819,88% | 4,39% | 1.565,19% |
| Gelsenkirchen | 7,22% | 2,36% | - 67,37% | 10,67% | 47,77% | 18,98% | 162,90% |
| Hagen | - 1,38% | - 2,27% | - 63,70% | 5,87% | 524,40% | 14,07% | 1.116,29% |
| Hamm | 11,38% | 11,71% | 2,87% | 26,96% | 136,91% | 42,21% | 270,96% |
| Herne | 8,49% | 1,91% | - 77,45% | 12,14% | 43,01% | 22,37% | 163,48% |
| Leverkusen | 24,36% | 17,48% | - 28,24% | 26,87% | 10,31% | 36,27% | 48,87% |
| Moers | 1,66% | 3,21% | 93,83% | 10,02% | 505,15% | 16,83% | 916,46% |
| Mülheim | - 4,72% | - 8,99% | - 90,41% | - 2,68% | 43,15% | 4,36% | 192,38% |
| Münster | 20,59% | 34,87% | 69,39% | 44,07% | 114,10% | 53,28% | 158,80% |
| Oberhausen | - 34,64% | - 36,83% | - 6,32% | - 32,33% | 6,66% | - 27,15% | 21,62% |
| Paderborn | 49,15% | 57,04% | 16,06% | 61,15% | 24,43% | 65,27% | 32,81% |
| Recklinghausen | 13,35% | 19,78% | 48,17% | 27,53% | 106,17% | 35,27% | 164,17% |
| Siegen | 26,43% | 25,60% | - 3,12% | 37,98% | 43,70% | 50,35% | 90,52% |
| Solingen | 1,37% | - 6,64% | - 583,03% | - 0,83% | - 160,22% | 5,44% | 296,13% |
| Arithm. Mittel | 11,69% | 9,71% | - 197,78% | 18,09% | 47,55% | 26,66% | 307,33% |
| Standardabweichung | 18,06% | 20,54% | 672,19% | 20,62% | 259,32% | 21,03% | 416,80% |
| Median | 9,93% | 7,46% | - 20,64% | 19,40% | 43,08% | 27,57% | 163,19% |
| Max | 49,15% | 57,04% | 93,83% | 61,15% | 524,40% | 65,27% | 1.565,19% |
| Min | -34,64% | -36,83% | - 2.993,48% | - 32,33% | - 819,88% | - 27,15% | - 0,90% |

**Tabelle 25:** Veränderung der EKQ 1

In Folge der IPSAS-Umrechnung sinkt die durchschnittliche EKQ 1 in Szenario 1 auf 9,71% (Median: 7,46%), steigt in Szenario 2 auf 18,09% (Median: 19,40%) und in Szenario 3 auf 26,66% (Median: 27,57%) an. Die höchste EKQ 1 hat in allen Szenarien Paderborn (siehe Tabelle 25 und Abbildung 2).

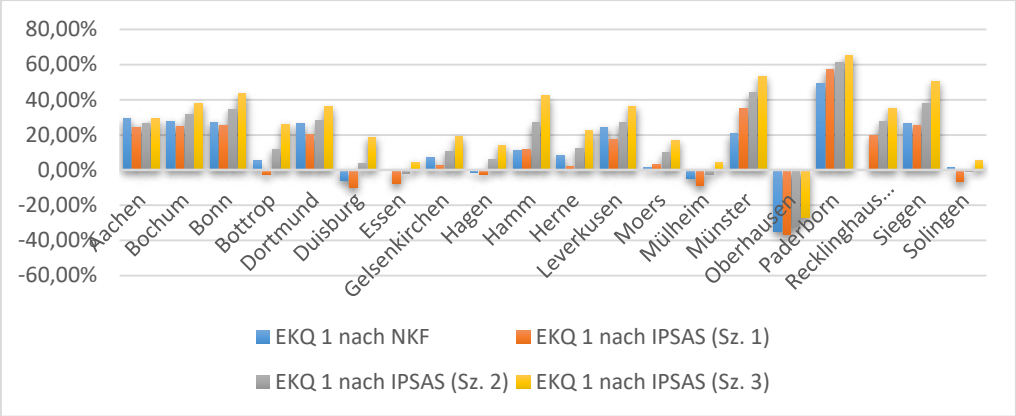


**Abbildung 2:** EKQ 1 für die 20 Städte nach NKF und IPSAS

Die größte prozentuale Veränderung der EKQ 1 ist für Essen (Szenario 1: -2.993,48%; Szenario 2: -819,88%; Szenario 3: +1.565,19%) festzustellen. Im Durchschnitt sinkt die EKQ 1 in Szenario 1 um 197,78% (Median: 20,64%), steigt in Szenario 2 um 47,55% (Median: 43,08%) und in Szenario 3 um 307,33% (Median: 163,19%) an.

Abbildung 3 zeigt die erheblichen Veränderungen der EKQ 1. Diese Veränderungen hängen wesentlich vom Anteil der aufzulösenden Sonderposten für Zuwendungen nach IPSAS ab.

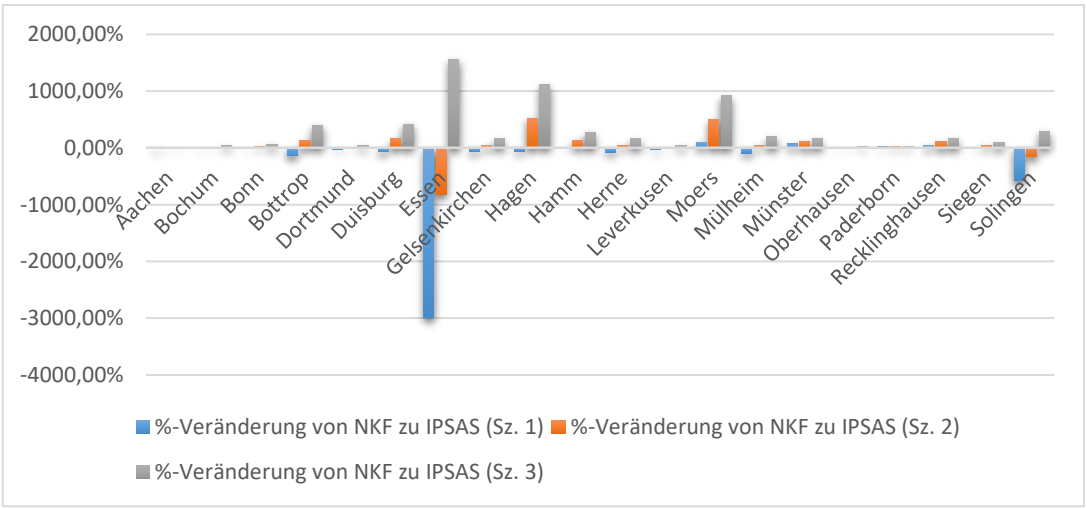


**Abbildung 3:** Prozentuale Veränderung der EKQ 1 von NKF zu IPSAS für die 20 Städte

Für die EKQ 2 liegen folgende Ergebnisse gemäß Tabelle 26 vor.

| Stadt | NKF | IPSAS – Szenario 1 | | IPSAS – Szenario 2 | | IPSAS – Szenario 3 | |
|---|---|---|---|---|---|---|---|
| | EKQ 2 | EKQ 2 | Prozentuale Veränderung | EKQ 2 | Prozentuale Veränderung | EKQ 2 | Prozentuale Veränderung |
| Aachen | 35,77% | 29,09% | - 18,68% | 29,09% | - 18,68% | 29,09% | - 18,68% |
| Bochum | 43,86% | 38,00% | - 13,37% | 38,00% | - 13,37% | 38,00% | - 13,37% |
| Bonn | 48,90% | 43,38% | - 11,29% | 43,38% | - 11,29% | 43,38% | - 11,29% |
| Bottrop | 35,31% | 25,47% | - 27,88% | 26,05% | - 26,22% | 26,05% | - 26,22% |
| Dortmund | 42,71% | 36,04% | - 15,63% | 36,04% | - 15,63% | 36,04% | - 15,63% |
| Duisburg | 25,32% | 16,55% | - 34,62% | 18,63% | - 26,43% | 18,63% | - 26,43% |
| Essen | 13,76% | 4,06% | - 70,50% | 4,31% | - 68,67% | 4,39% | - 68,06% |
| Gelsenkirchen | 27,07% | 18,98% | - 29,90% | 18,98% | - 29,90% | 18,98% | - 29,90% |
| Hagen | 19,67% | 13,75% | - 30,10% | 14,07% | - 28,48% | 14,07% | - 28,48% |
| Hamm | 48,83% | 42,21% | - 13,55% | 42,21% | - 13,55% | 42,21% | - 13,55% |
| Herne | 30,10% | 22,37% | - 25,68% | 22,37% | - 25,68% | 22,37% | - 25,68% |
| Leverkusen | 44,21% | 36,27% | - 17,97% | 36,27% | - 17,97% | 36,27% | - 17,97% |
| Moers | 22,57% | 16,83% | - 25,43% | 16,83% | - 25,43% | 16,83% | - 25,43% |
| Mülheim | 11,62% | 3,97% | - 65,84% | 4,24% | - 63,47% | 4,36% | - 62,47% |
| Münster | 58,81% | 53,28% | - 9,42% | 53,28% | - 9,42% | 53,28% | - 9,42% |
| Oberhausen | - 18,53% | - 23,54% | - 27,05% | - 25,22% | - 36,09% | - 27,15% | - 46,51% |
| Paderborn | 69,80% | 65,27% | - 6,50% | 65,27% | - 6,50% | 65,27% | - 6,50% |
| Recklinghausen | 40,31% | 35,27% | - 12,51% | 35,27% | - 12,51% | 35,27% | - 12,51% |
| Siegen | 54,74% | 50,35% | - 8,02% | 50,35% | - 8,02% | 50,35% | - 8,02% |
| Solingen | 14,84% | 5,08% | - 65,79% | 5,39% | - 63,66% | 5,44% | - 63,34% |
| Arithm. Mittel | 33,48% | 26,63% | - 26,49% | 26,74% | - 26,05% | 26,66% | - 26,47% |
| Standardabweichung | 20,00% | 20,68% | 19,43% | 20,79% | 18,76% | 21,03% | 18,99% |
| Median | 35,54% | 27,28% | - 22,06% | 27,57% | - 22,06% | 27,57% | - 22,06% |
| Max | 69,80% | 65,27% | - 6,50% | 65,27% | - 6,50% | 65,27% | - 6,50% |
| Min | -18,53% | -23,54% | - 70,50% | - 25,22% | - 68,67% | - 27,15% | - 68,06% |

**Tabelle 26:** Veränderung der EKQ 2

Das arithmetische Mittel der EKQ 2 nach NKF liegt bei 33,48% (Median: 35,54%). Die EKQ 2 liegt im Durchschnitt in Szenario 1 bei 26,63% (Median: 27,28%), in Szenario 2 bei 26,74% (Median: 27,57%) und in Szenario 3 bei 26,66% (Median: 27,57%). Die höchste EKQ 2 hat in allen Szenarien Paderborn. Oberhausen verfügt als einzige Stadt immer über eine negative EKQ 2 (siehe Tabelle 26 und Abbildung 4).

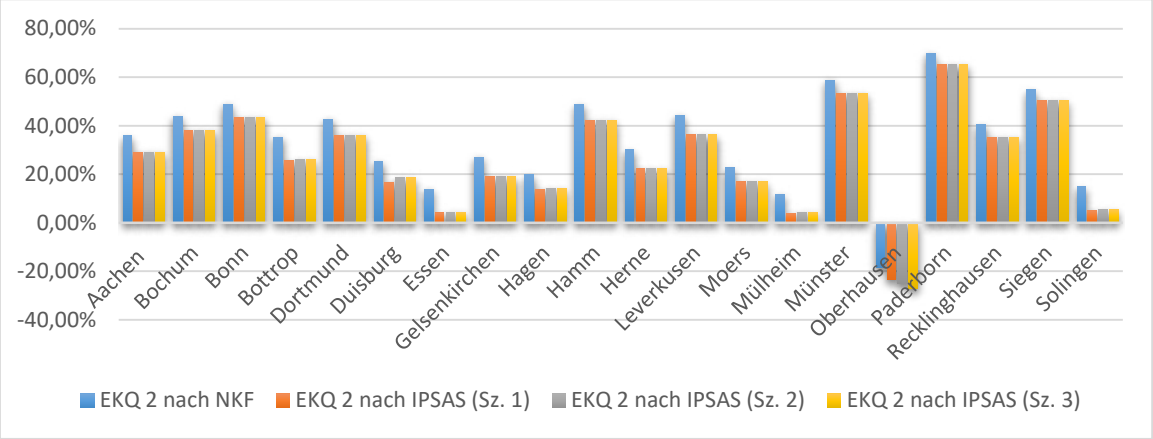


**Abbildung 4:** EKQ 2 für die 20 Städte nach NKF und IPSAS

13 Städte weisen in allen Szenarien dieselbe Bilanzsumme und somit in allen Szenarien dieselbe Veränderung der EKQ 2 auf (siehe Tabelle 26 und Abbildung 5). Für Bottrop, Duisburg, Essen, Hagen, Mühlheim, Oberhausen und Solingen sind verschiedene Veränderungen der EKQ 2 aufgrund unterschiedlicher Bilanzsummen je Szenario festzustellen.

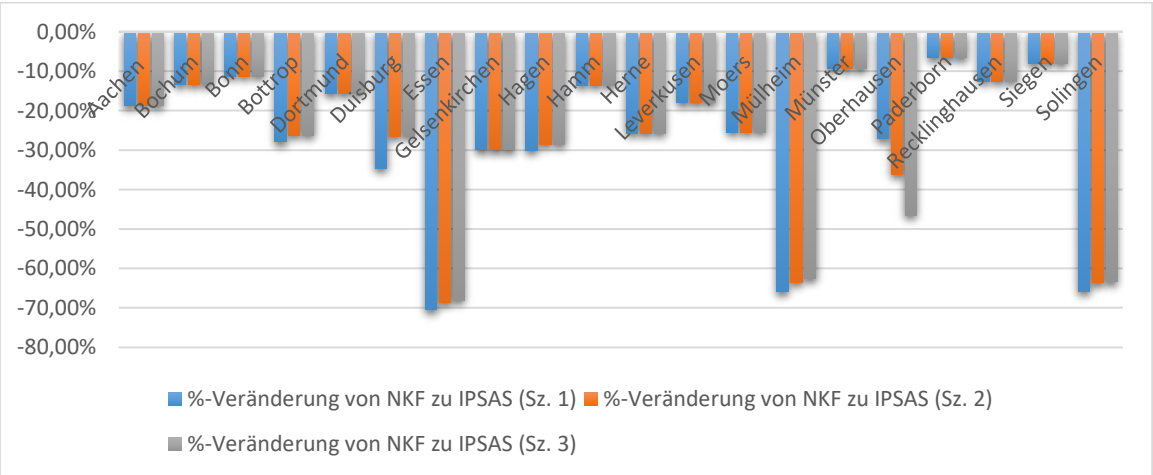


**Abbildung 5:** Prozentuale Veränderung der EKQ 2 von NKF zu IPSAS für die 20 Städte

Die prozentual größte Veränderung zum NKF ist in jedem Szenario für Essen festzustellen. Die EKQ 2 sinkt in den verschiedenen Szenarien im Vergleich zum NKF

teilweise erheblich. Im arithmetischen Mittel sinkt die EKQ 2 um 26,49% (Szenario 1), 26,05% (Szenario 2) und 26,47% (Szenario 3). Der Median beträgt jeweils -22,06%. Die Anpassung der Pensionsrückstellungen sorgt für ein deutliches Sinken des Eigenkapitals. Die Umstellung auf IPSAS verringert demnach die Eigenkapitalquoten teilweise erheblich.

## 7 Diskussion und Fazit

In diesem Artikel wird eine näherungsweise Umrechnung von NKF-Jahresabschlüssen auf IPSAS für 20 große Städte in NRW vorgenommen. In Europa sollen eigene europäische Standards für das öffentliche Rechnungswesen (EPSAS) auf Basis der IPSAS entwickelt werden. Dementsprechend ist eine Umrechnung auf IPSAS sinnvoll, da diese die Grundlage für die EPSAS bilden. Für die Entwicklung der EPSAS sollen Wahlrechte und Auslegungsspielräume in den IPSAS konkretisiert und vereinheitlicht werden.

Grundsätzlich lässt sich feststellen, dass eine Umstellung auf IPSAS die Situation in den betrachteten Städten aus NRW deutlich verändern würde. Die Analyse der 20 Städte zeigt teilweise eine erheblich größere negative Veränderung der Jahresergebnisse als in Hiddenhausen. Die jeweiligen Medianwerte der verschiedenen Szenarien (-17,36% bis -24,44%) in dieser Analyse sind vergleichbar mit der Veränderung des Jahresergebnisses in Hiddenhausen von -19 %. Für ehrenamtliche Mandatsträger wären diese Umstellungseffekte nicht erklärbar.

Einschränkend ist zu erwähnen, dass das Planvermögen (gesicherte Vermögen für die Pensionsansprüche) nicht in den untersuchten Abschlüssen zu identifizieren ist. Eine Saldierung von vorhandenen Planvermögen und Pensionsrückstellungen würde den festgestellten Effekt mildern. Nichtsdestotrotz wird ein hoher Anpassungseffekt bei den Pensionsrückstellungen nötig werden. Es ist daher bei der Einführung der EPSAS auf eine Übergangsregel wie bei der BilMoG-Umstellung nach Art. 67 Abs. 1 S. 1 EGHGB zu drängen. Diese Übergangsregel sieht vor, dass die Anpassungen über 15 Jahre verteilt werden können. Eine solche Regelung würde die Umstellung den Kommunen zumindest erleichtern.

Ein weiterer wesentlicher Faktor für die Umrechnungseffekte ist der Sonderposten für Zuwendungen. Der Anteil der Sonderposten für Zuwendungen mit Rückzahlungsverpflichtung beeinflusst den Umstellungseffekt für die Kommunen. Die unterschiedlichen Möglichkeiten sind anhand verschiedener Szenarien abgebildet worden, sodass die möglichen Auswirkungen deutlich werden.

Eine weitere Einschränkung ist, dass im Rahmen der Umrechnung auf Impairment-Tests verzichtet werden muss, da für deren Durchführung nach IPSAS u. a. für zahlungsmittelgenerierende Vermögenswerte Cash-Generating-Units gebildet werden müssten und die dafür nötigen Informationen in den vorhandenen Jahresabschlüssen nicht vorliegen.

Abschließend ist festzuhalten, dass die Entwicklung zu internationalen Rechnungslegungsstandards im öffentlichen Rechnungswesen vorgezeichnet scheint. Der vorliegende Beitrag reiht sich in eine Reihe von Forschungsarbeiten ein, die bereits einen Eindruck der gravierenden Umstellungseffekte liefern, die auf die Kommunen in absehbarer Zeit zukommen könnten.

**Literaturverzeichnis**

Adam, B. (2013). Einführung in IPSAS Grundlagen und Fallstudie, Berlin.

Adam, B. (2014). Gutachtliche Stellungnahme zu Abweichungen der IPSASs/EPSASs von kommunalem Haushaltsrecht und Einschätzung des resultierenden Umstellungsaufwands, Internet: https://www.bertelsmann-stiftung.de/fileadmin/files/Projekte/79_Nachhaltige_Finanzen/Stellungnahme_AbweichungIPSAS-EPSAS.pdf (16.09.2016).

Adam, B. (2016). Vorwort, in: Adam, B. (Hrsg.): Praxishandbuch IPSAS, 1. Aufl., Berlin.

Allianz Global Investors (2010). Bilanzrechtsmodernisierungsgesetz und Versorgungspflichten, Internet: https://www.allianzglobalinvestors.de/cms-out/loesungen/pension-solutions/docs/bilanzrechtsmoderniesierungsgesetzt.pdf (16.09.2016).

Baetge, J. und Haenelt, T. (2006). Pensionsrückstellungen im IFRS-Abschluss. *Der Betrieb*, 58(45): 2413-2419.

Baugesetzbuch, in der Fassung vom 23. September 2004 (l. I S. 2414), zuletzt geändert durch Artikel 6 des Gesetzes vom 20. Oktober 2015 (BGBl. I S. 1722).

Blab, D. M. (2014). Die Anwendung der International Public Sector Accounting Standards (IPSAS) als funktionales Element einer Neuordnung der öffentlichen Verwaltung, Köln.

Budäus, D., Burth, A., und Hilgers, D. (2013). European Public Sector Accounting Standards (EPSAS). *Verwaltung & Management*, 19(6): 289-295.

Budäus, D., Hilgers, D., und Raupach, B. (2014). Standardisierung des öffentlichen Rechnungswesens: Vom IMK-Beschluss 2003 zu EPSAS 2015. *Verwaltung & Management*, 20(3): 153-156.

Der Neue Kämmerer (2013). Kommunen droht weiterer Systemwechsel. 9(3): 3.

Europäische Kommission (2013). Bericht an den Rat und das Europäische Parlament – Die angestrebte Umsetzung harmonisierter Rechnungsführungsgrundsätze für den öffentlichen Sektor in den Mitgliedsstaaten – Die Eignung der IPSAS für die Mitgliedstaaten, Internet: http://eur-lex.europa.eu/legal-content/DE/ALL/?uri=celex%3A52013DC0114 (16.09.2016).

Europäische Kommission (2014). Consolidated annual accounts of the European Union, Internet:http://ec.europa.eu/budget/library/biblio/documents/2013/2013_annual_accounts_en.pdf (16.09.2016).

Fudalla, M., Tölle, M., Wöste, C., und zur Mühlen, M. (2011). Bilanzierung und Jahresabschluss in der Kommunalverwaltung – Grundsätze für das „Neue Kommunale Finanzmanagement“ (NKF), 3. Aufl., Berlin.

Gemeindehaushaltsverordnung Hessen, in der Fassung vom 27. Dezember 2011 (GVBl. I S. 840), zuletzt geändert durch Gesetz vom 20.12.15 (GVBl. I S. 618).

Gemeindehaushalts- und Kassenverordnung Niedersachsen, in der Fassung vom 15. November 2005 (Nds. GVBl. S. 352), zuletzt geändert durch Verordnung vom 01. Februar 2011 (Nds. GVBl. S. 31).

Heiling, J. und Wirtz, H. (2010). Rechtliche Grundlagen des kommunalen Gesamtabschlusses in den einzelnen Bundesländern, in: Müller-Marques Berger, T. und Krebs, U. (Hrsg.): Der kommunale Gesamtabschluss – Zielsetzung, Grundlagen und Erstellung, 1. Aufl., Stuttgart: 13-22.

Heintges, S. (2015). Potenzielle Nutzen und Kosten der Reform. *Die Wirtschaftsprüfung*, 68(Sonderheft 1): 19-26.

Henkes, J. (2008). Der Jahresabschluss kommunaler Gebietskörperschaften: von der Verwaltungskameralistik zur kommunalen Doppik, 1. Aufl., Berlin.

Hilgers, D. (2016). Die Dispersion der Doppik? Das neue öffentliche Haushalts- und Rechnungswesen zwischen kommunaler Routine und europäischer Harmonisierung, Internet: https://www.haushaltssteuerung.de/weblog-die-dispersion-der-doppik-das-neue-oeffentliche-haushalts-und-rechnungswesen-zwischen-kommunaler-routine-und-europaeischer-harmonisierung.html (16.09.2016).

Höfer, R., Hagemann, T., und Neumeier, G. (2014). Bewertungsparameter für Versorgungszusagen im internationalen und deutschen Jahresabschluss 2014. *Der Betrieb*, 67(47): 2661-2663.

Hurlebaus, A. (2013). Grundsätze ordnungsgemäßer kommunaler Rechnungslegung und ihre Auslegung im Hinblick auf die Bewertung kommunaler Sachanlagen, Wiesbaden.

Innenministerkonferenz (2003). Beschlussniederschrift über die 173. Sitzung der ständigen Konferenz der Innenminister und -senatoren der Länder am 21. November 2003 in Jena, Internet: http://www.haushaltsreform.de/IMK-Beschluss-2003-11-21.pdf (16.09.2016).

IPSASB (2016). Handbook of International Public Sector Accounting Pronouncements, Internet: https://www.ifac.org/publications-resources/2016-handbook-international-public-sector-accounting-pronouncements (16.09.2016).

Kiaman, O. (2011). Kommunale Rechnungslegung: Eine kritische Würdigung von Rechnungszwecken, -zielen und -inhalten, online-veröffentlichte Dissertation: http://edok01.tib.uni-hannover.de/edoks/e01dh12/685018881.pdf (03.08.2017).

Kiaman, O. und Wielenberg, S. (2010). Sind die Regeln der externen Unternehmensrechnung auf die kommunale Rechnungslegung übertragbar? *Zeitschrift für Betriebswirtschaft*, 80(3): 237-261.

Klein, A. (2015). Eignung der IPSAS für die Bewertung kommunaler Sachanlagen. *Betriebswirtschaftliche Forschung und Praxis (BFUP)*, 67(6): 643-664.

Köhrmann, H. (2009). Die Rechnungslegung kommunaler Gebietskörperschaften – Eine Analyse der Regelungen des NKF und der IPSAS, Köln.

Kommunalabgabengesetz für das Land Nordrhein-Westfalen, in der Fassung vom 21. Oktober 1969, zuletzt geändert durch Artikel 2 des Gesetzes vom 8. September 2015 (GV. NRW. S. 666).

Kußmaul, H. und Henkes, J. (2011). Kommunale Doppik: Einführung in das Dreikomponentensystem, Berlin.

Lasar, A. (2010). Keine Harmonisierung im öffentlichen Haushalts- und Rechnungswesen. *Verwaltung & Management*, 16(1): 3-16.

Lorson, P. C., Haustein, E., und Wigger, C. (2017). Europäische Harmonisierung des öffentlichen Rechnungswesens – Wesentliche Unterschiede zwischen Standards staatlicher Doppik und IPSAS. *Die Wirtschaftsprüfung*, 70(10): 576-584.

Makaronidis, A. (2015). Harmonisierte Europäische Rechnungsführungs- und Rechnungslegungsstandards für den öffentlichen Sektor. *Die Wirtschaftsprüfung*, 68 (Sonderheft 1): 2-7.

Ministerium für Inneres und Kommunales des Landes Nordrhein-Westfalen (2008). Handbuch zum NKF-Kennzahlenset, Internet: http://www.mik.nrw.de/fileadmin/user_upload/Redakteure/Dokumente/Themen_und_Aufgaben/Kommunales/kommunale_finanzen/nkf_kennzahlenhandbuch.pdf (16.09.2016).

Ministerium für Inneres und Kommunales des Landes Nordrhein-Westfalen (2014): Neues Kommunales Finanzmanagement in Nordrhein-Westfalen – Handreichung für Kommunen, 6. Aufl., Internet: http://www.mik.nrw.de/fileadmin/user_upload/Redakteure/Dokumente/Themen_und_Aufgaben/Kommunales/kommunale_finanzen/nkf_handreichung6.pdf (16.09.2016).

Müller, S. (2016a). Kapitel 18: Rückstellungen, Eventualverbindlichkeiten und Eventualforderungen (IPSAS 19), in: Adam, B. (Hrsg.): Praxishandbuch IPSAS, 1. Aufl., Berlin: 289-327.

Müller, S. (2016b). Kapitel 24: Leistungen an Beschäftigte (IPSAS 25), in: Adam, B. (Hrsg.): Praxishandbuch IPSAS, 1. Aufl., Berlin: 429-459.

Müller-Marques Berger, T. (2008). Internationale Rechnungslegung für den öffentlichen Sektor (IPSAS) Grundlagen und Einzeldarstellungen, Stuttgart.

Müller-Marques Berger, T. und Heiling, J. (2015). Europäische Standards für die öffentliche Rechnungslegung – Welchen Beitrag kann die internationale öffentliche Rechnungslegung (IPSAS) leisten? *Die Wirtschaftsprüfung*, 68(Sonderheft 1): 11-18.

Müller-Marques Berger, T. und Wirtz, H. (2016). Kapitel 22: Erträge aus einseitigen Leistungsbeziehungen (IPSAS 23), in: Adam, B. (Hrsg.): Praxishandbuch IPSAS, 1. Aufl., Berlin: 395-409.

Raupach, B. und Stangenberg, K. (2009). Doppik in der öffentlichen Verwaltung: Grundlagen, Verfahrensweisen, Einsatzgebiete, 2. Aufl., Wiesbaden.

Richtlinie 2011/85/EU (2011). Richtlinie über die Anforderungen an die haushaltspolitischen Rahmen der Mitgliedsstaaten vom 8. November 2011, Internet: https://webcache.googleusercontent.com/search?q=cache:IeF3HX1X-JcJ:https://plone.rewi.hu-berlin.de/de/lf/oe/whi/archiv/sixpack-iv-rl-2011-85-eu.pdf+&cd=3&hl=de&ct=clnk&gl=de (16.09.2016).

Saliterer, I., Herbst, A., und Korac, S. (2016). Kapitel 2: Darstellung des Jahresabschlusses (IPSAS 1), in: Adam, B. (Hrsg.): Praxishandbuch IPSAS, 1. Aufl., Berlin: 25-52.

Schuster, F. (2015). IPSAS – ein Weltstandard auf dem Weg nach Europa. *Betriebs-Berater*, 70(29): 1707-1711.

Stadt Leverkusen (2014). Jahresabschluss 2013, Internet: https://www.leverkusen.de/vv/oe/orga/135/orga/1/orga/8/145010100000013526.php, (16.09.2016).

Stadt Paderborn (2014). Jahresabschluss 2013, Internet: https://www.paderborn.de/rathaus-service/stadtverwaltung/finanzen/Jahresabschluesse.php (16.09.2016).

Verordnung über das Haushaltswesen der Gemeinden im Land Nordrhein-Westfalen (Gemeindehaushaltsverordnung NRW), in der Fassung vom 16. November 2004 (GV. NRW. S. 644), zuletzt geändert durch das Gesetz vom 16. November 2004 (GV. NRW. S. 644).

Wirtz, H. (2008). Grundsätze ordnungsmäßiger öffentlicher Buchführung, Berlin.

Working Group EPSAS (2015). Update on EPSAS – 1st meeting of Working Group EPSAS 15-16 September 2015 – Malta, Internet: https://circabc.europa.eu/webdav/CircaBC/ESTAT/EPSAS/Library/Working Group EPSAS/Agenda item 4 - Update on EPSAS.pdf (16.09.2016).

***English Abstract***

This article at hand addresses the conversion of the annual accounts from the North Rhine-Westphalian municipal accounting (NKF) to the International Public Sector Accounting Standards (IPSAS) for 20 cities in North Rhine-Westphalia. In particular, the paper analyses the effects of this conversion on the accrued liabilities, the annual result, the equity, the total assets and the equity ratios.

This examination of a conversion to IPSAS is necessary because the European Union plans the implementation of homogenous European accounting standards for the public accounting of municipalities. These European Public Sector Accounting Standards (EPSAS) shall base on the IPSAS. As EPSAS do not yet exist, a conversion from NKF to IPSAS is suggestive to reveal the effects resulting from a possible change of the accounting system to EPSAS.

The results show serious changes for the accrued liabilities, the annual result and the equity ratios. Despite these changes, the total assets remains almost unchanged.