



Het meten van winstkwaliteit

“De Accrual Anomalie in Nederland”

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“De Accrual Anomalie in Nederland”

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Voorwoord

Voor U ligt het verslag van het afstudeeronderzoek dat ik, Jork Muyres, heb uitgevoerd voor Theodoor Gilissen Bankiers N.V. Het vormt het resultaat van de laatste opdracht binnen mijn Bachelor of Science curriculum voor de studie Technische Bedrijfskunde aan de Universiteit Twente, te Enschede.

Dit afstudeerverslag bestaat uit twee delen. Het eerste deel bevat een onderzoeksrapport naar het meten van winstkwaliteit zoals gepubliceerd op 2 oktober 2007 door de opdrachtgever, Theodoor Gilissen Bankiers. Het tweede deel bestaat uit een afzonderlijk rapport met daarin het achterliggende onderzoek naar het meten van winstkwaliteit, gericht op de accrual anomalie. Dit paper heeft als basis gevormd voor de publicatie van het eerste deel.

Speciale dank gaan uit naar mijn begeleiders ter plaatse Pim Lausberg en Jan Meijer voor hun kritische blik, steun en gezellige werksfeer op locatie tijdens mijn afstudeertraject.

Daarnaast gaat mijn laatste dank uit naar Reinoud Joosten, niet alleen voor zijn kritische blik op behandelde literatuur en het verrichte onderzoek maar ook om de motiverende gesprekken, al dan niet rond het onderwerp winstkwaliteit.

Enschede, 21 mei 2008
Jork Muyres

Management Samenvatting

Operationeel resultaat zoals gerapporteerd in het jaarverslag van een onderneming bestaat uit twee componenten: accruals en kasstromen. In dit verslag laten wij zien dat de accrual- en kasstroom- componenten van het resultaatcijfer verschillende voorspelkracht bezitten voor toekomstige resultaatcijfers. Het verslag laat zien dat aandelen met relatief hoge accruals, een lagere koersperformance vertonen dan de markt. Andersom, vertonen aandelen met relatief lage accruals hogere rendementen dan de markt. Het onderzoek focust zich op Nederlandse beursgenoteerde ondernemingen in de periode 1992 tot en met 2005. Uit het onderzoek kunnen we concluderen dat beleggers rekening dienen te houden met het verschil in “voorspelkracht” tussen accruals en kasstromen.

Beleggers zouden meer belang moeten hechten aan de kasstroom component van operationeel resultaat dan aan het accrual component. Accruals kunnen door beleggers gebruikt worden als kwaliteitsindicator bij de analyse van aandelen. Hoewel in fundamentele aandelenanalyse al rekening wordt gehouden met kasstromen en balans verschuivingen, kan het accrual instrument gebruikt worden als een handig hulpmiddel. Door gebruik te maken van het hulpmiddel, kunnen beleggers worden geattendeerd op (kleine) veranderingen in winstkwaliteit. Het is een nuttig hulpmiddel om bedrijven, uit dezelfde sector, onderling te vergelijken.

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Deel I

Research Special
Theodoor Gilissen Bankiers N.V.

“Het meten van Winstkwaliteit”

2 oktober 2007

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Het meten van winstkwaliteit

Voor beleggers is het essentieel om niet alleen aandacht te besteden aan de hoogte maar ook aan de kwaliteit van het gerapporteerde winstcijfer van een beursgenoteerde onderneming. In dit rapport gaan wij in op de voorspelkracht van accruals voor Nederlandse beursgenoteerde ondernemingen in de periode 1992 tot en met 2005. Hieruit blijkt dat aandelen met relatief hoge accruals, een lagere koersperformance vertonen dan de markt. Andersom, vertonen aandelen met relatief lage accruals hogere rendementen dan de markt. Door middel van dit onderzoek tonen wij aan dat accruals een belangrijke maatstaf zijn voor de beoordeling van de winstkwaliteit van beursgenoteerde ondernemingen en als zodanig relevant voor de fundamentele analyse van aandelen.



- Accruals als hulpmiddel bij beoordeling van winstkwaliteit
- Accruals en kasstromen bezitten verschillende voorspelkracht
- Vlottende activa hebben de meeste invloed op accruals
- Beleggers overschatten accruals en onderschatten kasstromen

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Inleiding

"Our goal is not to capture market share or be global. Our goal is to be the No. 1 stock on Wall Street."

*WorldCom debacle onderstreept
vereiste kritische blik van beleggers*

Bovenstaande uitspraak van CEO Ebbers van WorldCom eind jaren '90, illustreert waarom beleggers altijd kritisch en zorgvuldig dienen te kijken naar de (kwaliteit van) gerapporteerde winstcijfers. WorldCom werd in 2002 getroffen door een boekhoudschandaal met faillissement tot gevolg. Creatieve boekhoudmethoden maakten het voor het onderneming mogelijk om verschillende operationele uitgaven uit te smeren op de balans (accruals), in plaats van uitgaven direct te rapporteren en aandeelhouders teleur te stellen.

*Accruals als maatstaf voor
winstkwaliteit*

Verschiedende academische onderzoeken (Sloan, 1996, Richardson, 2005) tonen aan dat er een verband is tussen winstkwaliteit en aandelenperformance. Een maatstaf voor de winstkwaliteit van ondernemingen zijn de zogenaamde accruals, ofwel inkomsten en/of uitgaven die op de balans staan maar nog niet zijn ontvangen en/of betaald. Accruals vloeien voort uit de accrual boekhoudmethode, waarbij kosten dienen te worden genomen in de periode dat de -aan deze kosten verbonden- opbrengsten worden gegenereerd. Maar deze boekhoudmethode vereist veelal *subjectieve* veronderstellingen. Hieruit volgt dat ondernemingen met een optimistisch management eerder negatief verrassen, dan ondernemingen met een conservatief management.

*Voorspelkracht van accruals voor
Nederlandse beursgenoteerde
ondernemingen*

In dit rapport gaan wij in op de voorspelkracht van accruals voor Nederlandse beursgenoteerde ondernemingen in de periode 1992 tot en met 2005. Hieruit blijkt dat aandelen met relatief hoge accruals, een lagere koersperformance vertonen dan de markt. Andersom, vertonen aandelen met relatief lage accruals hogere rendementen dan de markt. Door middel van dit onderzoek tonen wij aan dat accruals een belangrijke maatstaf zijn voor de beoordeling van de winstkwaliteit van beursgenoteerde ondernemingen en als zodanig relevant voor de fundamentele analyse van aandelen.

Hoe worden 'accruals' aangeduid?

Balans 'accruals' ontstaan doordat men binnen de accountancy gebruikt maakt van het zogenaamde 'matching' principe. Dit betekent dat de gemaakte kosten en opbrengsten van een onderneming worden toegerekend aan de periode waarop ze betrekking hebben. Deze methode heeft als voordeel dat het de fluctuaties in het gerapporteerde resultaat afvlakt. Bovendien zou deze methode een betere weergave geven van de operationele gezondheid van een onderneming. In dit boekhoudkundige systeem bestaat de winst uit de som van de kasstromen en de veranderingen in balans accruals.

Matching principe

Een voorbeeld zal meer duidelijkheid verschaffen in accrual accounting. Indien een onderneming producten levert aan haar klanten, dan zal zij de waarschijnlijkheid in moeten schatten dat alle uitstaande betalingen worden betaald. Als de kans groot is dat enkele debiteuren niet aan hun betalingsverplichting kan voldoen dan zal een onderneming haar debiteurensaldo omlaag bijstellen. De daling leidt dan tot een afname van het balanstotaal en zal ten laste van de winst worden geboekt. De afname van deze balanspost als gevolg van de herwaardering kan gedefinieerd worden als een accrual. Accruals kunnen betrekking hebben op zowel de activa als de passivazijde van een balans. Deze balansposten vereisen aannames, welke al dan niet opzettelijk, foutgevoelig zijn.

Accruals vereisen subjectieve aannames

Uit academisch onderzoek (Sloan, 1996) blijkt dat er een negatief verband is tussen accruals en aandelenperformance. Sloan begint zijn onderzoek door aan te tonen dat de componenten van winst, accruals en kasstroom, verschillende voorspelkracht hebben voor de winst van volgend jaar. Hij breidt zijn onderzoek uit door ook aandelenkoersen bij het onderzoek te betrekken. Hieruit blijkt dat er een positieve relatie is tussen winstontwikkeling en aandelenperformance. Echter een essentiële vraag is hoe de verschillende informatiecomponenten (accruals en kasstroom) reageren op de koers van een aandeel. Sloan ontdekt dat koersen van aandelen sterker reageren op veranderingen in accruals dan veranderingen in kasstromen. Beleggers lijken de werkelijke voorspelkracht van accruals te overschatten, terwijl het meest betrouwbare winstonderdeel, kasstroom wordt onderschat.

Beleggers overschatten accruals en onderschatten kasstromen

Om op dit fenomeen in te spelen ontwikkelt Sloan een beleggingsstrategie die bestaat uit het kopen van aandelen met de laagste accruals, en het verkopen van aandelen met de hoogste accruals. Aandelen met lage accruals worden gekocht omdat beleggers in het verleden al te negatief hebben gereageerd op de lage accrual cijfers (door overschatting van de accrual component). Aandelen met hoge accruals worden verkocht omdat beleggers in het verleden al te positief hebben gereageerd op de hoge accruals (door overschatting van de accrual component). De resultaten van deze beleggingsstrategie op de Amerikaanse markt zijn te vinden in onderstaande grafiek. Hieruit blijkt dat er slechts twee jaren zijn waarin een negatief rendement wordt behaald ten opzichte van de markt. Dit fenomeen, waarin aandelen met lage accruals hogere beursrendementen vertonen dan aandelen met hoge accruals, staat bekend onder de naam de accrual anomalie.

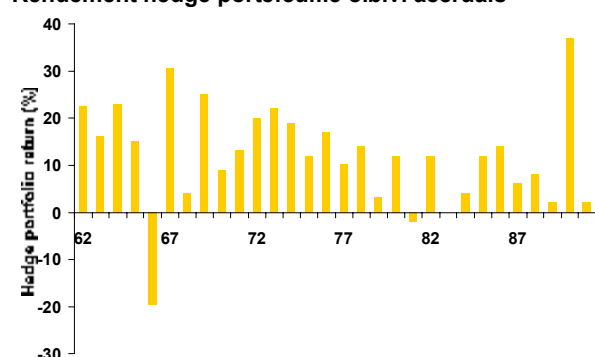
Accrual anomalie

Activa- en passivazijde van een balans

	2006	2007
Vaste activa	150	150
Vlottende activa		
Vorraden	100	80
Liquide middelen	50	50
Vorderingen	20	20
	170	150
Totaal vermogen	320	300

Bron: Theodoor Gilissen Research

Rendement hedge portefeuille o.b.v. accruals



Bron: Sloan, 1996, Do Stock prices fully reflect information in accruals and cash flows about future earnings

3 onderzoeksvragen

De accrual anomalie in de Nederlandse markt

Nadat het concept van de accruals is beschreven, is het de vraag of deze anomalie ook voor de Nederlandse markt geldt. Ons onderzoek concentreert zich op de Nederlandse markt in de periode 1992-2005. De volgende onderzoeksvragen kunnen worden opgesteld:

1. Hebben accruals en kasstroom *verschillende* voorspelkracht voor toekomstige bedrijfsresultaten?
2. Welke accrual balansposten hebben de meeste invloed en verdienen dus de meeste aandacht van beleggers?
3. Weerspiegelen aandelenkoersen het verschil in voorspelkracht van accruals en kasstromen?

Kasstromen bezitten meer voorspelkracht voor toekomstige resultaten

Om de eerste vraag te beantwoorden maken we gebruik van een lineaire regressietechniek. De gedachte achter deze techniek is om te bepalen of de huidige winst van een onderneming kan worden verklaard door de winst van vorig jaar. De lineaire coëfficiënt wordt weergegeven door een bèta, welke de gevoeligheid van de winst op $t=0$ voor de winst op $t+1$ aangeeft. Uit onderstaande tabel blijkt dat van iedere euro aan winst vandaag, gemiddeld Eur 0,65 van deze winst terugkomt in het winstcijfer van het jaar erop. Voor iedere Euro aan kasstromen vandaag zal Eur 0,775 aan kasstromen terugkomen in het resultaat van volgend jaar. Dit ten opzichte van "slechts" Eur 0,697 aan accruals. Hieruit kunnen we afleiden dat kasstromen meer voorspellende waarde voor toekomstige resultaten hebben, dan de accrual component van winst. Onze bevindingen zijn hiermee gelijk aan het eerdere onderzoek van Sloan.

Subjectiviteit van accruals

Eén van de verklaringen waarom de accrual component minder voorspelkracht bezit voor de toekomstige winst is de grote mate van subjectiviteit in dit cijfer. Subjectiviteit in accruals ontstaat doordat veranderingen van balansposten aan verwachtingen en schattingen van het management onderhevig zijn. Bij het rapporteren van kasstromen is minder subjectiviteit van het management mogelijk omdat het gaat om de in- en uitgaande kasstromen.

Onderzoekskarakteristieken: lineaire regressie

Variabelen	Bedrijfsresultaat (jaar $t+1$)		Accrual en kasstroom (jaar $t+1$)	
	beta	t-statistiek	beta	t-statistiek
Intercept	0.015	8,80**	0.014	24,05**
Bedrijfsresultaat	0.65	31,35**		
Accruals			0.697	25,06**
Kasstroom (operationeel)			0.775	33,04**

** statistisch significant op 1% niveau

Bron: Theodoor Gilissen Research

Om een antwoord te geven op de tweede probleemstelling, is een vergelijking gemaakt tussen verschillende balansposten van de betreffende ondernemingen en met de markt als geheel. Voor iedere ondernemingen zijn drie variabelen gemeten:

1. Verandering in de operationele accruals (aangroei van balansposten)
2. Verandering in de operationele kasstroom
3. Verandering in de winst

Deze variabelen zijn onderling te vergelijken door een correctie te doen voor bedrijfsgrootte, waarbij elke variabele wordt gedeeld door totaal geïnvesteerd vermogen.

Negatief verband tussen de accrual- en kasstroomcomponent van winst

Na het verzamelen van de benodigde data worden de ondernemingen verdeeld in vijf mandjes op basis van accrual grootte. Onderneming met lage of zelfs negatieve accrual componenten worden ingedeeld in mandje 1. Bedrijven met hoge, positieve accruals komen voor in mandje 5. Uit de onderstaande tabel blijkt dat ondernemingen met lage accruals, relatief hoge kasstromen hebben. Andersom geredeneerd, hebben ondernemingen met hoge accruals, relatief lage kasstromen. Per definitie bestaat er een negatief verband tussen de accrual- en kasstroom component van het bedrijfsresultaat.

Portfolio's gerangschikt op accrual grootte

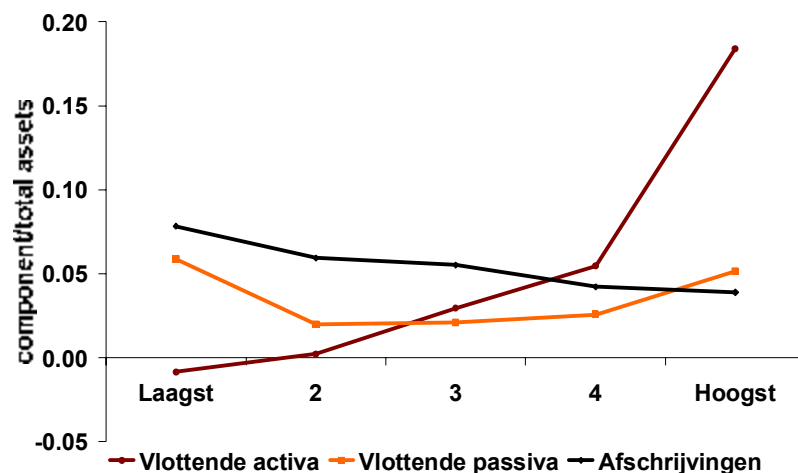
Onderzoek Karakteristieken					
1992-2005	Portfolio Accrual Rank				
	Laagst	2	3	4	Hoogst
Bedrijfsresultaat componenten					
Accruals					
Gemiddeld	-0.15	-0.08	-0.05	-0.01	0.09
Kasstroom					
Gemiddeld	0.20	0.15	0.14	0.11	0.04
Bedrijfsresultaat					
Gemiddeld	0.05	0.08	0.10	0.10	0.14

Bron: Theodoor Gilissen Research, Compustat Global

Alertheid noodzakelijk bij sterke toename van vlottende activa

De geconstateerde verhoudingen kunnen verklaard worden door een analyse van de onderliggende componenten van accruals, te weten de vlottende activa (zoals voorraden en debiteuren), vlottende passiva (zoals crediteuren) en afschrijvingen. Uit onderstaande figuur blijkt dat hoge accruals worden veroorzaakt door een sterke stijging in vlottende activa. Hieruit kan geconcludeerd worden dat beleggers extra alert moeten zijn indien een sterke toename van de vlottende activa is waar te nemen, zoals voorraden en/of debiteuren.

Verhoudingen accrual componenten



Bron: Theodoor Gilissen Research, Compustat Global

Houden beleggers rekening met het verschil in voorspelkracht?

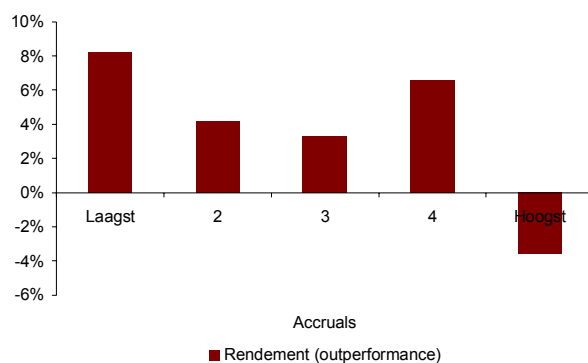
Nu is aangetoond dat winstcomponenten verschillende voorspelkracht hebben voor toekomstige resultaten is het de vraag of Nederlandse beleggers rekening houden met het verschil in voorspelkracht van de winstcomponenten. Voor elk aandeel meten we het rendement gecorrigeerd voor de markt (CBS All Shares Index). Aandelenrendementen worden gemeten over een periode van één jaar. De metingen van rendementen beginnen pas op het moment dat beleggers inzicht hebben kunnen krijgen in alle gerapporteerde jaarcijfers. Concreet betekent dit vier maanden na sluiting van het boekjaar.

Beleggers hechten meer waarde aan accruals dan noodzakelijk

Gelijk aan de bevindingen van Sloan, laat onderstaande figuur zien dat er een negatief verband is tussen enerzijds accruals en aandelenperformance. De ondernemingen met relatief, hoge accruals laten een underperformance zien ten opzichte van de aandelen met relatief lage accruals. Andersom geredeneerd, ondernemingen met relatief, lage accruals laten een underperformance zien opzichte van de aandelen met relatief hoge accruals. Hieruit kan geconcludeerd worden dat beleggers meer waarde hechten aan accruals dan eigenlijk noodzakelijk.

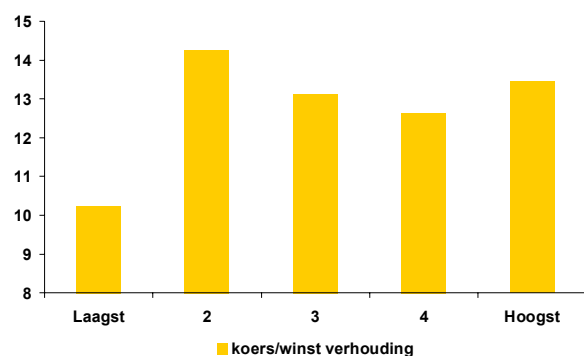
Verder kan men zich afvragen of de genoemde performance veroorzaakt wordt door de hoogte van accruals of omdat onbewust aandelen worden geselecteerd met eigenschappen die de aandelenperformance kunnen beïnvloeden door bijvoorbeeld koers/winst-verhouding. Fama en French toonde in 1992 aan dat groeiaandelen (hoge k/b en hoge k/w) slechter presteren dan waarde aandelen (lage k/b en lage k/w). In onderstaande grafiek is te zien dat het tegenovergestelde plaats vindt in de accrual portefeuilles. Hoge k/b, hoge k/w en lage verhoudingen komen voor in de hoogste accrual portfolio en vice versa. Buitengewone aandelenrendementen lijken dus niet het gevolg te zijn van deze risicofactoren.

Aandelenrendement Nederlandse markt



Bron: Theodoor Gilissen Research, Bloomberg

Koers/ winst verhouding



Bron: Theodoor Gilissen Research, Bloomberg

Verklaringen voor de accrual anomalie

Subjectiviteit door aannames in het boekhoudproces

Pessimistische aannames leiden tot lagere accruals

Optimistische aannames leiden tot hogere accruals

Het conservatieve management voldoet aan de verwachtingen

Het optimistische management zal eerder negatief verrassen

Mogelijke verklaringen voor de accrual anomalie

Als mogelijke verklaringen voor deze inefficiëntie, kunnen twee oorzaken worden aangedragen: 1) subjectiviteit in boekhoud aannames en 2) winststuring.

Subjectiviteit in accruals ontstaat doordat balansposten aannames vereisen welke, al dan niet opzettelijk, foutgevoelig zijn. Een voorbeeld laat zien hoe twee identieke bedrijven, met twee verschillende managementteams, verschillende resultaatcijfers rapporteren. Het managementteam van onderneming A is pessimistisch ten aanzien van de toekomst, onderneming B is echter optimistisch. Beide ondernemingen worden geconfronteerd met een afname van de omzetgroei in het huidige jaar.

Het pessimistische management team ziet de afname van de omzetgroei als een indicatie voor slechtere tijden. Dit management besluit daarom twee verwachtingen omlaag bij te stellen 1) de schatting van de waarde van opgeslagen voorraden én 2) de waarschijnlijkheid dat alle uitstaande betalingen worden afbetaald. De pessimistische aanname leidt tot een afname van de vlottende activa met een daling van het totaal aan accruals tot gevolg. Daarnaast zal dit management het huidige productieniveau verlagen wat in de toekomst kan leiden tot een daling van de operationele winst doordat vaste kosten worden gealloceerd over minder productie-eenheden. Dit bedrijf zal dan een lage accrual score hebben.

De onderneming met het optimistische management zal de afname van de omzetgroei inschatten als een tijdelijke slapte in de markt, waarbij zij er vanuit gaat dat de omzetgroei in de nabije toekomst zal herstellen. Het management ziet daarom geen reden om voorraden te verlagen of om de nog te ontvangen betalingen te herwaarderden. Ook productieniveaus blijven ongewijzigd waardoor voorraden groter worden en accruals toenemen. Dit bedrijf zal in onze analyse een hoge, positieve accrual score hebben. Voorts zijn er twee scenario's mogelijk: 1) de omzetgroei herstelt of 2) de omzetgroei neemt af.

Indien de omzetgroei zich herstelt zal het optimistische management haar productie verhogen. De vaste kosten zullen gealloceerd worden over een groter productieaantal en marges zullen verbeteren. De operationele winst zal toenemen met positieve gevolgen voor de beurskoers. Het negatieve management voldoet aan de verwachtingen, geen winstverrassingen zullen plaats vinden en de aandelenkoers zal stabiel blijven.

Wanneer de omzetgroei afneemt zal het optimistische management genoodzaakt zijn om af te schrijven op haar voorraden, of de productie te verlagen wat resulteert in lagere winstmarges. De daling van het bedrijfsresultaat leidt tot een negatief koerseffect. Het pessimistische management voldoet aan de verwachtingen, er zijn geen winstverrassingen en dus zal de aandelenkoers geen scherpe bewegingen laten zien. Het voorbeeld laat zien dat investeren in een onderneming met een optimistisch management met hoge accruals eerder een negatieve winstverassing laat zien.

Winstverrassingen als gevolg van boekhoudaannames

	Verwachting correct	Verwachting niet correct
Optimistisch management	Geen winstverassing	Negatieve winstverassing
Pessimistisch management	Geen winstverassing	Positieve winstverassing

Bron: Theodoor Gilissen Research

Winststuring kan ontdekt worden met de accrual ratio

Een andere oorzaak kan zijn dat het management belang heeft bij het evenaren of verbeteren van het gerapporteerde winstcijfer. Door het gebruik van aannames in de waardeverandering van balansposten is het mogelijk om gerapporteerde winsten al dan niet opzettelijk beter voor te doen dan ze zijn. Het management kan bijvoorbeeld uitgaven, gedaan voor het huidige boekjaar, alloceren aan de opbrengsten voor het volgende boekjaar. Deze manipulatietechniek resulteert in hoge positieve accruals in het huidige boekjaar. Deze manipulatie kan echter niet voor altijd plaats blijven vinden. Een bedrijf leent geld van haar eigen balans uit de toekomst, om aan de bedrijfsresultaten van vandaag te voldoen. Zo kan men zich voorstellen dat het voor de onderneming steeds lastiger wordt om op deze manier aan toekomstige verwachtingen toe te voegen. Een negatieve reactie van de aandelenkoers na het bekend maken van het teleurstellende resultaat is voor de hand liggend.

Praktijktoeepassing van de accrual ratio

Praktijkvoorbeeld toepassing accrual ratio

Nadat we de voorspelkracht van accruals op de bedrijfsresultaten en hiermee op de aandelenperformance hebben beschreven, gaan we nu in op de toepassing van de accrual ratio in de praktijk. Hierin wordt gedemonstreerd hoe accruals kunnen worden gebruikt ter beoordeling van de winstkwaliteit.

Accrual ratio van 28% suggereert alertheid voor de winstcijfers van ASML in 1998

Op 22 januari 1998 rapporteerde ASML haar jaarcijfers over 1997. Ondanks de Azië crisis, nam de nettowinst toe met 51%, presteerde het bedrijf solide resultaten en steeg de aandelenkoers in 1997. De accrual ratio van 28%, gaf echter een verontrustend signaal. Beleggers reageerden negatief op de jaarcijfers en het aandeel gaat in één dag 5% onderuit vanwege de uitgesproken bezorgdheid over de Aziatische halfgeleidermarkt. Na één week staat de koers van het aandeel weer op haar oude niveau. ASML spreekt in haar jaarverslag een verwachting uit over 1998:

"In 1998 kunnen de ontwikkelingen in Azië een sterke invloed hebben en een stempel drukken op de wereldomzet. Hoewel op langere termijn een groeiende markt wordt verwacht, zijn de ontwikkelingen op korte termijn onduidelijk. Voor 1998 verwacht ASML, in het meest negatieve scenario 10% omzet- en winstgroei. Hoewel het tempo van de groei mede afhankelijk zal zijn van de gang van zaken in de halfgeleiderindustrie in het algemeen en van de situatie in Korea in het bijzonder."

Het management waarschuwt voor negatieve ontwikkelingen in de markt. Maar blijkt dit ook uit de jaarrekeningen?

Accrual ratio heeft signaalfunctie, maar verdere analyse is vereist

Door gebruik te maken van de accrual ratio, kan de kwaliteit van de winst worden beoordeeld. Door het totaal aan operationele accruals te delen door totaal geïnvesteerd vermogen berekenen we de accrual ratio. De accrual ratio van +28% is erg hoog vergeleken met de rest van de Nederlandse markt (gemiddeld -0,8%). Voor een belegger die op de hoogte is van de accrual anomalie zou dit een signaal zijn dat voorzichtigheid geboden is. De belegger zou natuurlijk niet blind moeten varen op het signaal "hoge accruals"; verdere fundamentele analyse geeft meer inzicht in het bedrijf. De stijging in accruals wordt gedreven door twee factoren. Door de toegenomen omzet in 1997 steeg het totaal aan vlottende activa aanzienlijk (+41%), terwijl de omzet toe nam met 35%, stegen te ontvangen betalingen met 53% en voorraden zelfs met 67%. Kennelijk zijn er onverkochte voorraden en debiteuren bijgekomen.

De stijging van de voorraden wordt toegelicht in het jaarverslag:

"De verhouding gemiddelde voorraden/netto-omzet was 21,3%, 21,6% en 24,8% in respectievelijk 1995, 1996 en 1997. Deze toename weerspiegelt de hogere kostprijs van de DUV-systemen, in combinatie met het lagere bruto-omzetresultaat-percentage en de langere productiecyclus van deze systemen. Het voorraadniveau wordt eveneens beïnvloed door de noodzaak van een toereikende voorraad reserveonderdelen voor de afnemers van het steeds grotere aantal geïnstalleerde units. Daarnaast dient een beperkte extra voorraad van de belangrijkste onderdelen voor de productie van wafer steppers en scanners te worden aangehouden."

Balans ASML 31 december 1997

Balans ASML (in mln. Eur)	1996	1997	
Liquide middelen	75,15	34,95	
Debiteuren	185,13	283,86	+ 53%
Voorraden	152,41	253,80	+ 67%
Overig	5,73	16,59	
Vlottende Activa (Totaal)	418,41	589,20	+ 41%
Crediteuren	74,76	119,52	+ 60%
Te betalen winstbelasting	31,42	27,13	
Overig	84,71	74,40	
Vlottende passiva	190,90	221,05	+ 16%
Totaal vermogen	487,04	663,97	

Bron: ASML

Berekening accrual ratio ASML

Accruals ASML (in mln Eur)	1997	
Δ Vlottende activa	170,78	
Δ Liquide middelen	<u>-40,20</u>	
		210,98
Δ Vlottende passiva	30,15	
Δ Korte termijn leningen	0,00	
Δ Te betalen winstbelasting	<u>-4,29</u>	
		34,45
Afschrijvingen	16,07	16,07
Accruals Operationeel		160,47
Gemiddeld Totaal vermogen		575,51
Accruals Ratio		28%

Bron: Theodoor Gilissen Research, ASML

Onzekerheid in de markt als gevolg van de Azië crisis

Ondanks de uitgesproken onzekerheid in de markt (met name Azië), wordt een grotere waarde aan voorraden aangehouden. ASML noemt 4 redenen waarom het saldo aan voorraden is opgelopen: 1) hogere kostprijs, 2) langere productiecycclus, 3) meer reserveonderdelen op voorraad vanwege toenemend aantal klanten 4) hogere voorraad voor productie van machines.

Totaal aan vlottende activa stijgt aanzienlijk door voorraadtoename

De laatste twee redenen verdienen extra aandacht. ASML geeft aan op korte termijn onduidelijkheid te hebben over te verwachte omzet. Op langere termijn blijft de onderneming optimistisch over de verwachte vraag en omzetgroei. Ondanks de grote onzekerheid en de malaise in de Aziatische markt verlaagt het management de totale voorraden niet maar laat deze toenemen. Mocht de omzet in de toekomst stagneren dan zullen voorraden afgeboekt moeten worden wat resulteert in een afname van de operationele winst.

... en toename debiteuren

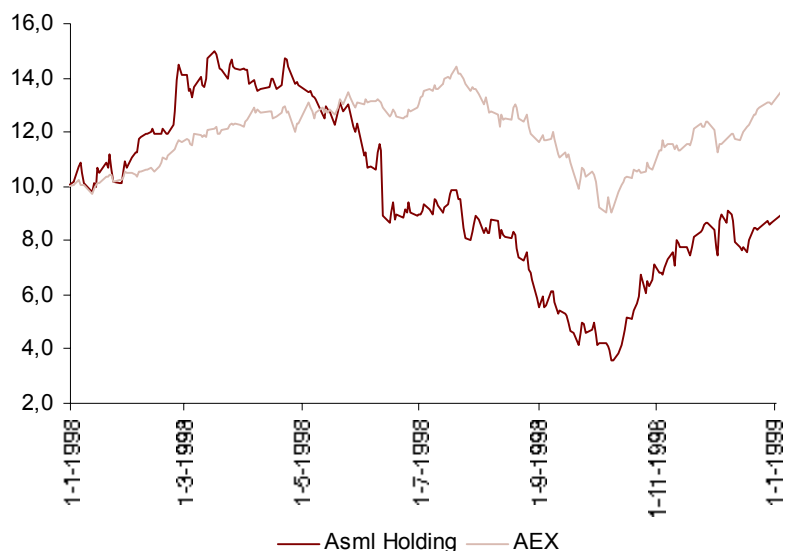
Op 31 december 1997 had circa 31% van de debiteuren betrekking op in Zuid-Korea gevestigde afnemers. In het jaarverslag vermeldt ASML het volgende:

“Gezien de huidige valutacrisis en aanverwante ontwikkelingen ten aanzien van Korea in het algemeen, worden debiteuren door de directie nauwlettend gevolgd, waarbij wordt verwacht dat mogelijk enige vertraging kan worden opgelopen bij het innen van genoemde debiteuren. Vooralsnog heeft de directie besloten dat deze onzekerheden het opnemen van een voorziening voor dubieuze debiteuren niet noodzakelijk maken.”

Winst ontstaat door een sterke aangroei van balansposten en niet door kasstromen.

Blijkbaar was het management zich bewust van de turbulentie in de markt (gevoed door de Azië crisis). Het aantal debiteuren steeg doordat sommige Aziatische partijen problemen hadden om hun producten te betalen. Toch besloot het management niet om de balanspost debiteuren lager in te schatten. Terwijl de kans steeg dat klanten in de toekomst niet aan hun betalingsverplichtingen kunnen voldoen. De grote toename van accruals ten gevolge van de stijging in voorraden en debiteuren draagt positief bij aan de operationele winst over 1997 (+51% JoJ); deze stijging moet met argusogen worden bekeken. De winst wordt namelijk voor het grootste gedeelte gecreëerd door accruals (toename van balansposten) in plaats van operationele kasstromen.

Rendement ASML t.o.v AEX



Bron: Theodoor Gilissen Research, JCF Quant

Naast een interne analyse bekijken we ook de markt waarin ASML zich bevindt. De vraag naar chipmachines blijkt eind 1997 af te nemen. Waakzaamheid voor een daling van de vraag naar chipmachines is dus geboden.

Winstwaarschuwing als gevolg van dalende vraag ...

Op 12 juni 1998 komt ASML voorbeurs met een winstwaarschuwing: *“Door een dalende vraag en hogere kosten van nieuwe producten zal de winst over 1998 lager uitkomen.”*

... heeft een daling van de aandelenkoers tot gevolg

De aandelenkoers reageerde op dit nieuws met een daling van 15%. Waakzaamheid voor tegenvallende winstcijfers was al te verwachten door de sterke stijging van de waarde van voorraden en debiteuren over het boekjaar 1997. Gedurende 1998 presteert de koers van het aandeel ASML beduidend slechter dan de AEX. De accrual ratio, liet zien dat de operationele winst vooral gestuwd wordt door aangroei van balansposten: accruals en niet door operationele kasstromen. Verdere fundamentele analyse toonde aan dat de stijging in operationele winst was veroorzaakt door de sterke aangroei van debiteuren en voorraden in 1997. Dit in combinatie met lagere operationele kasstromen suggereert een slechte operationele winstgevendheid voor ASML. De hoge accrual ratio, een verdere fundamentele analyse en een analyse van de markt bleek in dit voorbeeld een goede voorspeller te zijn voor tegenvallende winstresultaten.

Hoe staat de winstkwaliteit van ASML er momenteel voor?

Uiteraard kunnen we de accrual maatstaf ook vandaag de dag toepassen. Onze accrual ratio van -5% voor het aandeel ASML suggereert een positief signaal voor het aandeel. Een meer fundamentele analyse van onze Technologie analist Wing Yen Choi ondersteunt onze positieve houding.

Accrual ratio van -5% suggereert een goede kwaliteit van de winst

Op 18 juli 2007 publiceerde ASML haar tweede kwartaal cijfers. Ondanks goede omzetresultaten boekte ASML het laagste aantal orders (30 systemen) van de afgelopen twee jaar als gevolg van een stagnatie in de vraag naar chipmachines. De lage accrual ratio (-5%) suggereert een hoge winstkwaliteit, doordat winsten vooral gestuwd worden door kasstromen in plaats van accruals. ASML spreekt tijdens de presentatie van haar tweede kwartaalcijfers de verwachting uit meer machines te zullen verkopen in het tweede halfjaar 2007:

“We zijn erg blij een aanzienlijk aantal nieuwe orders te hebben ontvangen, ondanks de voorzichtige vraag van producenten van memory chips Gebaseerd op onafhankelijk onderzoek, blijkt dat het aantal orders de bodem heeft bereikt. ASML verwacht dan ook dat het aantal orders zal toenemen in de tweede helft van 2007.”

De accruals worden beïnvloed door drie factoren: 1) de toename van voorraden (+7,3%), 2) de afname van debiteuren (-12,5%) en 3) de toename van crediteuren (+13,8%).

Fundamentele analyse rechtvaardigt de positieve accrual indicatie

De toename van de voorraden wordt verklaard door een afnemende vraag in het tweede kwartaal 2007. Ondanks tegenvallende orders in het tweede kwartaal verwacht het bedrijf een aantrekkende vraag in de rest van 2007, hierdoor is een lichte toename van voorraden (+7,3%) gerechtvaardigd. Exorbitante stijgingen van voorraden (zoals we zagen in 1997) komen niet voor, terwijl toekomstige omzetverwachting sterker is dan in 1997. Een afname van de debiteuren is het gevolg van de daling van de vraag naar chipmachines in het tweede kwartaal.

Operationele winst wordt gestuwd door kasstromen en niet door accruals

De toename van de vlottende passiva wordt gedreven door de toename van de post crediteuren (+13,8%). De stijging is in lijn met de toename van voorraden. Daarnaast is de toename te verklaren doordat ASML goede betalingsvoorwaarden heeft afgedwongen bij leveranciers, waardoor leveranciers later kunnen worden betaald; een toename van het werkkapitaal is het gevolg. Verdere fundamentele analyse laat zien dat ASML zowel de gemiddelde verkoopprijs per machine (van Eur 12,5 mln naar Eur 12,7 mln) als de brutomarge (van 40% naar 41%) weet te verhogen. Een sterke operationele winstgevendheid van ASML kan worden verwacht (ook in de toekomst) om de volgende twee redenen: 1) de accrual ratio laat zien dat de operationele winst voornamelijk gestuwd wordt door (operationele) kasstromen en niet door accruals, 2) hogere verkoopprijzen en verbeterde brutomarges leiden tot hoge positieve kasstromen.

Conservatieve aannames beperken negatieve winstverassingen in de toekomst

Ondanks optimistische verwachtingen ten aanzien van toekomstige vraag naar chipmachines blijft het management conservatief in het aanhouden van voorraden. In geval van stagnatie van de vraag naar chipmachines zal ASML slechts in geringe mate het operationele werkkapitaal hoeven bij te stellen, wat ook in geringe mate ten laste komt van de winst. Winstcijfers zullen beleggers hierdoor niet sterk in negatieve zin verrassen. In geval van een stijgende vraag zal zij kunnen profiteren van goede brutomarges en hoge verkoopprijzen, waardoor hogere toekomstige kasstromen en een sterke winstgevendheid beleggers in positieve zin kunnen verrassen.

Balans ASML 1 juli 2007

Balans ASML (in mln. Eur)	1kw07	2kw07	
Liquide middelen	1463	2299	
Debiteuren	649	568	-12,5%
Voorraden	907	973	7,3%
Overig	170	184	
Vlottende Activa (Totaal)	3188	4024	
Vlottende passiva	1164	1324	13,8%
Totaal vermogen	4142	5013	

Bron: Theodoor Gilissen Research, ASML

Berekening accrual ratio ASML

Accruals ASML (in mln Eur)	2kw07	
Δ Vlottende activa	835,40	
Δ Liquide middelen	836,10	-/-
		-0,70
Δ Vlottende passiva	160,10	
Δ Korte termijn leningen	0,00	-/-
Δ Te betalen winstbelasting	0,00	-/-
	160,10	
Afschrijvingen	52,07	52,07 -/-
Accruals Operationeel		-212,87
Gemiddeld Totaal vermogen	4.577,55	:
Accruals Ratio		-5%

Bron: Theodoor Gilissen Research, ASML

Conclusie

In dit rapport tonen wij aan dat de accrual ratio een nuttig hulpmiddel is voor de beoordeling van winstkwaliteit van beursgenoteerde ondernemingen. Door gebruik te maken van het hulpmiddel, kunnen beleggers worden geattendeerd op (kleine) veranderingen in winstkwaliteit. Ons onderzoek naar de accrual anomalie in de Nederlandse aandelenmarkt levert de volgende conclusies:

- De accrual component en de kasstroom component van operationele winst bezitten verschillende voorspellende waarde voor toekomstig winst.
- Vlottende activa hebben de meeste invloed op accruals en verdienen dus de meeste aandacht van beleggers.
- Beleggers houden onvoldoende rekening met het verschil in voorspellende waarde van de winstcomponenten. Beleggers overschatten operationele accruals en onderschatten operationele kasstromen.

Accruals kunnen door beleggers gebruikt worden als kwaliteitsindicator bij de analyse van aandelen. Hoewel in fundamentele aandelenanalyse al rekening wordt gehouden met kasstromen en balans verschuivingen, kan het accrual instrument gebruikt worden als een handig hulpmiddel. Door gebruik te maken van het hulpmiddel, kunnen beleggers worden geattendeerd op (kleine) veranderingen in winstkwaliteit. Het is een nuttig hulpmiddel om bedrijven, uit dezelfde sector, onderling te vergelijken. Wij raden aan om het accrual instrument te gebruiken als onderdeel van het aandelen selectie proces en niet als een stand alone selectie instrument.

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Deel II

**Research report
Universiteit Twente**

“The Accrual Anomaly in the Dutch market”

21st of May 2008

The Accrual Anomaly in the Dutch market

May 2008

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The Accrual Anomaly in the Dutch market

May 2008

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Abstract

Operational earnings consist of two components: accruals and cash flows. This paper explains that the accrual and cash flow components of earnings have different impact on future earnings in the Netherlands. This impact of current components of earnings into future earnings do we call persistence. Cash flows tend to persist more in future earnings than the accrual component of current earnings. However, no statistically significant evidence can be given that stock prices reflect the difference in persistence of earnings components. Back testing demonstrates that the market can not be beaten by investing in extreme accrual portfolios yearly. We use a dataset of 816 firm-year observations in the Netherlands, in the period 1992-2005. The difference in persistence of the accrual and cash flow components of current earnings should be exploited by investors. Investors should give more importance to the cash flow component of current earnings, than the more subjective accrual component of earnings. To implement the difference in persistence of the accrual component of earnings a warning sign can be used by investors: A more robust absolute accrual measure, such as an accrual level can be used as a warning signal to investors.

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1. Introduction

1.1 Background

Financial statements provide valuable information for investors and financial analysts to estimate a company's future earnings. By focusing only on the income statement (and its bottom-line total earnings), investors neglect essential information about the company, reflected on the balance sheet and in the cash flow statement.

Operational earnings contain valuable predictive information for future stock returns (Ball & Brown 1968). Sloan (1996) and Chan *et al.* (2006) show that investors do not make use of all information contained in current earnings. It is signaled that two components of (current) earnings: accruals and cash flows have different predictive value for stock returns. Stocks with relatively high positive accruals signal a significant lower stock price performance the year after. This phenomenon is named: "*The Accrual Anomaly*" first observed by Sloan (1996). This thesis examines whether investors use the information contained in the accrual and cash flow components of earnings for companies listed in the Netherlands.

1.2 Research objective

The main objective of this research report is (1) to test whether the accrual anomaly holds in the Netherlands. Equally interesting is to test whether it is possible to earn money by taking into account the accrual anomaly in the Netherlands. The second objective is (2) to investigate whether a trading strategy exists wherein the information contained in earnings can be exploited to make abnormal stock returns.

1.3 Research report

This thesis is structured as follows. First, Chapter 1 gives a general introduction into the accrual anomaly. Second, Chapter 2 gives a thorough background on accruals, accrual accounting and earnings quality. Chapter 3 treats related literature. Chapter 4 states research questions in the form of hypotheses. The next chapter describes essentials about dataset, databases used for information gathering and potential biases in this research. Chapter 6 presents and explains descriptive statistics and test analysis. Chapter 7 describes the results of the tests and final conclusions and recommendations are described in Chapter 8. Finally, Appendix G summarizes descriptions of 'technical' terms used in the thesis

2. Accrual Definitions

2.1 Introduction

Before historic studies in topics of “earnings quality” and “*The Accrual Anomaly*” are described it is important to understand the concept of earnings, cash flows and accruals (Section 2.2). Section 2.3 describes key-definitions of accruals. Finally, Section 2.4 and 2.5 explain the phenomenon of “*The Accrual Anomaly*” and earnings quality can be found in respectively paragraph 2.4 and 2.5.

2.2 Accruals, cash flows and earnings

Earnings, shortly described as the amount of profits that a firm generates, are an essential determinant for a company’s stock price. According to Ball and Brown (1969), earnings are considered as a good indicator for financial profitability, potential growth and future dividend. Which is an explanation why much attention is paid by investors to reported earnings in annual reports. Reliable and objective measurement of reported earnings are of great importance, however purely objective earnings-figures will rarely be present. Reported earnings can be characterized as subjective due to assumptions made in the definition and calculation of total earnings.

As an example; earnings are the same as the difference between all cash inflow and cash outflow during a given period (for example one year). This example does not take into account that business activities take place over a longer time frame than the recording period (one year). For example, a company that spends cash for the purchase of fixed assets (like property, plant and equipment) which will be in use for the next five years, would report huge negative earnings the first year and positive earnings in the subsequent four years. This measurement problem can be solved by using accrual accounting techniques. Instead of recording all cash flows in the year that expenses or revenues take place (which is called cash accounting¹) it is possible to allocate revenues to expenses, in the period in which they will take place not on the date the payment is made (which is called accrual accounting²). The recognition and measurement of certain assets and liabilities on the balance sheet are results of the application of the accrual concept.

¹ *Accrual accounting* is a bookkeeping method that is driven by events. A company has to allocate revenues to expenses, in the period in which they took place, not on the date the payment is made (as in cash accounting).

² *Cash accounting* is a bookkeeping method that is cash flow driven. Revenue is only recognized (and recorded in company accounts) when cash inflow takes place (no matter if an operational event took place). A disadvantage of the cash accounting method is that it is impossible to show expected cash inflows and expected future liabilities. This is covered by the accrual accounting concept.

The accrual accounting method provides a new definition to earnings: sum of all cash in- and outflows *plus* changes in balance sheet accruals. This adjustment of the earnings definition (which is currently prescribed by all accounting rules and principles) make earnings accounts more vulnerable for subjectivity. Accrual accounts can be prone to errors; these irregularities make it extremely interesting to investigate significant changes in firms' accrual accounts.

2.3 Accrual definition

In accrual accounting, accruals are recorded as *accrued expenses* or *accrued revenues*. An accrued expense is a liability resulting from an expense for which no cash outflow has taken place and no receipt is received yet.

Example accrued expense:

A furniture company receives from its supplier 1000 kg of timber on the 20th of December 2007. The timber is used the same week to produce and sell 50 chairs. On the 31st of December 2007 the company is closing its books and realizes that the invoice of the received 1000 kg of timber is not received yet. Because the timber is used in 2007 the liability already exists in 2007. The company estimates the expected amount which will be invoiced for the delivered timber and records an accrual on its balance sheet of 2007, due to the high probability that the expense will occur.

An accrued revenue is an asset, which results from a revenue for which no cash inflow has taken place and no official document is issued yet.

Example accrued revenue:

The furniture company receives a customer order and ships 50 tables directly on the 27th of December 2007. The furniture company sends the invoice in a later stadium on the 20th of January 2008. The furniture company closes its books on the last day of January 2007 and recognizes that the invoice of the shipped products is not issued yet. Because the deal is made in 2007, the furniture company records the asset in the form of a short term receivable (accrued revenue) on its balance sheet of 2007.

Healy (1985) defines accruals as the change in non-cash working capital less depreciation expenses. In this definition accruals are accounts on a balance sheet that represent all liabilities and non-cash based assets (which are used in accrual based accounting). Examples of these balance sheet accounts are: accounts payables, accounts receivables, goodwill, future tax liabilities and inventories. Using accruals in balance sheet analysis gives insight into what a company owes and what cash revenues it expects to receive.

A firm's balance sheet gives essential information about differences between *reported* performance and *actual* performance. It could give evidence of aggressive or creative accounting practices. Main reason is that earnings that do not immediately generate cash flow are recorded. For example when a firm reports one Euro of earnings in its profit and loss statement two things could have happened:

1. Cash flows or
2. Change in a balance sheet item, called an accrual.

When extreme accruals are measured it could be a signal of poor balance sheet quality and poor earnings. Sloan (1996) defines an accrual as:

The difference between accounting earnings and cash flows

This definition explains that an accrual is the total of expenses and revenues which occurred although cash is not paid or received yet (cash flows). In several studies different definitions of accruals are used. Sloan (1996) uses the following definition and variables to build his research:

Accrual	= $(\Delta CA - \Delta Cash) - (\Delta CL - \Delta STD - \Delta TP) - DEP$
ΔCA	= change in current assets
$\Delta Cash$	= change in cash/cash equivalents
ΔCL	= change in current liabilities
ΔSTD	= change in debt included in current liabilities
ΔTP	= change in income taxes payable
DEP	= depreciation and amortization expense

Figure 1: Accruals specified by Sloan (1996)

All variables are standardized (scaled) by firm size to facilitate comparisons between companies. In Sloan (1996) firm size is measured as an average of the beginning and end of year book value of total assets. This definition is most widely used. An impression of the accrual definition, as defined by Sloan (1996), can be found in Appendix C.

Key difference between the accrual and cash flow components of earnings is that the accrual component involves a greater degree of subjectivity (Sloan (1996)). Sloan (1996) incorporates accruals relating to non-current operating assets, such as capital expenditures. This definition (based on Healy (1985)) also ignores non-current operating asset accruals and subtracts depreciation expenses. Richardson *et al.* (2005) show that the accrual definition of Healy (1985), excludes several economically significant categories of accruals with low reliability. Non-current operating asset accruals represent a good example. Such accruals were at the heart of the well-known tragedy at World-Com (according to Richardson *et al.* (2005)). The definition of Richardson *et al.* (2005) also incorporates accruals relating to non-current operating liabilities, such as post-retirement benefit obligations. Their definition of accruals is broad and also includes accruals related to financial receivables and financial liabilities such as long term debt.

Here, Sloan's definition will be used as a guideline because we only focus on changes in operational aspects of a company's report which can be measured objectively and at their best using current databases.

2.4 The Accrual Anomaly

The accrual anomaly explains that stocks with high accruals today, show lower earnings and under perform stocks with low accruals the following year. This means that high accruals suggest low quality of earnings. It can be seen as an anomaly because in theory might expected that quality of earnings will be reflected in stock prices. However the market does not seem to take into account the quality of firms' earnings components, which leads to overestimated (underestimated) stock prices in relation with "real" values. This is in conflict with the efficient market hypothesis stating that stock prices fully reflect all publicly available market information.

2.5 Earnings quality

The market may be misled by earnings figures recorded as income under the bottom line on the profit- and loss statement. Bottom line earnings can be misleading because of incidental or non-operational results included in the income statement. These earnings will be misleading if the market ignores the *quality* of those figures; for example due to a large change in balance sheet accruals.

An example of a company with low earnings quality is when it reports a net income that increases over time but cash flow is declining. This is a signal of low earnings quality because it suggests that the organization gets income from non-cash operations. These measures of earnings quality give valuable investment information.

A definition of earnings quality is given by Pratt (2000): *"the extent to which net income reported on the income statement differs from true earnings"*. If a big gap between reported net income and true earnings is found, low quality of reported earnings can be indicated. On the opposite, if reported net income match true earnings, the quality of the reported figures is high.

In thesis we test whether changes in balance sheet accruals can be used as a measure of earnings quality and predicts future earnings for companies in the Netherlands. Earnings management could differ from mild manipulation to fraud, as seen in different corporate accounting scandals like World-Com (2002), according to Kaplan & Kiron (2004).

3. Theoretical Framework

The first research in the field of the accrual anomaly has been made by Sloan (1996) in his article Sloan found that stocks with high accruals (the difference between accounting earnings and cash flow), have lower returns the year after and under perform stocks with low accruals. Sloan (1996) recognizes that earnings (reported as net income in the profit and loss statement) consists of two components:

1. Cash component (all recorded cash in- and outflows);
2. Accrual component (all recorded revenues and expenses for which no cash in- or outflow has been taken place)

Sloan (1996) investigates if stock prices reflect information about future earnings contained in the accrual and cash flow components of current earnings. He finds that stock prices act as if investors fail to identify correctly the different properties of the two components of earnings. The stock price results are inconsistent with the traditional efficient market's view that stock prices fully reflect all publicly available information. Sloan (1996) focuses on the operational components of earnings, Richardson *et al.* (2005) pay attention to a broader category of accruals and also include non-operational accruals. Richardson *et al.* (2005) provide a categorization of balance sheet items and accruals. They conclude that some balance sheet categories, such as marketable securities and short debt, can generally be measured with high reliability. Other balance sheet classifications, such as account receivables and intangible assets, are generally measured with low reliability. Examples of accruals with low reliability is the difference in "current operating assets"; this balance sheet category is dominated by receivables and inventory. Receivables require the estimation of uncollectibles and are a common earnings management tool. Inventory accruals entail various cost flow assumptions/allocations and subjective write downs, according to Richardson *et al.* (2005).

Richardson *et al.* (2005) put effort in constructing a model which shows that less reliable accruals lead to lower earnings persistence. They develop a balance sheet categorization of accruals and a rate to each category according to the reliability of the underlying accruals is given. Richardson *et al.* (2005) confirm that less reliable accruals have less impact on earnings. They find that accounts receivables, other current assets and other current liabilities are less reliable components of accruals. Most reliable components of accruals are according to Richardson *et al.* inventories and accounts payables. In line with Sloan (1996) they find that investors badly anticipate on the lower earnings and accruals, which leads to significant security mispricing.

Sloan's research includes all listed American companies (excluding firms in the financial sector, 40.679 in total) for 30 years in the period 1961-1990. Sloan (1996) ranks all firm-year-observations based on the accrual component and divides them equally into 10 groups. He compares different earnings components (accruals, cash flows and earnings), by sorting observations on the accrual component rank. This gives statistical evidence of a strong negative relation between accruals and cash flows. Sloan shows that the cash flow component of earnings has more persistence than the accrual component of earnings to estimate future stock return.

Sloan's study suggests that an abnormal stock return can be earned by following a trading strategy. This strategy takes into account that investors do not correctly anticipate on the reported accrual and cash flow components in annual reports. Sloan (1996) is aware of the fact that small-sized companies are more risky and have more extreme stock returns, and therefore he corrects for size and risk. Sloan (1996) sorts all firm-year observations in ascending order of their accrual component, divided in ten equal groups. Then he creates a trading strategy by creating baskets of stocks. The first basket consists of long positions in firms, reporting the lowest accruals (lowest decile). The second basket contains short positions (with an equal weight) in firms with high accruals (highest decile). Sloan creates a new annual portfolio for every 30 years. The returns are measured after one, two and three years. As expected this long-short portfolio leads respectively to an abnormal return of 10,4%, 4,8% and 2,9%.

Whereas most research focus on the United States market, Pincus *et al.* (2006) researched the international validity of the accrual anomaly. They conclude that the accrual anomaly is present in only four countries: US, Australia, Canada and the UK. However they find some evidence of the underweighting of operating cash flows in other countries including the Netherlands. In the Netherlands, Pincus *et al.* (2006) use a dataset of 819 firm year observations in the period 1994- 2002. They find results that stock prices correctly reflect the underweighting of the operating cash flow component in current earnings; however it can not be not be proven on statistically significant basis.

Pincus *et al.* (2006) focus on 20 different international markets to investigate whether the accrual anomaly as first proved by Sloan, generalizes to other countries. They find that the accrual anomaly is more likely to occur in countries having a common law legal tradition (which allows extensive use of accrual accounting). A reason for this phenomenon is that countries with a common law legal tradition have a lower concentration of share ownership and also possibly having weaker shareholder protections, according to Pincus *et al.* (2006).

Appendix A provides a summary of key-studies in the accrual anomaly. Three major studies in the field of the accrual anomaly are described. These articles are used as a guideline to test the accrual anomaly in the Dutch market in this thesis.

4. Hypotheses

4.1 Introduction

This chapter formulates research questions as hypotheses to reach the two research objectives (1) to test if the accrual anomaly holds in the Dutch market and (2) to investigate whether a trading strategy exists wherein the information contained in a company's earnings can be exploited and make abnormal stock returns.

4.2 Hypotheses

Main objective of the first hypothesis is to test whether, and in what manner, the accrual and cash flow components have different persistence in future earnings. In several studies hypotheses are tested for the American stock market. This report will test the accrual anomaly for the stock market in the Netherlands.

H₁: The accrual- and cash flow components of current earnings have different persistence of future earnings.

In an efficient market, one might expect that investors make rational decisions and pay more attention to the cash flow component of current earnings than the accrual component of current earnings. In an efficient market, one might expect that these differences are fully reflected in the share price. In the second hypothesis the influence of accrual components is assessed. If investors focus too much on reported earnings, then they will tend to overprice stocks in which the accrual component is relatively high. The following relational hypothesis is stated:

H₂: Stock prices reflect the differences in persistence of the accrual and cash flow components of future earnings.

To find out whether market inefficiency exists, a final hypothesis is stated. We create an investment strategy: buying stocks with low accruals and selling stocks with high accruals. Stocks with low accruals are purchased, because we assume that investors react too negatively at low accrual figures published in the past. This negative reaction of investors was a result of overestimating the accrual component in total earnings. Stocks with high accruals are sold because we assume that investors react too positively on high accrual figures. This positive reaction of investors was a result of overestimating the accrual component. In other words, in hypothesis three is tested if *stocks, listed on the Dutch stock exchange, with relatively high (low) accruals, have lower (higher) returns and "underperform" stocks with low (high) accruals*:

H₃: A trading strategy, in which short positions are taken in firms with high accruals and long positions are taken in firms with low accruals, outperforms the market index.

5. Methodology

5.1 Introduction

This chapter describes first the dataset used to test the three hypotheses described before. Section 5.3 explains potential biases. In the last subsection, the methodology is described to analyze the dataset. The methodology described bears a strong similarity with Sloan's (1996) research process.

5.2 Dataset

5.2.1 Sample period and target population

The total dataset contains all Dutch firms listed on the Amsterdam Stock Exchange in the period 1992 – 2005. This time frame is selected because the documentation of financial statement data, by Compustat, in the Netherlands, was started in 1991. 2006 data are not included because this would require 2007-2008 stock return data. Besides there are two sample formation disclosure criteria:

1. Financial firms

Financial firms like banks and insurance companies are excluded in the dataset. Main reason is that reported earnings and balance sheet items differ from other firms. This exclusion is in line with other studies like Sloan (1996).

2. Market capitalization

Smaller companies tend to be riskier to invest in. Fama and French (1995), show that stocks of small firms provide above-average returns by taking above-average risk³. Investors regularly use the “market cap” criterion as investment criterion. In this report firms with a market capitalization smaller than EUR 200 million in 2006 are excluded. Portfolio managers of major investors, like Theodoor Gilissen Bankiers N.V. in the Netherlands only invest in companies with a minimum market capitalization of EUR 200 million in 2006. Since stocks of companies with a small market capitalization rate will not be purchased by portfolio managers; they will not be included in our thesis. Market capitalization is corrected by consumer price changes (inflation) in the Netherlands for every year. Table 6 (Appendix F) shows the minimum investment criteria for firms to include in this thesis. Listed companies with a market capitalization below the given market capitalization rates, per year, are disclosed.

³ E.F. Fama, K.R. French, “Size and Book-to-market factors in earnings and returns”, *Journal of Finance* 50 (1995), pp. 131-155

5.2.2 Data collection

The data collection process starts with the selection of companies that fit the market capitalization criterion (see below). After this selection two kinds of data are gathered from different sources (between brackets) for every firm-year:

1. Financial statement data to calculate several underlying accrual variables (Compustat (Global)⁴);
2. Stock return data (Bloomberg⁵).

Details of the collected data are described in detail in Section 5.4 research methodology.

5.3 Potential biases

In empirical research, adjustments for potential biases make research more objective. In data gathering and analysis process several biases have to be acknowledged: sample selection bias, survivorship bias and look-ahead bias.

Due to the method of data selection a distortion of the data in the overall sample can be signalled. Survivorship bias (described below) is a type of sample selection bias. In the sample selection process the data-period used, is only 14 years (1991-2005) due to sparsely available market data for the Dutch market in subsequent years. However this selection bias can be eliminated because the market has been moving in several stages of the market cycle (bull- as well as bear markets).

Survivorship bias can be seen as the tendency for failed companies to be excluded in data analysis according to Elton & Gruber (1996). Companies which are successful enough to survive are consequently taken in account. By not taken into account those companies who performed worse or are liquidated, average stock returns are corrected upwards. Several adjustments are used to avoid the impact of the survivorship bias. In contrast with other research (Sloan 1996, Pincus *et al.* 2006) all firms at the moment of portfolio formation are included (instead of disclosing firms which data are not available in financial statement databases). If necessary financial statement data are missing; data are manually searched and included in the sample. As second, the survivorship bias is avoided by including actual stock performance in case of

⁴ Standard & Poor's provide financial fundamental and market data in a digital database named Compustat (Global). Compustat provides detailed information about 22.000 listed companies worldwide. All data are standardized for balance sheet and profit and loss statements from 1991 for the Dutch market. The database makes it possible to determine (most of the) balance sheet accounts during the years for (most of the) in-sample firms. To improve the reliability of the dataset all data are manually checked, filtered and if necessary corrected due to irregularities in the Compustat files.

⁵ Besides financial accounting figures, also stock return data are provided by Bloomberg. This firms' database provides financial software and data tools to gather historic stock prices of companies worldwide. Bloomberg provides future stock returns corrected for currency rates (Euro – Guilder) for all in sample firms. All stock returns (including dividends) are measured four months after the end of a firm's book-year.

corporate actions (like mergers and acquisitions) or delisting because of liquidation. If a public company is de-listed for the first reasons, then the stock return after delisting is included in the buy-hold annual return. If a security is de-listed due to liquidation then a delisting return of -100% is recorded.

A look ahead bias is signaled when information or data in a research are used that would not have been available in the period being analyzed. Main adjustment to avoid the look ahead bias is that all data are included in the sample in such a manner that the researcher has got exactly the same information today as in the past. In the data collection process only actual financial data are used (instead of adjusted financial statement figures).

5.4 Research methodology

To test if the accrual anomaly holds in the Netherlands an overall research methodology overview is given. The research framework consists of several steps, in every step a relationship of importance is the beginning of a more extensive model. See figure 2 for the first part of this earnings forecasting model. First of all, the relationship between current year earnings performance and future year earnings performance is expressed (relationship 1.1 in Figure 2). If this relationship holds, the model is extended by making a distinction between the components of earnings (accruals and cash flows). Goal of this research is to predict which component of current earnings persists in future earnings (relationship 1.2 in Figure 2).

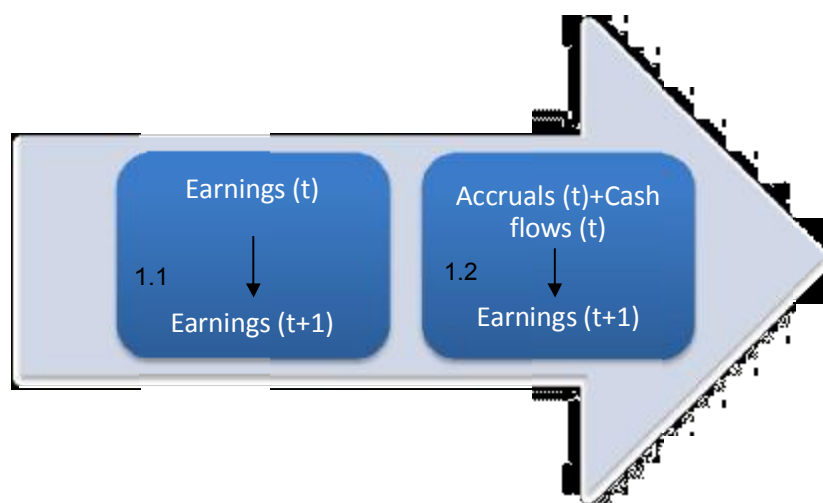


Figure 2: Earnings forecasting model 1

The model predicts which component of earnings, accruals or cash flows, has more persistence in future earnings. The question is whether investors are aware of the relation between accruals, cash flows and future earnings. The research is extended to predict whether investors focus too

much on earnings, failing to distinguish between the components of earnings. The perception of investors is measured by the variable (abnormal) stock price return. Following Sloan (1996), first is shown that all the information available to the market today is enough to predict future stock performance (efficient market theory) (relationship 2.1 in Figure 3). If market efficiency exists, abnormal returns of stocks are impossible. The market efficiency theory can be extended by an earnings performance measure to check if current year earnings are a good predictor for next year stock price performance (relationship 2.2 in Figure 3). If this relationship holds it is also possible to check whether investors distinguish between the information contained in the underlying components of earnings (cash flow and accruals), (relationship 2.3 in Figure 3).

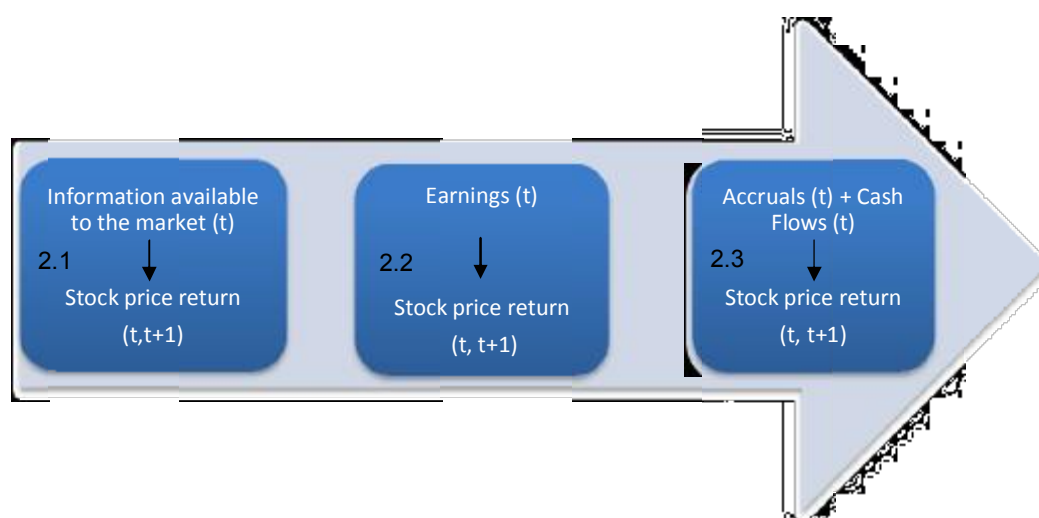


Figure 3: Earnings forecasting model 2

In this research only yearly figures, instead of quarterly figures, are used. Main reason is that quarterly figures could be influenced by seasonality effects. All data extracted from the databases are manually checked and corrected for mistakes. If yearly figures are missing they are attached by hand. Because changes in earnings, stock prices and balance sheet items are used, only firms with data available for two or more consecutive years are included.

After all these criteria are applied, a total sample of 816 firm-year observations is gathered. Table 7 (Appendix F) gives an overview of the number of firms included each year. Four kinds of data are gathered: earnings, accruals, cash flow and stock return.

Earnings

Earnings are defined as income from continuing operations. Nonrecurring items are excluded because only operational activities are involved in this research. By only taken operational

activities into account abnormal earnings created by one-time income are avoided. All earnings are scaled by average total assets.

$$\text{Earnings} = \frac{\text{income from continuing operations}}{\frac{1}{2} \cdot (\text{total assets}_t + \text{total assets}_{t-1})}$$

Accrual Component

Accruals are calculated using a balance sheet method. This means that accruals are measured using the change in operational balance sheet items such as current assets and current liabilities. The exact definition, also used by Sloan (1996), is:

$$\text{Accruals} = (\text{change in current assets} - \text{change in cash}) - (\text{change in current liabilities} - \text{change in debt including current liabilities} - \text{change in income taxes payable}) - \text{depreciation}.$$

Just like the earnings, accruals are scaled by average total assets:

$$\text{Accrual Component} = \frac{\text{accruals}}{\frac{1}{2} \cdot (\text{total assets}_t + \text{total assets}_{t-1})}$$

Cash Flow Component

Cashflow figures are not recorded directly from the cashflow statements of a company. The reason is that all the information to measure cash flow is already available. Cash flows can be expressed as the difference between earnings (income from continuing operations) and accruals. Just like earnings and accruals are cashflows scaled in the same manner:

$$\text{Cash Flow Component} = \frac{\text{income from continuing operations} - \text{accruals}}{\frac{1}{2} \cdot (\text{total assets}_t + \text{total assets}_{t-1})}$$

Stock return and excess return

Stock returns are measured on a yearly basis. Future stock returns are measured on that moment, the entire market has got the possibility to gather all public information (especially the annual report) from a listed company. All firms' financial statements are publicly available four months after the end of the fiscal book year. That is why the measurement of future stock returns (including dividend) is started four months after the end of the fiscal year from which the financial statement data are gathered (following Sloan (1996), on the first trading day of May).

$$\text{Excess return} = \frac{\text{Stock price}_{\text{month } 16}}{\text{Stock price}_{\text{month } 4}} - \left(\frac{\text{Market return}_{\text{month } 16}}{\text{Market return}_{\text{month } 4}} \right)^{\frac{1}{4}}$$

Adjusting returns for market returns per firm-year-observation (excess return), makes it possible to compare observations of dissimilar years. In this context the market returns is defined as the return on the Dutch stock market as a whole. The in-sample, stock returns of all firm-year-observations are adjusted for (yearly) market return; based on the CBS All Shares Index (table 5).

5.4.1 Procedures to test Hypothesis 1

$H_{1.}$ *The accrual- and cash flow component of current earnings have different persistence for future earnings.*

To test whether the accrual component and cash flow component have different persistence for future earnings a multiple regression technique is used as in Sloan (1996). The basic assumption behind Hypothesis 1 is that current earnings are a good predictor for future earnings (1). If earnings are separated in an accrual and cashflow component it is possible to test whether the components persist differently into future earnings (2):

$$(1) \quad Earnings_{t+1} = \alpha_0 + \alpha_1 \cdot Earnings_t + \epsilon_{t+1}$$

The relation between current earnings and future earnings (1) is expressed by Freeman et al. (1982). Here α_1 expresses the persistence of the accounting rate of return on assets. By using an intercept, α_0 , the earnings model is the best prediction of future earnings (instead of leaving out the intercept). Hypothesis 1 implies that the earnings forecasting equation is not well specified: the earnings parameter can be better specified by using its underlying values: accruals and cash flows:

$$(2) \quad Earnings_{t+1} = \gamma_0 + \gamma_1 \cdot Accruals_t + \gamma_2 \cdot CashFlows_t + \epsilon_{t+1}$$

Equation 2 now describes a linear combination of the accrual- and cashflow components of earnings to estimate earnings in the following year

We want to test if the accrual component (γ_1) has the same persistence as the cashflow component (γ_2). In this case: $H_0: \gamma_1 = \gamma_2$ and $H_1: \gamma_1 \neq \gamma_2$. By using the ordinary least squares regression technique adjusted for pooled data it is possible to estimate γ_1 and γ_2 . If there is a significant (95% significance level) difference between γ_1 (accruals) and γ_2 (cash flows) then H_0 can be rejected and Hypothesis 1 is accepted: the accrual component of earnings has different persistence than the cashflow component of earnings.

This regression method provides a t-statistic for the estimated parameters γ_1 and γ_2 . These t-statistics give an indication if the estimated parameters are significantly different from zero. A Wald test is used to check whether the parameters are significantly different from each other.

Wald Test

To test the hypothesis we can use a t-test or a Wald test. Altman (1991) uses a t-test to check whether the parameter is significant different. For a single parameter the Wald statistic is just the square of the t-statistic and so will give exactly equivalent results. In our case we use the Wald test because of 1) consistency with the test in Hypothesis 2 and 2) the ease of use (above the t-test) in the statistical software package Eviews. The Wald test can be used to check if an independent variable, earnings (t), has a statistically significant relationship with a dependent

variable (earnings (t+1)). So in this case the Wald test is used to predict whether the components of earnings are mispriced.

To calculate the Wald test statistic a system of equations is used by combining the forecasting equation and the pricing equations (explained in the following paragraph in equation 7). Now the Wald statistic tests in the first case : $\gamma_1 = \gamma_2$ which means : $\gamma_1 - \gamma_2 = 0$. More details about the Wald statistic can be found in the next chapter.

Assumptions

We have to make sure that all results are valid by checking whether all assumptions (as proposed by Brooks (1972)) that are made for the ordinary least squares estimator are satisfied:

- Assumption 1:** Model is *linear in parameters*
- Assumption 2:** The data are a *random sample* of the data generating process
- Assumption 3:** The errors are *statistically independent* from one another
- Assumption 4:** The independent variables are not too strongly *collinear*
- Assumption 5:** The expected value of the residuals is zero
- Assumption 6:** The residuals have *constant variance*
- Assumption 7:** The residuals are normally distributed

Assumptions 5, 6 and 7 suggest that residuals are normally distributed with $\mu = 0$ and standard deviation is sigma squared.

5.4.2 Procedures to test Hypothesis 2

H₂: Stock prices reflect the difference in persistence for the accrual and cash flow components of future earnings.

Hypothesis 1 tests whether the components of earnings differ in persistence to future earnings. If this hypothesis is accepted it can be included in the market model to check whether investors (stock prices) distinguish between earnings components too. We describe two testing procedures to test for market efficiency. In both procedures we only use two accounting variables (cash flows and accruals) in year t to estimate stock returns in year $t+1$. It does not seem accurate to estimate future stock prices with no more than two variables. Nevertheless we use this method to see whether large (small) accruals give rise to small (large) stock price returns in the subsequent year. If this relationship holds we might assume that investors tend to overvalue the value of accruals in operating earnings.

Almost all accounting research in the field of the accrual anomaly makes extensive use of the Mishkin Test to determine whether accounting information is priced correctly by the market. The Mishkin Test, first described by F. Mishkin in 1983, tests whether stock prices reflect all information that is available in the accrual and cash flow components of earnings. It is a framework that jointly estimates a linear forecasting equation (to forecast accounting figures like earnings) and a model of market equilibrium pricing (based on market efficiency theory). The Mishkin Test compares the weight applied to past information (accruals and cash flows) in the forecasting equation (3) with the weight applied by the pricing equation (4). If the weights are significantly different, the test assumes that the market is not using accounting information rationally. More information about the Mishkin Test is described in Appendix C.

$$(3) \quad Earnings_{t+1} = \gamma_0 + \gamma_1 \cdot Accruals_t + \gamma_2 \cdot CashFlows_t + u_{t+1}$$

$$(4) \quad Abnormal\ return = \beta \cdot (Earnings_{t+1} - \gamma_0 - \gamma_1^* \cdot Accruals_t - \gamma_2^* \cdot CashFlows_t) + \varepsilon_{t+1}$$

Nevertheless past studies do not state explicitly the advantages of the Mishkin Test over the alternative of an Ordinary Least Squares regression technique. A. Kraft, A. Leone and C. Wasley (2007) suggest accounting researchers to use OLS in their research settings since OLS is equivalent to the Mishkin Test in conducting tests of the market pricing of accounting numbers. They recommend to use OLS, since the technique is more easily implemented in standard statistical packages along with traditional diagnostic tests and model corrections. A suggestion for further research is to compare both frameworks. Since the Mishkin test was the starting point however not the most simplistic model to do the test, we decide to perform the test based on OLS techniques. The relation with OLS and the Mishkin framework can be done in further research

In OLS we directly regress the abnormal return (in the period from t to t+1) on the accounting variables (cash flows and accruals):

$$(5) \quad \text{Abnormal Return}_{t,t+1} = \gamma_0 + \gamma_1 \cdot \text{Accruals}_t + \gamma_2 \cdot \text{CashFlows}_t + u_{t+1}$$

Now the test statistics are $\gamma_1=0$ and $\gamma_2=0$. If γ_1 or γ_2 is significantly different than zero we can reject the null-hypothesis. The OLS regression provides a t-statistic for the estimated parameters γ_1 and γ_2 . T-statistics give an indication if the estimated parameters are significantly different from zero.

5.4.3 Procedures to test Hypothesis 3

H₃: A trading strategy, wherein short positions are taken in firms with high accruals and long positions are taken in firms with low accruals, outperforms the market index.

Portfolios of firms are constructed and ranked by the accrual component of earnings each year. In this strategy a long position is taken in the quintile with the lowest accrual ranked firms and a short position is taken in all firms in the quintile with the highest accruals. Returns of the created portfolios are calculated on a yearly basis.

By creating portfolios of firms signaling extreme accrual components of earnings, other factors that could cause abnormal returns. Through the following risk measures it is possible to assess if abnormal stock returns of high-/low accrual portfolio's are caused by other factors.

- beta,
- size,
- price-to-book ratio,
- price/earnings ratio and
- dividend yield.

According to Brealey & Meyers (2003, p 197) a stock's sensitivity to changes in the value of the market is known as beta:

Expected risk premium on a stock = beta x expected risk premium on market

$$r - r_f = \beta \cdot (r_m - r_f)$$

r – stock return

r_f – risk free rate

r_m = expected market return

For every firm-year-observation a beta is estimated, four months after the book-year is closed. Beta estimation is based on weekly stock price data. By using only stock price data that is available at the moment of portfolio formation a look-ahead-bias is avoided. The expected market return and risk free rate is respectively calculated using the weekly change in AEX Index and the 10 years- EURIBOR. Beta estimation, for every firm-year observation, makes it possible to

assess if abnormal stock returns, for high-/ low- accrual portfolios are caused by selecting high-/low risk stocks.

Fama & French (1995) show that stocks of small firms and those with a high book-to-market ratio yield above-average returns. In data analysis size, price-to-book-, price/earnings- and dividend ratios are measured for every firm year observation to check if abnormal returns for high/low accrual portfolios are not (primarily) influenced by these factors.

Fama and French (1995) identified that small cap stocks (stocks with a small market capitalization) outperform stocks with a larger size. For every firm year observation size is measured by market capitalization (stock price times number of outstanding shares) four months after the end of the bookyear.

Fama & French (1995) show that firms with a high book-to-market ratio have provided above average stock returns. In this research report the inverse of book-to-market ratio (price-to-book ratio) is measured for every firm-year-observation.

$$\text{Price to book} = \frac{\text{stock price}}{\text{shareholder equity per share}}$$

The price/earnings ratio (P/E) shows how much investors want to pay (stock price) for the earnings per dollar of earnings.

$$\text{Price/Earnings} = \frac{\text{stock price}}{\text{net earnings per share}}$$

The dividend yield shows how much a company pays out in dividends (annual dividend per share) in relation with its stock price.

$$\text{Dividend yield} = \frac{\text{annual dividend per share}}{\text{stock price}}$$

Fama & French (1995) and later Campbell & Shiller (1998) observed a relationship between current dividend yield (as well as price/earnings) and the future value of the equity market. They conclude that low dividend (as well as low price/earnings) yields today, predict low stock returns in the future and vice versa. By taking into account risk ratios it is possible to assess whether abnormal stock returns of high-/low accrual portfolio's are caused by investing in more risky stocks.

6. Empirical analysis

6.1 Descriptive statistics

The empirical analysis begins by providing descriptive statistics of components of earnings, accruals and risk proxies. All firm years are ranked annually based on the accrual component of earnings and then five equally sized portfolios are formed. Table 3 provides three different characteristics described below.

Components of earnings

The first panel of Table 1 shows the negative relation between the accrual component of earnings and the cash flow component of earnings (visualized in Figure 4). Firms reporting low accruals report high cash flows and vice versa. Firms in the quintile reporting the highest accruals show an average accrual component of 0.09. In other words 9% of the firm's total assets consist of accruals. As second the panel shows that there is a positive relation between earnings and accruals. Also a positive relation between the accrual component of earnings and earnings can be signaled. These components are additionally used testing hypothesis 3: trading strategy.

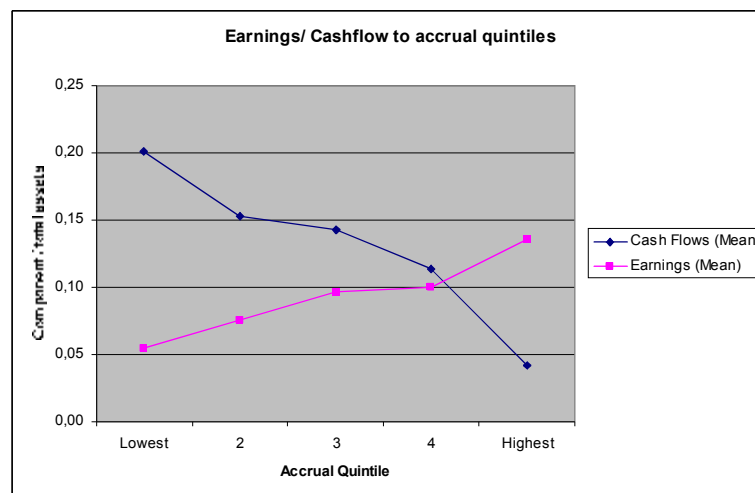


Figure 4: Earnings and Cash Flow component in relation with accrual quintiles

Risk proxies

In Sloan's research two risk proxies are measured: beta and size. In the second panel an extension to Sloan (1996) is made by measuring price-to-book ratio, price/earnings ratio and dividend yield (see paragraph 6.4). These risk measures make it possible to signal if abnormal stock returns are caused by additional risk.

A small difference in beta is observed ranging from a mean of 0.74 in the extreme highest and lowest accrual ranked portfolios and a slightly higher (mean of 0.77) in the middle portfolio. In other words: extreme accrual portfolios are less sensitive for changes in the market. This contrasts Sloan (1996), where far more extreme beta values are found. No high differences in beta (difference less than 10%) are observed, which makes it possible to assume that the accrual ranked portfolios are well adjusted for beta-risk. The second risk measure, size, is measured using market capitalization. Here you see that more extreme portfolios (containing firms with high- or low- accruals) contain smaller (and consequently more risky) stocks.

Because of high variation in other risk measures it is more reliable to look at the median value of price-to-book, price-to-earnings and dividend yield. In table 5 these ratios are depicted. A balanced median of the price to book ratio, between 2.27 and 2.16 is measured in the four lowest accrual firm year observations. Firms in the highest accrual portfolio contain firms with a higher price to book ratio (median of 3.17). More information about the other risk measures is described in Section 5.4.

Components of accruals

The last panel of table 2 provides information about fundamentals of the accrual component. The general expectation is that if a company's current assets increase during a year (for example because the firm is growing and working capital requirements increase) current liabilities also tend to increase. Remarkable to see is that current asset components of accruals are strongly positive related with accruals. Firms with high accruals show a strong increase in current assets and vice versa. This is in contrast with the other accrual components: current liability changes and depreciation expenses. This information suggests that extreme accruals can be attributed to changes in current asset items like inventories or accounts receivables (and not (or less) to the other components of accruals like depreciation and current liabilities).

Characteristics of all firm-year observations						
1992-2005		Portfolio Accrual Ranking				
		Lowest	2	3	4	Highest
Components of Earnings						
Accruals						
Mean	-0,15	-0,08	-0,05	-0,01	0,09	
Median	-0,13	-0,08	-0,05	-0,01	0,05	
Cash Flows						
Mean	0,20	0,15	0,14	0,11	0,04	
Median	0,21	0,17	0,14	0,11	0,06	
Earnings						
Mean	0,05	0,08	0,10	0,10	0,14	
Median	0,08	0,09	0,10	0,10	0,12	
815	163	163	163	163	163	
Total:	815					
Quintile size	163					
Risk proxies						
Beta	Mean	0,74	0,73	0,77	0,73	0,74
	Median	0,71	0,72	0,77	0,71	0,73
Size / Market cap (mln)						
Mean	3024,2	3984,4	4267,8	7013,9	3954,1	
Median	645,7	877,4	930,8	746,8	696,1	
Components of Accruals						
Current Assets						
Mean	-0,01	0,00	0,03	0,05	0,18	
Median	0,00	0,00	0,03	0,05	0,14	
Current Liability						
Mean	0,06	0,02	0,02	0,03	0,05	
Median	0,03	0,01	0,02	0,02	0,05	
Depreciation						
Mean	0,08	0,06	0,06	0,04	0,04	
Median	0,07	0,06	0,06	0,04	0,04	

Table 1: Descriptive statistics of all firm year-observations

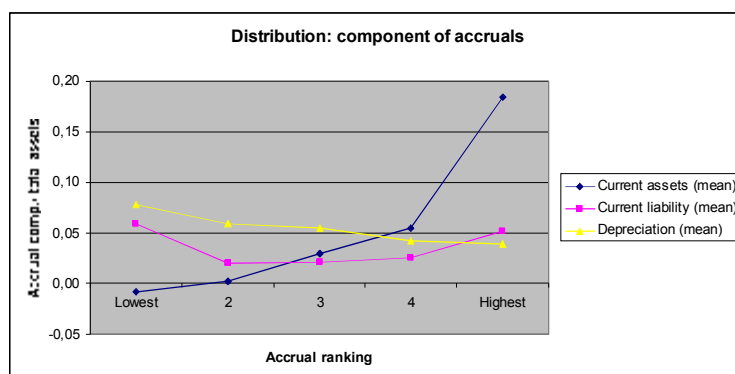


Figure 5: Distribution of accrual components by portfolio accrual ranking

6.2 Test of Hypothesis 1

We test the relation between the accrual- and cashflow- components of current earnings to future earnings by pooled ordinary least square (OLS) regression. This technique makes it possible to estimate an accruals- and cashflows parameter to predict future earnings (table 2). Results of coefficient estimation for the accrual- and cash flow component of earnings show differences in persistence for future earnings.

OLS regression for future earnings		
$Earnings_{t+1} = \gamma_0 + \gamma_1 \cdot Accruals_t + \gamma_2 \cdot CashFlows_t + \varepsilon_{t+1}$		
Sample size (n) = 813		
Variable	Coefficient	Std. Error
γ_0	0,014 (3,92)**	0.00358
γ_1	0,697 (25,06)**	0.02782
γ_2	0,775 (33,04)**	0.02345
Between brackets: t-statistic		
** Indicates a significance at 1% using a two-tailed t-test		

Table 2: OLS regression for future earnings

The null-hypothesis $H_0: \gamma_1 = \gamma_2$ describes that the cash flow component has the same persistence as the accrual component of earnings. $H_1: \gamma_1 < \gamma_2$ describes that the accrual component has less persistence than the cash flow component. Table 3 provides the OLS regression statistics and other tests performed by EViews. The accrual parameter, $\gamma_1 = 0.697$, has a lower predictive value than the cash component of earnings $\gamma_2 = 0.775$. Table 2 provides information to test whether the accrual coefficient *significantly* differs from the cash flow coefficient. To test whether the accrual and cashflow have significantly different values $\gamma_1 \neq \gamma_2$, a Wald test is used. The Wald test is performed in EViews. In reality the Wald test statistic looks

like: $\frac{(\hat{\theta} - \theta_0)^2}{\text{var}(\hat{\theta})}$. The relationship $\gamma_1 = \gamma_2$ is tested by using the linear restriction $-\gamma_1 + \gamma_2 = 0$. Here -

$\gamma_1 + \gamma_2$ is an estimator for θ .⁶ The Wald test gives an F-statistic of 9.650 which rejects that the accrual component and the cash flow component of earnings are equal. The probability that $\gamma_1 = \gamma_2 < 0.5\%$, based on the chi-square distribution with two degrees of freedom. In short: the null hypothesis can be rejected: the accrual component has less persistence than the cash flow component of earnings for future earnings. Appendix D tests if the regression assumptions are met.

6 For the textbook case of a linear regression model, $y = X\beta + \varepsilon$ and linear restrictions: $H_0: R\beta = r$ Where R is a known $q \times k$ matrix, and r is a q -vector, respectively. The Wald statistic becomes: $W = (R\hat{\beta} - r)'(R\hat{\text{se}}(X'X)^{-1}R' - r)$ which is asymptotically distributed as $\chi^2(q)$ under H_0 according to EViews 5.0 help function:

6.3 Test of Hypothesis 2

Tests of Hypothesis 1 show that the accrual and cash flow component of current earnings have different persistence for future earnings. Hypothesis 2 tests whether the difference in persistence of accounting numbers is priced correctly by the market.

Because Hypothesis 1 is accepted ($\gamma_1 \neq \gamma_2$) it is time to check whether investors take into account that accruals and cash flows have a different persistence to future stock returns. The null-hypothesis contains two constraints to test for market efficiency: $H_0 : \gamma_1 = 0$ and $\gamma_2 = 0$. Results of the OLS regression equation are described in Table 3.

OLS Regression		
Abnormal Return _{t+1} = $\gamma_0 + \gamma_1 * \text{Accruals}_t + \gamma_2 * \text{CashFlows}_t + \varepsilon_{t+1}$		
Sample size (n)= 815		
	Coëfficiënt	Std. Error
γ_0	0,0177 (0,71)	0,025
γ_1	-0,421 (-2,15)*	0,196
γ_2	0,0025 (0,016)	0,164
Adjusted R-Squared		0,81%
Between brackets: t-statistic		
* Indicates a significance at 5% using a two-tailed t-test		

Table 3: Ordinary Least Squares Regression, to estimate earning coefficients with abnormal stock returns.

The OLS estimation shows that the accrual coefficient is estimated as -0,421, which is smaller than zero, at a 5% significance level. This gives evidence of overweighting the accrual component of earnings. A significant negative coefficient indicates that extreme positive total accruals in year t are followed by extreme negative abnormal returns in the subsequent year (t+1). The cash flows coefficient is estimated as 0,0025, which is close to zero. This gives no evidence that investors over- or underweight the cashflow component of earnings; we can assume that investors price the cash flow component of earnings correctly.

We have to be aware that we used a simplistic method to test whether investors price accounting data correctly. We only include two variables (accruals and cash flows) to test for the mispricing of the accounting variables. A recommendation for further research is to include other variables to test the mispricing of the accounting variables: accruals and cash flows.

6.4 Test of Hypothesis 3

Hypothesis 1 proves that the cash flow and accrual component of earnings have got different persistence. Hypothesis 2 shows that investors do not take into account this effect; however it is not statistically significant. If investors do not take into account the accrual and cash flow information, abnormal stock returns could be earned by exploiting this information.

The last hypothesis makes the accrual anomaly come into practice: A trading strategy such that a short position is taken in firms with high accruals and a long position is taken in firms with low accruals. This strategy tries to make use of the “mispricing” of the accrual component. This means that investors overvalue high accrual companies and undervalue low accrual companies. Tests to prior hypotheses conclude that the cash flow and accrual component of earnings have different persistence. Hypothesis 3 tests whether investors disregard this effect. The big issue that this last hypothesis tries to tackle whether it is possible to earn money if you assume that the accrual anomaly effect takes place in the Netherlands.

Figure 6 shows yearly stock returns: investing in firms with the highest accruals and the lowest accrual (quintile 1 and 5). In 7 of the 14 years, firms with high accruals show better stock performance. In the other years the lowest accrual group outperforms firms with high accrual components in earnings. No direct conclusions can be drawn because of irregularities in behavior of the extreme accrual quintiles. No pattern is observed that firms in the highest accrual quintile outperform the AEX (8 times) against firms in the lowest quintile (6 times).

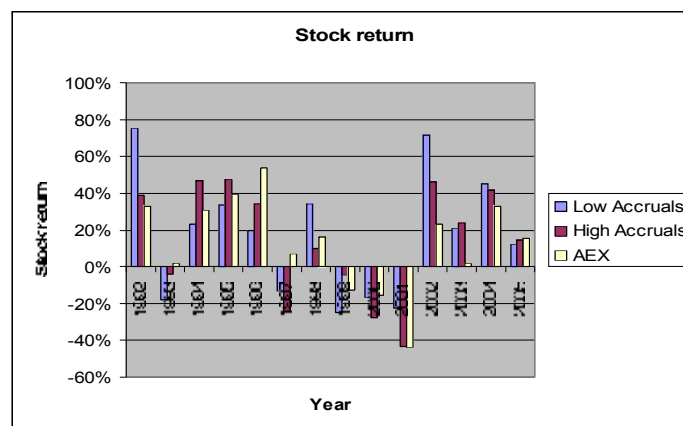


Figure 6: Stock return of high-/low- accrual quintile portfolios

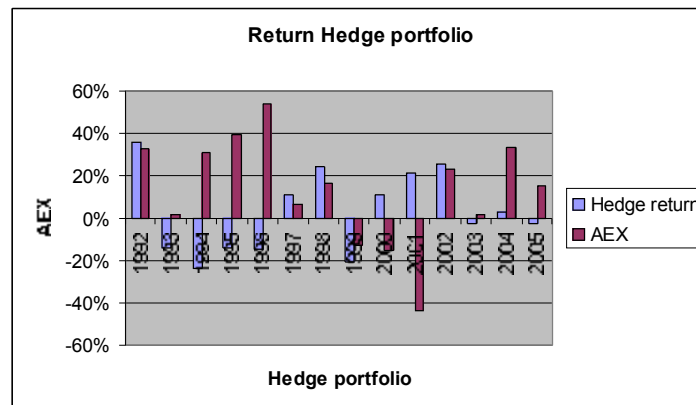


Figure 7: Stock return on hedge portfolio

Yearly results of a trading strategy wherein a short position is taken in firms with high accruals and a long position is taken in firms with low accruals is showed in Figure 7. The hedge strategy apparently does not show any consistent behavior of stock returns. It gives not enough evidence that stocks with high accruals underperform stocks with low accruals in the Dutch market. This conclusion is based on year-on-year information. A representation of all firm-year observations together with the excess return (the same procedure as performed in the descriptive statistics) is given in table 5.

Characteristics of all firm-year observations					
1992-2005	Portfolio Accrual Ranking				
	Lowest	2	3	4	Highest
Components of Earnings					
Accruals					
Mean	-0,15	-0,08	-0,05	-0,01	0,09
Median	-0,13	-0,08	-0,05	-0,01	0,05
Excess return					
Mean	8,18%	4,11%	3,31%	6,55%	-3,57%
Median	2,75%	1,42%	-3,62%	1,04%	-5,35%
Ratios					
Price to book					
Mean	0,84	3,39	3,21	3,79	5,32
Median	2,27	2,29	2,18	2,16	3,07
Price/Earnings					
Mean	15,21	17,66	20,72	16,51	16,74
Median	10,24	14,25	13,11	12,63	13,45
Dividend Yield					
Mean	2,31%	2,80%	2,41%	2,75%	2,47%
Median	2,09%	2,37%	2,29%	2,52%	2,42%

Table 4: Excess return and risk ratios, all firm year observations

Sloan (1996) investigates the American market with an average sample size of circa 1300 observations yearly. In contrast to our research, sample size differences can have a strong effect

on realized hedge results. In contrast with Sloan (1996), only 44-77 observations are measured yearly; resulting in a high contribution of outliers in the performance results. There is a high difference in average accrual component of earnings every year due to the small number of observations per quintile. For example: In 1994 a total of 44 observations with only 8 observations in the highest accrual quintile; is recorded, showing an average accrual component of 0.02. The year 2000 contains 75 observations in total (15 observations per quintile, average abnormal return of -9.13%) with an average accrual component of earnings of 0.24 in the highest accrual quintile (abnormal return of +47%). Due to high differences in sample size (portfolio size) during the observed years outliers can have huge effects on yearly results. This small-sample-size problem can be solved by observing all-firm year observations together and measuring abnormal stock returns (corrected for market price movements). The stock performance of every firm-year observation is corrected for the market return (CBS All Shares Index) which makes it possible to assess all firm year observations together. Excess returns are ranked based on the ascending accrual component of earnings for every firm year observations. In contrast with the first representations, a negative relation between the accrual component of earnings and the excess return exists. In Table 5 is showed that firm's with a low accrual component of earnings (average of -0.15) show an average abnormal return of 8.18%. Firms in the highest accrual component quintile (average of 0.09) show an average abnormal return of -3.57%. It is unreasonable to assume that this relationship is primarily caused by the accrual effect based on this back testing technique. Other risk measures are also taken into account.

The risk measures price to earnings, price to book and dividend yield, show slightly higher values in the high accrual quintile in relation with the low accrual quintile. This suggests that in the highest accrual quintile more "value" stocks (high price to earnings, high price to book) are included. In the lowest quintile more "glamour" stocks (low price to earnings and low price to book) are included. Fama and French (1992) demonstrate that "value" stocks perform significant higher than "glamour" stocks. In our sample the opposite of this theory is signaled. Risk characteristics in combination with excess returns described in Table 5 tend to show that stock performance (abnormal return) differences in the extreme accrual portfolios are not caused by unintentionally selecting "growth" or "value" stocks.

A solution to the small-sample-size problem is to use an absolute accrual measure, in the form of an accrual level: Investors should be cautious, if firms signal an accrual component higher than (for example) 10% of total assets. They should be willing to invest if firms signal accrual components lower than -15% of total assets. If these criteria are applied in a trading strategy (taking long positions in firms with accruals lower than 0.15 and taking short positions in firms with accruals higher than 0.10) it still underperforms the AEX (see figure 6).

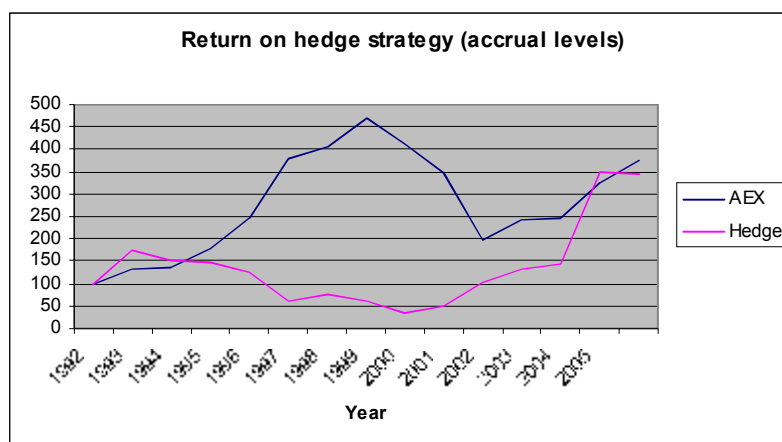


Figure 8: Return on hedge strategy:
Taking long positions in firms with accruals lower than 0.15 and taking short positions in firms with accruals higher than 0.10; in relation with AEX

6.5 Conclusions

This chapter described main descriptive statistics of the data set, and research hypotheses were tested.

Hypothesis 1 is accepted: the accrual and cash flow component of current earnings have different persistence for future earnings.

The second hypothesis tests whether investors use the information that accrual and cash flow components have (different) persistence for future stock performance. In Hypothesis 2 we find evidence that positive accruals in year t are followed by negative abnormal returns in the subsequent year ($t+1$). In the OLS test method we see that the null-hypothesis can not be rejected strongly, at a 1% level. Still we can interpret the results as if investors are likely to overvalue accrual figures; wherein more value should be given to cash flows. We have to be aware that we used a simplistic method to test whether investors price accounting data correctly. We only include two variables (accruals and cash flows) to test for the mispricing of the accounting variables. A recommendation for further research is to include other variables to test the mispricing of the accounting variables: accruals and cash flows.

The third hypothesis, trading strategy, is rejected: abnormal stock returns can not be gained by taking the accrual anomaly effect into account with our dataset.

7. Results

7.1 Results Hypothesis 1

Results of the first regression analysis show that the two earnings components: accruals and cash flows have different persistence for future earnings. Remarkable is that both components show high statistic significances which makes the model and the assumptions reliable. A R-squared of 0.62 shows that the model parameters explain most of the results correctly with a low variability.

7.2 Results Hypothesis 2

After the first hypothesis is not rejected, Hypothesis 2 tests whether the market is aware of the difference in persistence of components of earnings. We find evidence that positive accruals in year t are followed by negative abnormal returns in the subsequent year ($t+1$). In the OLS test method we see that the null-hypothesis can not be rejected strongly, on a 1% level. Still we can interpret the results as if investors are likely to overvalue accrual figures; wherein more value should be given to cash flows. The test procedure determines whether the described accounting information is priced correctly by the market. However results of the test signals that the market does not correctly prices the accounting information, strong significant results can not be proved.

We have to be aware that we used a straight forward method to test whether investors price accounting data correctly. We only include two variables (accruals and cash flows) to test the mispricing of accounting variables. A recommendation for further research is to include other variables to test the mispricing of the accounting variables accruals and cash flows.

In this research methodology stock returns are measured four months after the fiscal year of a company ends. This measurement technique is also used in Sloan (1996). The assumption is made that after four months all company information is exposed to the market. The question is whether this is actually the right moment. In 2005 companies were able to report accounting figures earlier in time than in the beginning of the 90's. The most accurate data measurement would be to measure all abnormal returns on the exact date that year-figures are issued.

The high variation of the model estimating market (stock prices), with an R-squared less than 1% is attributed to high number of other factors that might influence a firm's stock return. The test does not give enough evidence that investors price the accrual component of earnings higher than the cash flow component. The high variance in coefficients can be explained by the broad

scale of firms in different industries. Companies in different industries report a higher variance in figures than companies in the same sector. Recommendation for further research is to distinguish firms to different sectors and industries to test Hypothesis 2. It is interesting to recognize whether the accrual anomaly holds in different industries.

Last but not least we should question whether the abnormal stock return is properly corrected for market risk. With the acknowledgement that a stock's beta and size are correlated with stock return. In further research it is worth full to correct stock prices for other factors like beta and size.

7.3 Results hypothesis 3

No consistent behavior can be discovered in stock returns in relation to earnings components. The trading strategy performed by taking a long position in companies with a low accrual component and taking a short position in companies with a high accrual component of earnings does not beat the market.

Small-sample-size problem can be solved by observing all-firm year observations together and measuring abnormal stock returns (corrected for market price movements). The quintile with the lowest accrual components of earnings show higher average abnormal stock returns (+8.18%) against the highest accrual components of earnings showing an average abnormal return of -3.14%. To implement the persistence difference of the accrual component of earnings a warning sign can be used by investors: A more robust absolute accrual measure, in the form of an accrual level could give a warning signal to investors. Investors should be cautious, if firms signal an accrual component higher than 13% of current earnings a negative future effect might be expected. The reason is that the company already increased its earnings in the past with figures which did not consist of real cash flows but accruals. On the opposite, an accrual component lower than - 10% of total earnings might suggest a positive future effect. The company had been conservative in recording increases of current assets or decreasing current liabilities which suggest that it were the real cash inflows leading to higher earnings. A suggestion for further research in the field of the accrual anomaly is to look at the values of these accrual levels.

7.4 Behavioral explanations

Two behavioral reasons why investors should take into account the difference in persistence of earnings components are: earnings management and subjectivity of management's assumptions.

Earnings management

End of year earnings are an important performance measure for companies. Management could have the desire to sustain current earnings level and perform at the expectation level.

Unfortunately subjectivity consists in accounting practices. Management is able to manipulate earnings, by using clever accounting practices: When managers intentionally try to increase operating income on top of cash flows, accruals will rise. This accrual increase can be attributed to changes in balance sheet account items like inventories, accounts receivables or accounts payable. Managers have the possibility to manipulate accounts receivables by accruing future receivables to today. Current liabilities can be underestimated or accrued to the next firm year. This manipulation technique, results in high accruals and higher earnings today. However this accruing technique can not continue forever. In fact a company borrows from the future to meet today's earnings expectations. A firm will have a hard time in the future to "pay back" its borrowings on its own balance sheet and furthermore meets future earnings expectations. You can imagine the effect on the stock price when future earnings figures are disappointing. It is hard to recognize whether management is truly objective and is not "manipulating" accrual accounts. Large changes in accruals should be viewed with skepticism and investors should be cautious for big changes in accrual components of earnings; an accrual measure, as proposed at the end of Paragraph 6.4 can be a useful tool for investment decisions.

Subjective management assumptions

Besides earnings management, pessimistic or optimistic (sales) assumptions by management could affect future stock returns. Management can have the intention to use historic sales growth as a predictor for future sales performance. In case of declining sales figures two different management reactions can result in different earnings figures. First, management can be pessimistic and interpret the decline in sales growth as a sign of declining future sales figures. This management team will react by reducing (the value of) inventories and decreasing the estimated accounts receivables. A company with an optimistic management will continue operations, because they see no danger that sales will continue to decline the future. This management team sees no need to decline inventories or lower their estimated accounts receivables. However both companies report the same sales figures you see differences in reported earnings. The optimistic company reports higher accruals today than the pessimistic company. If both companies are proved correct in the future for their expectations in sales growth; no earnings surprise occurs and no correction in stock price will take place. However, if estimated sales figures are proved wrong, earning surprise occurs and stock prices will move. If the pessimistic company (with a low accrual rating) is proved wrong, investors are positively surprised and stock prices increase. If the optimistic company (with the high accrual rating) is proved wrong the company has to write down inventories, resulting in lower earnings and investors are negatively surprised: stock prices fall.

8. Conclusion & Recommendations

In this research report it is tested whether investors correctly price the accrual and cash flow components of earnings. Difference in persistence for future earnings of the cash flow and accrual component of earnings exists for the Dutch market. Cash flows tend to persist more in future earnings than the accrual component of current earnings. However no statistical significant evidence can be given that stock prices reflect different persistence of earnings components. Back testing demonstrates that the market can not be beaten by investing in extreme accrual portfolios yearly. The proven difference in persistence of the accrual and cash flow components of current earnings should be used in financial analysis. Especially current asset items (inventories and accounts receivables) should be treated because these items provide information on future earnings and cash flows.

Recommendations for future research can extend research in the field of the accrual anomaly. This research only tests for patterns in yearly figures instead of quarterly figures. Testing relationships with quarterly figures could give additional information to the different tests and creates a sample size which is four times bigger. Adjustments for seasonality have to take place to optimize the total sample. Secondly this research does not distinguish between the underlying current assets- and liabilities items in testing the accrual component of earnings. As third the research could be extended by researching stock returns in a short period around announcement dates. This gives additional insight in the influence of earnings information during announcement dates. At last the research could be extended by using a broader definition for accruals by also including non-operating accruals. At very last we suggest to test Hypothesis 2 using the Mishkin test framework and compare this with the OLS techniques used in our research.

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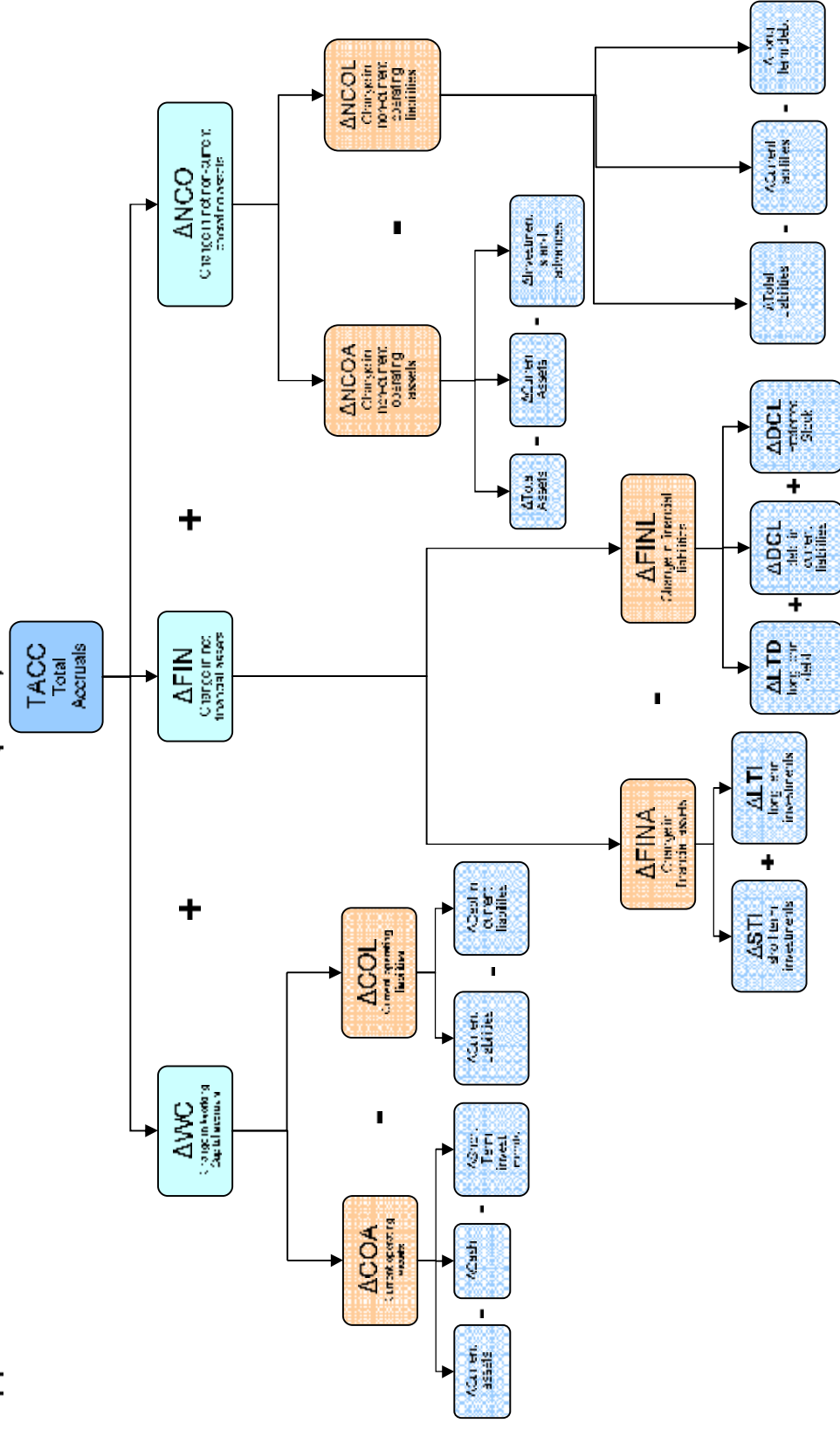
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Appendix A Summary of key-studies

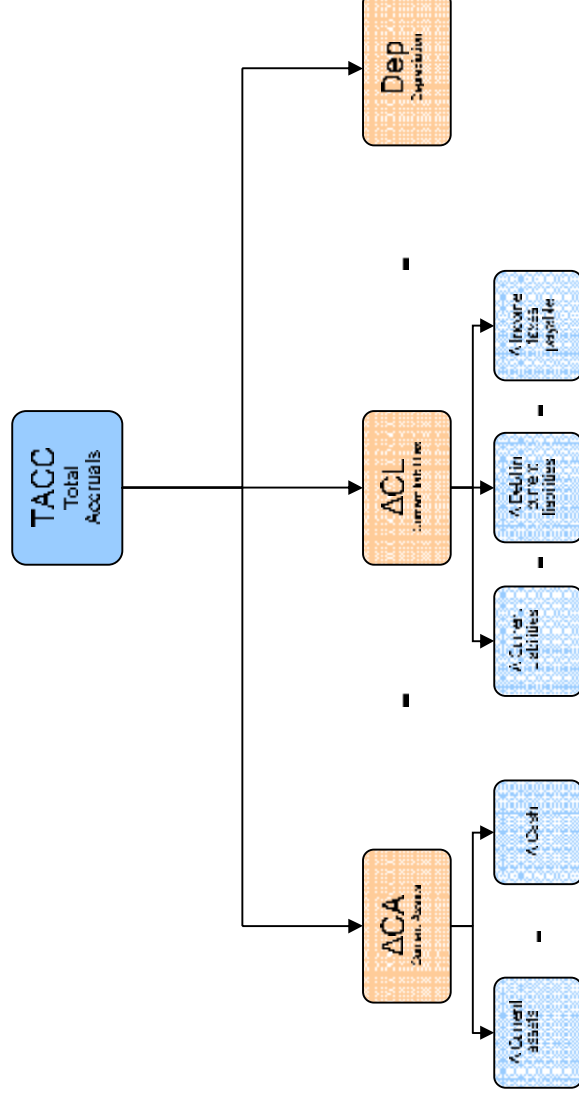
Article	Authors	Time period	# Years	# Firm year observations	Variables
Do Stock Prices Fully Reflect Information in Accruals and Cash Flows about Future Earnings?	Sloan	1962-1991	30	40,879 firm-year observations	Earnings, Accrual, and Cash flow Component Accruals = $(\Delta CA - \Delta Cash) - (\Delta CL - \Delta STD - \Delta TP) - DEP$
Earnings quality and stock returns	Chan, Chan	1971-1995	24	ALL NYSE, AMEX & NASDAQ	Accruals = $\Delta CA - \Delta CL - DEP$ Non discretionary var. (capture the impact of business conditions) vs. discretionary var. (reflect managerial choices)
The accrual anomaly: international evidence	Pincus, Rajgopal, Sankararajaram	1994-2002	12	DK504, Japan 13,822, US: 19,039; NL: 619	Following Richardson et al. $TACC = \Delta WWC + \Delta NCO + \Delta FIN$
Accrual Reliability: earnings persistence and stock prices	Richardson, Sloan, Soiman, Tuna	1982-2001	39	138,617 firm-year obs.; 2765	$TACC = \Delta WWC + \Delta NCO + \Delta FIN$
The Accrual Anomaly and Size		1968-1999	12	15,961 observations	
Why is the accrual anomaly not arbitraged away	Christina Mashruwala	1975-2000	26	32,299 observations	
Agency Theory of Overvalued Equity as an Explanation for the Accrual Anomaly	Kothari	1963-2004	42	157,456 observations	
Stock market anomalies: What can we learn from repurchases and insider trading?	Core	1989-2001	12	81,505 observations	

Table A1: Literature Review

Appendix B Accrual Definition Richardson (2005)



Appendix C Accrual Definition Sloan (1996), Thomas & Zhang (2001)



Accruals specified:

$$\text{Accruals} = (\Delta CA - \Delta \text{Cash}) - (\Delta CL - \Delta \text{STD} - \Delta \text{TP}) - \text{DEP}$$

ΔCA = change in current assets

ΔCash = change in cash/cash equivalents

ΔCL = change in current liabilities

ΔSTD = change in debt included in current liabilities

ΔTP = change in income taxes payable

DEP = depreciation and amortization expense

Excluded:
Debt: it relates to financing transactions;
Income taxes payable: consistency with earnings;

Appendix D Mishkin Test

1. General Description of Mishkin test

The Mishkin Test, first described by F. Mishkin in 1983, tests whether stock prices reflect all information that is available in the accrual and cash flow components of earnings. It is a framework that jointly estimates a linear forecasting equation (to forecast accounting figures like earnings) and a model of market equilibrium pricing (based on market efficiency theory). The Mishkin Test compares the weight applied to past information (accruals and cash flows) in the forecasting equation (3) with the weight applied by the pricing equation (4). If the weights are significantly different, the test assumes that the market is not using accounting information rationally.

Studies in the field of The Accrual Anomaly make use of the Mishkin testing framework (1983). The Mishkin Test indicates whether accounting data are priced rationally. According to Kraft *et al.* (2007) researchers use the Mishkin Test to test the hypothesis that the market's subjective expectation of earnings in setting security prices is identical to the objective expectation of earnings conditional on past information. In other words, it tries to test whether "the market" acts as if it correctly uses all 'public' available information in forming expectations. Before we describe the Mishkin test it is important first to describe the theory of efficient markets.

Lets assume that r_{t+1} is the return on a particular stock from period t to $t+1$. Furthermore assume that investors have all public information available at the end of period t . We call this set of information Φ_t . Market efficiency theory implies that the market's 'subjective' expected return on the stock, $E_m(r_{t+1}|\Phi_t)$, is equal to the true expected stock return (conditional on all available information, Φ_t):

$$(1) \quad E_m(r_{t+1}|\Phi_t) = E(r_{t+1}|\Phi_t)$$

The same relationship can be applied to earnings. If we assume that markets behave efficient we can say:

$$(2) \quad E_m(\text{Earnings}_{t+1}|\Phi_t) = E(\text{Earnings}_{t+1}|\Phi_t)$$

Equation (2) suggests that the market's expected earnings for period $t+1$ equals the expected 'true' earnings for period $t+1$, conditional on all past information Φ_t .

Empirical evidence, in the name of market efficiency, suggests that:

$$(3) \quad E(r_{t+1}) = r_{t+1} - E_m(r_{t+1}|\Phi_t) = 0$$

In words, this equation implies that the expected stock return is zero. The expected stock return equals the true stock return minus the market's expectations on the stock return. The efficient

market theory does not suggest that the market price of a stock should be equal to the true value of the stock at every point in time. The theory only suggests that errors in the market prices are unbiased; which means that stock prices can be greater or smaller than their true value, as long as the deviations are random. In other words, there is an equal chance that a stock is under- or overvalued; thereby the theory suggests that these differences are uncorrelated. Market efficiency theory implies that it is impossible to make consistently superior stock returns or profits by studying past returns. Prices reflect the information contained in the record of past prices.⁷ The word “efficient” should be interpreted in the logics of engineering: as if the market is agile and quickly interprets and uses information when it becomes available.

By using information of stock returns, we can understand how the market uses information in earnings in year t . Mishkin uses equation (2) and (3) to describe the efficient market-condition, where ε_{t+1} is the disturbance term which expectation is zero:

$$(2) R_{t+1} = \beta[(\text{Earnings}_{t+1} - E(\text{Earnings}_{t+1}|\Phi_t))] + \varepsilon_{t+1}$$

Following Sloan (1996) we define two equations: (5) a forecasting equation and (6) a pricing equation. The forecasting equation (5) uses past information (Earnings_t) to estimate future earnings (Earnings_{t+1}). The weight placed on past earnings, α_1 , estimates how past earnings persist into future earnings. The abnormal return $_{t+1}$ stands for the return on a particular stock over period t to $t+1$ minus the market return (CBS All Shares Index) over the same period. All the time we assume that market-efficiency theorem holds.

$$(5) \quad \text{Earnings}_{t+1} = \gamma_0 + \gamma_1 \cdot \text{Earnings}_t + \eta_{t+1}$$

$$(6) \quad \text{Abnormal return}_{t+1} = \beta \cdot (\text{Earnings}_{t+1} - \gamma_0 - \gamma_1^* \cdot \text{Earnings}_t) + \varepsilon_{t+1}$$

Market efficiency theory implies that the weight applied to earnings in the forecasting equation (1) is consistent with the weight applied by the market to earnings in the pricing equation (2). In other words, market efficiency implies that earnings are priced rationally. Thus market efficiency imposes the constraint $\alpha_1 = \alpha_1^*$, which requires that stock prices correctly price earnings performance.

As we remarked in Chapter 2, earnings are divided into two components: cash flows and accruals. We also apply these components of earnings into a forecasting equation (5) and into pricing equation (6), leading to:

$$(5) \quad \text{Earnings}_{t+1} = \gamma_0 + \gamma_1 \cdot \text{Accruals}_t + \gamma_2 \cdot \text{CashFlows}_t + \eta_{t+1}$$

$$(6) \quad \text{Abnormal return}_{t+1} = \beta \cdot (\text{Earnings}_{t+1} - \gamma_0 - \gamma_1^* \cdot \text{Accruals}_t - \gamma_2^* \cdot \text{CashFlows}_t) + \varepsilon_{t+1}$$

⁷ Brealey, Myers, page 337

Also here we assume that market efficiency theory holds: the weight applied to the accrual component of earnings is consistent with the weight applied by the market to accruals in the pricing equation (6). As well as, the weight applied to the cash flow component of earnings is consistent with the weight applied by the market to cash flows in the pricing equation. Consequently market efficiency imposes: $\gamma_1 = \gamma_1^*$ and $\gamma_2 = \gamma_2^*$.

Weighted least square (WLS), is used as in Sloan (1996) since it is robust to outliers. Just like OLS this regression method uses the same minimization of the sum of the residuals. However not all points are weighted equally; points with a lower variance have a greater statistical weight. When market efficiency holds two constraints are present: $\gamma_1 = \gamma_1^*$ and $\gamma_2 = \gamma_2^*$. When hypothesis 1 is accepted ($\gamma_1 \neq \gamma_2$) then the same is expected in the test of hypothesis 2. Alternatively when security prices perform as if investors do not distinguish between these two components of earnings, then the coefficients on the two components will be equal. The relationships $\gamma_1 = \gamma_1^*$ and $\gamma_2 = \gamma_2^*$ are tested with a Wald test. The Wald statistic is compared against a Chi-square distribution with two degrees of freedom (we test for two restrictions).

2. Mishkin test and OLS

Kraft, Leone and Wasley (2007) suggest accounting researchers to use OLS in their research settings since OLS is equivalent to the Mishkin Test in performing tests of the market pricing of accounting numbers. In this section we demonstrate how the Mishkin Test is almost identical to an OLS modeling technique.

The Mishkin test contains two equations, the forecasting equation (5) and the pricing equation (6) which parameters are simultaneously estimated.

$$(5) \quad \text{Earnings}_{t+1} = \gamma_0 + \gamma_1 \cdot \text{Accruals}_t + \gamma_2 \cdot \text{CashFlows}_t + u_{t+1}$$

$$(6) \quad \text{Abnormal return} = \beta \cdot (\text{Earnings}_{t+1} - \gamma_0 - \gamma_1^* \cdot \text{Accruals}_t - \gamma_2^* \cdot \text{CashFlows}_t) + \varepsilon_{t+1}$$

We can substitute the forecasting equation (5) into the pricing equation (6):

$$(7) \quad \text{Abnormal return} = \beta \cdot (\gamma_0 - \gamma_0 + (\gamma_1 - \gamma_1^*) \cdot \text{Accruals}_t + (\gamma_2 - \gamma_2^*) \cdot \text{CashFlows}_t + u_{t+1}) + \varepsilon_{t+1}$$

Which can be written as:

$$(7^*) \quad \text{Abn. return} = \beta \cdot (\gamma_0 - \gamma_0) + \beta \cdot (\gamma_1 - \gamma_1^*) \cdot \text{Accruals}_t + \beta \cdot (\gamma_2 - \gamma_2^*) \cdot \text{CashFlows}_t + \beta \cdot u_{t+1} + \varepsilon_{t+1}$$

Since β is constant, new terms can be written: $\beta \cdot (\gamma_i - \gamma_i^*) = \delta_i$, including a new error term :

$$(8) \quad \text{Abnormal return} = \delta_0 + \delta_1 \cdot \text{Accruals}_t + \delta_2 \cdot \text{CashFlows}_t + v_{t+1}$$

Equation (8) is almost equivalent to the Mishkin test framework of equation (5) and (6). A difference can be recognized since the error term in (6) is omitted. They furthermore note to use

OLS since the technique is more easily implemented in standard statistical packages along with traditional diagnostic tests and model corrections .

Appendix E Regression assumptions H1

In this Appendix an extensive summary of the regression for the future earnings model is described and tested. We have to make sure that all results are valid by checking whether assumptions that are done for the ordinary least squares estimator are satisfied.

Dependent Variable: EARNINGS (t+1)				
Method: Ordinary Least Squares				
Sample size 1 813:				
Equation: $Earnings_{t+1} = \gamma_0 + \gamma_1 \cdot Accruals_t + \gamma_2 \cdot CashFlows_t + \epsilon_{t+1}$				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.01404	0.00358	3.92318	0.0001
ACCRUAL	0.69733	0.02782	25.0643	0.0000
CASH	0.77492	0.02345	33.0395	0.0000
R-squared	0.62376	Mean dependent var		0.09763
Adjusted R-squared	0.62269	S.D. dependent var		0.08804
S.E. of regression	0.05408	Akaike info criterion		-2.99241
Sum squared resid	2.05907	Schwarz criterion		-2.97306
Log likelihood	1060.81	F-statistic		583.567
Durbin-Watson stat	2.05183	Prob(F-statistic)		0.00000

Table 4: Coefficient test descriptives, EViews

Assumption 1: Model is *linear in parameters*

The Ordinary Least Squares estimation technique leads to a linear equation and the model is therefore linear in parameters.

Assumption 2: The data are a *random sample* of the population

In this research all public available information of public listed companies during the years are used.

Assumption 3: The errors are *statistically independent* from one another

No significant correlation between the coefficients is measured. The covariance matrix, output from EViews, is used to create the correlation matrix. By dividing every coefficient by the standard deviation of the correlated coefficient we can calculate the correlation values. See table 5.

Assumption 4: The independent variables are not too strongly *collinear*

The correlation matrix in table 7 shows there is some correlation between the three coefficients used in the regression equation. However the correlation is not so high that it gives problems with multi-collinearity, as a practical rule of thumb we say that a correlation larger than 0,9 or smaller than -0,9 is suspicious. However in this case the correlation between the intercept and the accrual parameter are high.

Correlation matrix			
$Earnings_{t-1} = \beta_0 + \beta_1 \cdot Accruals_t + \beta_2 \cdot CashFlows_t + \epsilon_{t-1}$			
	β_0	β_1	β_2
β_0	1,0000	-0,1913	-0,7779
β_1	-0,1913	1,0000	0,5367
β_2	-0,7779	0,5367	1,0000

Table 5: Correlation matrix OLS Regression H1

The Durbin-Watson statistic is a test statistic to detect presence of autocorrelation in the residuals of a regression analysis. The test statistic d is calculated using the error terms that follow from the regression $d = \frac{\sum_{t=1}^n (e_t - e_{t-1})^2}{\sum_{t=1}^n e_t^2}$ where e_t is the residual. When the statistic is near 0 auto correlation exists, if the DW-statistic is near 2 it gives extremely less evidence of autocorrelation in the residuals. In this case $d=2,05183 > 2$ so we can interpret that there is less autocorrelation.

Assumption 5: The expected value of the residuals is zero

By using an intercept in the OLS regression technique the expected value of the residuals is zero.

See also figure 9.

Assumption 6: The residuals have constant variance (homoskedasticity)

To ensure that we have no, or small, heteroskedasticity in the data, the Whites heteroskedasticity test is used. This method tests whether the error terms are identically distributed with the same variance. If the OLS technique is used while heteroskedasticity is present in the dataset, it is possible that the standard errors are wrong and the conclusion drawn from the test is not satisfactory.

The White test can be performed using EViews and gives in this set the value for the White test-statistic (T) of 4,86. T is asymptotically distributed as chi-squared with p=3 degrees of freedom. The White test statistic= 4,86 < 16,3 (with 0,01% significance level). We can accept H0 that there is no heteroskedasticity.⁸

⁸ C.A., Alexander, 2001, "Market Models", John Wiley & Sons, The Atrium, Southern Gate, Chichester, West Sussex

Assumption 7: The residuals are *normally distributed*

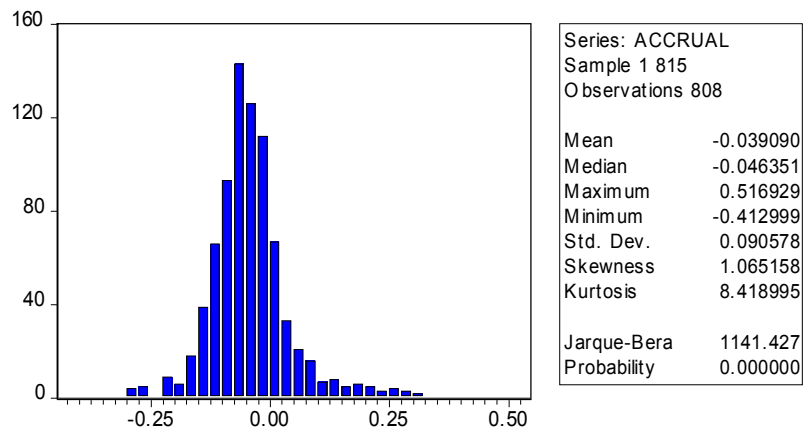


Figure 9: Histogram of firm year observations ranked by accruals component of earnings. The Jarque Bera statistic is used for testing normality in the residuals using EViews. If the residuals are normally distributed, the histogram should be bell-shaped and the Jarque Bera statistic should not be significant. The distribution of the residuals show a positively right skewed distribution; The JB test statistic (1141) tells us that small normality is measured in the residuals. Since the sample has a large set of observations (815), a significant difference does not have to be made.

Appendix F Regression assumptions H2 OLS

Assumption 1: Model is *linear in parameters*

The Least Squares estimation technique leads to a linear equation and the model is therefore linear in parameters.

Assumption 2: The data are a *random sample* of the population

In this research all public available information of public listed companies during the years are used.

Assumption 3: The errors are *statistically independent* from one another

No significant correlation between the coefficients is measured. The covariance matrix, output from EViews, is used to create the correlation matrix. By dividing every coefficient by the standard deviation of the correlated coefficient we can calculate the correlation values. See table 6.

Correlation matrix			
Abnormal Return _{t+1} = $\gamma_0 + \gamma_1 \cdot \text{Accruals}_t + \gamma_2 \cdot \text{CashFlows}_t + \varepsilon_t$			
	γ_0	γ_1	γ_2
γ_0	1,000	-0,024	-0,115
γ_1	-0,024	1,000	0,448
γ_2	-0,115	0,448	1,000

Table 6: Correlation matrix OLS regression H2

Assumption 4: The independent variables are not too strongly *collinear*

The correlation matrix in table 6 shows there is some correlation between the three coefficients used in the regression equation. However the correlation is not that high that it gives problems with multi-collinearity, as a practical rule of thumb we say that a correlation larger than 0,9 or smaller than -0,9 is suspicious.

The Durbin-Watson statistic is a test statistic to detect presence of autocorrelation in the residuals of a regression analysis. The test statistic d is calculated using the error terms that follow from the regression

$d = \frac{\sum_{i=1}^n (e_i - e_{i-1})^2}{\sum_{i=1}^n e_i^2}$ where e_i is the residual. When the statistic is near 0 auto correlation exists, when the DW-statistic is near to 2 it gives extremely less evidence of autocorrelation in the residuals. In this case $d=1,97$ so we can interpret that there is less autocorrelation.

Assumption 5: The expected value of the residuals is zero

By using an intercept in the OLS regression technique the expected value of the residuals is zero. See also table 7.

Estimation Output Residuals H2 OLS	
Mean	8,31 e-18
Median	-0,0407
Maximum	2,4116
Minimum	-1,0353
Std. Dev	0,4253
Skewness	1,4496
Kurtosis	7,7182
Jarque Bera	1032,4680
Probability	0,0000

Table 7: Estimation output OLS regression H2

Assumption 6: The residuals have *constant variance (homoscedasticity)*

To ensure that we have no, or small, heteroskedasticity in the data, the Whites heteroskedasticity test is used. This method tests whether the error terms are identically distributed with the same variance. If the OLS technique is used while heteroskedasticity is present in the dataset, it is possible that the standard errors are wrong and the conclusion drawn from the test is not satisfactory.

The White test can be performed using EViews and gives in this set the value for the White test-statistic (T) of 1,82. T is asymptotically distributed as chi-squared with p=3 degrees of freedom. The White test statistic= 1,82 < 16,3 (with 0,01% significance level). We can accept H0 that there is no heteroskedasticity.⁹

⁹ C.A., Alexander, 2001, "*Market Models*", John Wiley & Sons, The Atrium, Southern Gate, Chichester, West Sussex

Assumption 7: The residuals are *normally distributed*

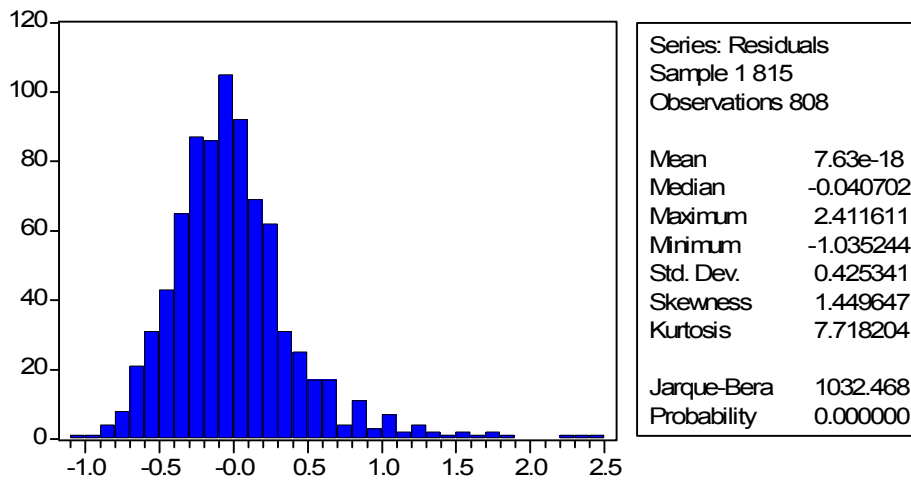


Figure 10: Histogram of firm year observations ranked by accruals component of earnings. The Jarque Bera statistic is used for testing normality in the residuals using EViews. If the residuals are normally distributed, the histogram should be bell-shaped and the Jarque Bera statistic should not be significant. The distribution of the residuals shows a positively right skewed distribution; The JB test statistic (1141) tells us that small normality is measured in the residuals. Since the sample has a large set of observations (815), a significant difference does not have to be made.

Appendix G Tables

Correction of market capitalization by inflation rate			
Year	Inflation (%) YoY	Market Cap. in EUR mln.	Market Cap. in guilder mln.
2006	1,0309	200,00	440,74
2005	1,9790	197,96	436,24
2004	1,1890	194,12	427,78
2003	1,6647	191,84	422,75
2002	2,7566	188,70	415,83
2001	4,1771	183,63	404,67
2000	2,6448	176,27	388,45
1999	2,1786	171,73	378,44
1998	1,6949	168,07	370,37
1997	2,3925	165,27	364,20
1996	2,3212	161,40	355,69
1995	1,5718	157,74	347,62
1994	2,6584	155,30	342,24
1993	1,1776	151,28	333,38
1992	2,6370	149,52	329,50
1991	4,7777	145,68	321,03
1990	2,7199	139,04	306,39

Source: Reuters Ecwin 2007

Table 9: Market capitalization
 criteria

Year	Number of firm-year- observations
1992	33
1993	38
1994	43
1995	50
1996	62
1997	77
1998	71
1999	60
2000	75
2001	66
2002	54
2003	58
2004	60
2005	69
1992-2005	816

Table 8: Number
 of firm –year-
 observations

Appendix H Glossary of Terms

Abnormal return	Part of return that is not due to systematic influences, e.g., marketwide price movements ¹⁰
Accrual	The change in non-cash working capital less depreciation expense or: amounts owing at a point in time, the amounts of which are not known with certainty ¹¹
Accrual accounting	An accounting method that measures the performance and position of a company by recognizing economic events regardless of when cash transactions occur. ¹²
Accrual anomaly	The accrual anomaly explains that stocks with large accruals today, show lower earnings relative to stocks with low accruals the subsequent year.
Amortization	1) Repayment of a loan by installments, 2) allowance for depreciation
Anomaly	Any departure from the strict characteristics of the type ¹³
Capital Asset Pricing Model	Model in which expected returns increase linearly with an asset's beta ¹⁴
Cash accounting	An accounting method where receipts are recorded during the period they are received, and the expenses in the period in which they are actually paid. ¹⁵
Cash flow (free)	Cash not required for operations or for reinvestment
Current asset	Asset that will normally be repaid within a year
Current liability	Liability that will normally be repaid within a year.
Depreciation	1) Reduction in the book or market value of an asset; 2) portion of an investment that can be deducted from taxable income
Earnings	The amount of profits that a company produces during a specific period, which is usually defined as a quarter (three calendar months) or a year ¹⁶
Earnings quality	the extent to which net income reported on the income statement differs from true earnings
Efficient market	Market in which security prices reflect information instantaneously
Systematic risk	Market risk, risk that cannot be diversified away
Working capital	Current assets and current liabilities. The term is commonly used as synonymous with net working capital

¹⁰ Brealey, R.A., Meyers, S.C., 2003, "Principles of Corporate finance", 7th Edition, 2003, McGraw-Hill / Irwin New York p.992

¹¹ A. Berry, R. Jarvis, *Accounting in a business context*, 4th edition, 2006, Thomson Learning

¹² <http://www.investopedia.com/terms/a/accrualaccounting.asp>, 19th November 2007

¹³ T.C. Colocut, A.B. Dobson, *Chambers dictionary of Science and Technology*, revised edition, 1974, W&R Chambers, p.993

¹⁴ Brealey, R.A., Meyers, S.C., 2003, "Principles of Corporate finance", 7th Edition, 2003, McGraw-Hill / Irwin New York

¹⁵ <http://www.investopedia.com/terms/c/cashaccounting.asp>, 19th November 2007

¹⁶ <http://www.investopedia.com/terms/e/earnings.asp>, 19th November 2007