The Macrotheme Review
A multidisciplinary journal of global macro trends

COMPREHENSION OF DISCRETIONARY ACCRUALS MODELS: EVIDENCE OF TURKEY AND EU

Serhan Gurkan
Department of Entrepreneurship, Faculty of Business, Karabuk University, 78050 Karabuk, Turkey

Abstract

Accrual accounting as a technology for improving financial reporting and disclosure. Estimating discretionary accruals is one of the hot topics in accounting literature. A large body of academic research has investigated the performance of alternative discretionary accrual models' ability of isolating the discretionary (managed) component from the non-discretionary (unmanaged) component of total accruals. The aim of this study is to examine which discretionary accruals model has better performance for Turkish companies, comparing European Union companies. I evaluate the relative performance of alternative models by comparing power of commonly used test statistics. The results of research indicate that The Performance Matched Modified Jones Model and Larcker and Richardson's model have better explanatory power than the Jones Model and Modified Jones Model – Dechow et al. In addition to this, findings suggest that country specific factors affects explanatory power of discretionary accruals model.

Keywords: Accrual Accounting, Discretionary Accruals Models, Earning Management

1. INTRODUCTION

Ball and Shivakumar (2006) viewed accrual accounting as a technology for improving financial reporting and disclosure. Accrual accounting increases the usefulness of accounting earnings for performance measurement and discretionary accruals is often used as a proxy for earning management. A large body of academic research examines the causes and consequences of earnings management. It has become routine for earnings management studies to separate accruals into "nondiscretionary" and "discretionary" components using regression analysis. So that, estimating discretionary accruals is one of the hot topics in accounting literature.

The measurement of accruals plays a central role in wide body of literature in accounting. The literature include studies on value relevance of accruals, earning management, decomposing accruals into "nondiscretionary" and "discretionary" components, market mispricing of accruals.

A large body of academic research has investigated the performance of alternative discretionary accrual models' ability of isolating the discretionary (managed) component from the non-discretionary (unmanaged) component of total accruals. There are several models to separate accruals into "nondiscretionary" and "discretionary" components. However accounting literature

has not got a consensus about which model has better perform to detect nondiscretionary accruals. The limitations of such models are poor ability of the models to isolate discretionary accruals (Dechow et.al, 2012). Country specific factors could cause mixed results or poor ability of studies that compare discretionary accruals models. If so, it is predicted that performance of models would differ according to countries included in research.

The aim of this study is to examine which discretionary accruals model has better performance for Turkish companies, comparing European Union companies. This study is motivated by that there is no systematic evidence bearing on relative performance of alternative discretionary accruals models comparing different countries' markets. I evaluate the relative performance of alternative models by comparing power of commonly used test statistics. This study does not try to compare detecting power of earning management with discretionary accruals.

This paper proceeds as fallows. Section 2 discusses how total accruals can be measured. Section 3 discusses all types of discretionary accruals models. Section 4 discusses data, methods and key findings of research. Section 5 summarizes and provides concluding remarks.

2. THEORETICAL FRAMEWORK

2.1. Measuring Total Accruals

There are two major approach to measure total accruals: balance sheet approach and cash flow statement based approach. Hribar and Collins (2002:106) indicate that presumed articulation in balance sheet approach's breaks down when non-operating events such as reclassitications, acquisitions, divestitures, accounting changes and foreign currency translations occur. So, balance sheet accruals estimates might be predictably biased and errors in balance sheet accruals estimation could confound returns regressions where discretionary and non-discretionary accruals are used as explanatory variables. Therefore, Hribar and Collins (2002) suggest computing accruals directly from cash flow statement. I follow cash flow statement based method introduced by Hribar and Collins (2002:109).

$$TACC_{it} = EBXI_{it} - CFO_{it} \quad (1)$$

Where TACC = the total accrual adjustments provided on the cash flow statement under the indirect method; EBXI = earnings before extraordinary' items and discontinued operations (Compustat #123); and CFO = operating cash flows (from continuing operations) taken directly from the statement of cash flows (Compustat #308-Compustat #124)[1].

2.2. Discretionary Accruals Models

The implementation of the discretionary accruals models starts with TACC. Latter, TACC can be decomposed into two different parts using discretionary accruals models. The purpose of a discretionary accrual model is to decompose total accruals into "nondiscretionary" (NDAC) and "discretionary" (DAC) components.

[1] Hribar and Collins (2002) subtract the cash portion of discontinued operations and extraordinary items (Compustat # 124) from total cash from operations to provide a cash flow from continuing operations. This cash flow definition is consistent with our definition of net income. Alternatively one could include bottom line net income (Compustat #172) instead of net income before extraordinary items, which is consistent with including cash from discontinued operations in the measure of operating cash flow.

NDAC are associated with a firm's operating and investment activities; DAC are the component of earnings that is deemed to reflect the portion of earnings which is result of managers' discretionary accounting choices.

The Jones Model (Jones, 1991) is the first accruals model has been great contribution to earnings management research. After that new models have been provided but most of them are based upon The Jones Model. The Modified Jones Model – Dechow et al. (1995), the Modified Jones Model — Larcker and Richardson (2004) and the Performance Matched Modified Jones Model (Kothari et al., 2005) are the most widely used models in accounting literature.

2.1.1. The Jones Model (Jones, 1991)

There have been previous studies such as DeAngelo (1986) and Healy (1985), which had used some type of discretionary accruals measure before the Jones Model (1991). As distinct from previous studies Jones (1991) use discretionary portion of accruals to capture earning management rather than discretionary portion of a single accrual account. She calculate total accruals as the change in non-cash working capital before income taxes payable less total depreciation expense. Previous studies assumed that nondiscretionary accruals are constant from period to period. To relax this assumption Jones (1991) use following expectation model which is called as The Jones Model:

$$\frac{TA_t}{A_{t-1}} = \alpha_1 \left[\frac{1}{A_{t-1}}\right] + \alpha_2 \left[\frac{\Delta REV_t}{A_{t-1}}\right] + \alpha_3 \left[\frac{\Delta PPE_t}{A_{t-1}}\right] + \varepsilon_t \qquad (2)$$

Where TA_t is total accruals in year t; ΔREV_t is revenues in year t less revenues in year t-1; ΔPPE_t is gross property, plant, and equipment in year t less PPE in year t-1; A_{t-1} is total asset in year t-1; ε_t is error term in year t and $\alpha_1, \alpha_2, \alpha_3$ are firm specific parameters. All variables in the model are scaled by lagged assets to reduce heteroscedasticty. Error term of model (ε_t) represents the level of discretionary accruals at time t. The Jones model specifies nondiscretionary accruals as linear in changes in total revenue and in total investments in durable assets.

2.2.2. The Modified Jones Model – Dechow et al. (1995)

The Jones Model assumes that revenues are nondiscretionary. Dechow et al. (1995, 199) indicate that "if earnings are managed through revenues, then the Jones Model will remove part of the managed earnings from the discretionary accruals proxy." To avoid this limitation of Jones Model, Dechow et al. (1995) consider the Modified Jones Model. Assuming that all credit sales are discretionary, they modify the Jones Model adjusting change in sales revenue for change in account receivable. The main difference between the two models is that the modified-Jones model attributes the entire change in receivables to discretionary accruals part. The Modified Jones Model is estimated as follows:

$$\frac{TA_t}{A_{t-1}} = \alpha_1 \left[\frac{1}{A_{t-1}}\right] + \alpha_2 \left[\frac{\Delta REV_t - \Delta REC_t}{A_{t-1}}\right] + \alpha_3 \left[\frac{\Delta PPE_t}{A_{t-1}}\right] + \varepsilon_t \qquad (3)$$

where ΔREC_t is net receivables in year t less net receivables in year t-1 scaled by total assets at t-1.

2.2.3. The Modified Jones Model — Larcker and Richardson (2004)

Larcker and Richardson [L&R] (2004, 634-635) imply that market expectations of future growth could place greater pressure on management and current performance could create incentives to engage in earnings management. L&R (2004) therefore include two additional independent

variables to Modified Jones Model, which are shown to be correlated with measures of unexpected accruals. First of these variables is book-to-market ratio (BM). L&R (2004, 634) include BM as a proxy for expected growth in the firm operations. The other additional variable is current operating cash flows (CFO). CFO is added to model to control current operating performance. The Modified Jones Model constituted by L&R is estimated as follows:

$$\frac{TA_t}{A_{t-1}} = \alpha_0 + \alpha_1\left[\frac{1}{A_{t-1}}\right] + \alpha_2\left[\frac{\Delta REV_t - \Delta REC_t}{A_{t-1}}\right] + \alpha_3\left[\frac{\Delta PPE_t}{A_{t-1}}\right] + \alpha_4 BM_t + \alpha_5\left[\frac{CFO_t}{A_{t-1}}\right] + \varepsilon_t \qquad (4)$$

2.2.4. The Performance-Matched Modified Jones Model (Kothari et al., 2005)

Kothari et al. (2005, 166) emphasis that the Jones Model and the Modified Jones Models are mis-specified when applied to samples experiencing extreme performance. In other words, these models are likely to generate a large estimated discretionary accrual whenever a firm experiences extreme growth in the test period compared to the estimation period. Hence Kothari et al. (2005) include return on asset in year t (ROA_t) variable to Modified Jones model – Dechow et.al (1995) as an additional regressor. The Performance-Matched Modified Jones Model is shown as follow:

$$\frac{TA_t}{A_{t-1}} = \alpha_0 + \alpha_1\left[\frac{1}{A_{t-1}}\right] + \alpha_2\left[\frac{\Delta REV_t - \Delta REC_t}{A_{t-1}}\right] + \alpha_3\left[\frac{\Delta PPE_t}{A_{t-1}}\right] + \alpha_4 ROA_t + \varepsilon_t \qquad (5)$$

where ROA_t is return on assets of year t.

Kothari et al. (2005) present that performance – matched discretionary accruals model is well specified and powerful while other Jones type accruals models are severely misspecified.

While prior research typically does not include a constant in the discretionary accruals model, they include a constant in the estimation for several reasons (Kothari et. al., 2005). First, it provides an additional control for heteroscedasticity not alleviated by using assets as the deflator. Second, it mitigates problems stemming from an omitted size (scale) variable.

3. EMPIRICAL IMPLEMENTATION

Samples are obtained from COMPUSTAT over 2005 to 2014 for vehicles sector. This sample period permits me to use financial statements prepared according to International Financial Accounting Standards. Using same accounting standards allow me to compare financial variables of business which issued different countries stock market. I selected 5 largest Turkish companies and 5 largest E.U companies by market capitalization. Sample is consisted of 100 firm-years for each variables.

Firstly, I evaluate total accruals for each firm and year following Hribar and Collins (2002) mentioned in Section 2.1.

To separate accruals into “nondiscretionary” and “discretionary” components I follow regression framework described in Section 2.2 for each discretionary accruals models.

Each discretionary accruals model are analyzed with Ordinary Least Squares (OLS) regression. Error term of models (ε_t) represents the level of discretionary accruals at time t.

Table 1 provides descriptive statistics on parameter estimated and test statistics generated by each of the discretionary accruals models.

Table 1. Descriptive Statics of Variables

Variables	Mean	Median	Std.Dev.
TA/A_{t-1}	-0.03	-0.04	0.33
ΔREV/A_{t-1}	0.09	0.11	0.74
ΔREC/A_{t-1}	-0.04	0.02	0.23
ΔPPE/A_{t-1}	0.40	0.43	0.30
BM	0.82	0.55	0.87
CFO/A_{t-1}	0.38	0.06	0.18
ROA	0.04	0.06	0.24
Variables	**Min.**	**Max.**	
TA/A_{t-1}	-10.14	7.10	
ΔREV/A_{t-1}	-4.45	1.75	
ΔREC/A_{t-1}	-1.04	0.98	
ΔPPE/A_{t-1}	-0.32	1.01	
BM	0.30	1.05	
CFO/A_{t-1}	-1.25	2.45	
ROA	-4.21	0.60	

Note: Where Δ is represent change computed between time t and time t-1. All variables, except BM and ROA, are deflected by total assets at t-1.

TA is the total accruals estimated with Hribar and Collins (2002) method. REV is revenues, REC is net receivables, PPE is gross property, plant, and equipment, BM is book to market ratio, CFO is current operating cash flows and ROA is return on assets.

One important key result in Table 1 is that as expected, average accruals are negative (-0,03), primarily because of depreciation. Vehicles firms need high amount investments onto fixed assets. So that their depreciation expenses are very high. Average of changes in revenue deflected by assets at time t variable is estimated as 0.09. 2008 financial crisis might lead to breakdown and same comments could be valid for other variables.

The existence of the unit-root is investigated by ADF which is developed by Dickey and Fuller (1979), PP test by Phillips and Peron (1988) to avoid the spurious regression problem. The unit root tests of ADF and PP are applied with constant-term model and the results are presented in Table 2.

Table 2. Unit Root Tests Results

	ADF	PP
Constant		
TA/A_{t-1}	48.24	56.21**
ΔREV/A_{t-1}	44.18	58.92**
ΔREC/A_{t-1}	58.45*	86.00*
ΔPPE/A_{t-1}	50.47	59.43**
BM	80.16*	114.77*
CFO/A_{t-1}	50.81	53.37*
ROA	49.00	63.93**
Constant + Trend		
TA/A_{t-1}	71.94*	82.60*
ΔREV/A_{t-1}	69.98*	85.56*
ΔREC/A_{t-1}	88.93*	99.93*
ΔPPE/A_{t-1}	73.06*	94.35*
BM	75.12*	89.08*
CFO/A_{t-1}	97.97*	105.25*
ROA	58.70**	65.35*

Note: The lag length is determined by Schwarz information criteria in ADF test. Newey-West band-width selection is used for PP test. * indicates stationary at 1% level, ** indicates stationary at 5% level

As shown in Table 2, I find that whole excess return series are stationary.

Before estimating models parameters, F Test, Hausman Test, Wooldridge test for autocorrelation, Breusch-Pagan Lagrange multiplier test and Pesaran cross sectional dependence test are employed and according to results of these tests Feasible Generalized Least Squares technique is selected to estimate parameter of discretionary accruals models. Models are estimated with Feasible Generalized Least Squares technique for Turkey and EU separately and results are presented at Table 3 and Table 4.

Models can be compared by holding the R^2 of the models. Higher R^2 value imply better performance to separate accruals into "nondiscretionary" and "discretionary" components. In addition to this, Akaike and Log Likelihood value can be used for comprehension of models. Same with R^2 value, Higher Akaike and Log Likelihood value indicate better performance of model.

Table 3. Results of Discretionary Accruals Model for Turkish Companies

TURKISH COMPANIES	Jones Model	Mod. Jones Model Dechow et al.	The Modified Jones Model Larcker and Richardson	The Performance Matched Modified Jones Model
$1 / A_{t-1}$	1.02***	0.88*	0.69*	0.63*
$\Delta REV/A_{t-1}$	-0.05**			
(ΔREV -ΔREC)		-0.01**	-0.01*	-0.01*
$\Delta PPE/A_{t-1}$	-0.13*	-0.12*	-0.05*	-0.26*
BM			0.05**	
CFO/A_{t-1}			0.07*	
ROA				0.02*
CONSTANT	1.84*	1.89*	1.91*	2.16*
R^2	0.74	0.76	0.78	0.79
Akaike Info	0.58	0.59	0.60	0.55
Log Likelihood	-6.21	-6.18	-1.01	0.15
F	11.38*	11.39*	9.43*	10.21*
Mean of Error	-5.05	3.28	5.94	-3.72

Note: Constant term is included into all models in keeping with Kothari et. al. (2005).
* indicates the significance at %1 level, ** indicates the significance at %5 level, *** indicates the significance at %10 level.

Estimation results is for the Jones model indicate significant explanatory power, with an adjusted R^2 of .74 and Log Likelihood of -6.21, but substantially less than the estimation based on other models. The change in sales revenue and gross property, plant, and equipment are significantly negatively associated with total accruals, as indicated by a coefficient of -0.05 and -0.13.

Modified Jones Model – Dechow et al. also has significant explanatory power, with an adjusted R^2 of .76 and Log Likelihood of -6.18. These values are better than Jones Model but worse than other modes. The change in sales revenue minus change in net receivables and change in gross property, plant, and equipment are significantly negatively associated with total accruals, as indicated by a coefficient of -0.1 and -0.12.

The Modified Jones Model – Larcker and Richardson with R^2 of .78 and Log Likelihood of -1.01 has better explanatory power than the Jones Model and Modified Jones Model – Dechow et al. but worse than The Performance Matched Modified Jones Model. Same as Dechow et. al. the change in sales revenue minus change in net receivables and change in gross property, plant, and equipment are significantly negatively associated with total accruals, as indicated by a coefficient of -0.1 and -0.5. Contrary, book to market ratio and current operating cash flows are significantly negatively associated with total accruals as indicated by a coefficient of 0.5 and 0.7.

The Performance Matched Modified Jones Model has best explanatory power with an adjusted R^2 of .79 and Log Likelihood of 0.15. These results indicate that The Performance Matched

Modified Jones Model is best model for Turkish companies included into research during 2005 – 2014.

As shown at Table 4, The Performance Matched Modified Jones Model display better performance than other discretionary accruals models for Turkish companies. Table 4 also show that the Jones Model has worst power. As discussed in McNichols (2000), there are many reasons to suspect that the estimated discretionary accruals from the Jones model reflect nondiscretionary forces rather than pure discretion. In particular, the Jones model assumes accruals react to the current change in sales, but that lagged and future changes are not relevant.

For Jones Model (1991), The loss in power arises because firms with insufficient observations to conduct a firm-specific regression have to be dropped and because a separate set of model parameters has to be estimated for each firm (Dechow et.al, 2012, 290).

Error term of models (ε_t) represents the level of discretionary accruals. Mean of error terms of models are represented in last line of Table 3. Mean of error terms of the Jones Model and The Performance Matched Modified Jones Model are negative while Modified Jones Models' are positive. So that, I can say that selecting accruals model is very important to researchers because Modified Jones Models indicate revenue enhancing earning management but the Jones Model and The Performance Matched Modified Jones Model indicate revenue diminishing earning management.

The results of discretionary accruals models for EU companies are presented Table 4.

Table 4. Results of Discretionary Accruals Model for EU Companies

EU COMPANIES				
	Jones Model	Mod. Jones Model Dechow et al.	The Modified Jones Model Larcker and Richardson	The Performance Matched Modified Jones Model
$1 / A_{t-1}$	1.52*	1.01*	0.72*	0.65*
$\Delta REV/A_{t-1}$	0.01**			
(ΔREV -ΔREC)		-0.01**	-0.01*	-0.01*
$\Delta PPE/A_{t-1}$	-0.19*	-0.09**	-0.08*	-0.13*
BM			0.09*	
CFO/A_{t-1}			0.11*	
ROA				0.04*
CONSTANT	2.45*	3.01*	1.75*	2.08*
R^2	0.65	0.68	0.70	0.70
Akaike Info	0.50	0.54	0.56	0.55
Log Likelihood	-5.11	-4.21	0.21	0.12
F	10.25*	11.87*	16.45*	13.21*
Mean of Error	-2.38	3.05	6.04	3.50

Note: Constant term is included into all models in keeping with Kothari et. al. (2005).
* indicates the significance at %1 level, ** indicates the significance at %5 level, *** indicates the significance at %10 level.

The similar to Turkish companies, estimation results is for the Jones model indicate significant explanatory power, with an adjusted R^2 of .65 and Log Likelihood of -5.11, but substantially less than the estimation based on other models. Modified Jones Model – Dechow et al. also has significant explanatory power, with an adjusted R^2 of .68 and Log Likelihood of -4.21. These values are better than Jones Model but worse than other modes. The Performance Matched Modified Jones Model with R^2 of .70 and Log Likelihood of 0.12 has better explanatory power than the Jones Model and Modified Jones Model – Dechow et al. but worse than The Modified Jones Model – Larcker and Richardson that has best explanatory power with an adjusted R^2 of .70 and Log Likelihood of 0.21. These results indicate that The Modified Jones Model – Larcker and Richardson is best model for EU companies included into research during 2005 – 2014.

Mean of error terms of the Jones Model is negative while Modified Jones Models' and The Performance Matched Modified Jones Model are positive.

4. CONCLUDING REMARKS

I examine explanatory power of discretionary accruals models - Jones Model, Modified Jones Model – Dechow et. al., Modified Jones Model – Larcker and Richardson and The Performance Matched Modified Jones Model. The aim of this study is to examine which discretionary accruals model has better performance for Turkish companies, comparing European Union companies. Estimation samples are selected based on three indicators: industry membership (vehicle sector), size (market capitalization) and in which stock market issued (Turkey and EU). Samples are obtained from COMPUSTAT over 2005 to 2014.

This paper makes two contributions. First, it provides a comprehension of explanatory power of the discretionary accruals models. The results of research indicate that The Performance Matched Modified Jones Model and Larcker and Richardson's model have better explanatory power than the Jones Model and Modified Jones Model – Dechow et al.

The second contribution is to examine whether explanatory power of discretionary accruals models are differ according to country from which data is obtained. The findings state that while The Performance Matched Modified Jones Model is best model for Turkish companies, The Modified Jones Model – Larcker and Richardson is best model for EU companies. It means that country specific factors affects explanatory power of discretionary accruals model.

The approach taken in this paper suggests several future research directions. Future researches can examine which country specific factors might affect explanatory power of discretionary accruals model. The second direction is to focus on specific accruals rather than aggregate accruals and these models can be modified.

REFERENCES

BALL, R. & SHIVAKUMAR, L., 2006. The Role of Accruals in Asymmetrically Timely Gain and Loss Recognition. *Journal of Accounting Research, Vol* 44 No 2, pp. 207-242.

DEANGELO, L., 1986. Accounting Numbers as Market Valuation Substitutes: A Study of Management Buyouts of Public Stockholders. *The Accounting Review,* Vol 61, pp. 400-420.

DECHOW, P. M., HUTTON, A., KIM, J. & SLOAN, R., 2012. Detecting Earnings Management: A New Approach. *Journal of Accounting Research, Vol* 50 No 2, pp. 275-334.

DECHOW, P., SLOAN, R. & SWEENEY, A., 1995. Detecting Earnings Management. *The Accounting Review,* Vol 70, pp. 193-225.

HEALY, P., 1985. The Effect of Bonus Schemes on Accounting Decisions. *Journal of Accounting and Economics,* Vol 7, pp. 85-107.

HRIBAR, P. & COLLINS, W., 2002. Errors in Estimating Accruals: Implications for Empirical Research. *Journal of Accounting Research,* Vol 40, pp. 105-134.

JONES, J., 1991. Earnings Management During Import Relief Investigations. *Journal of Accounting Research,* Vol 29, pp. 193-228.

KOTHARI, S., LEONE, A. & WASLEY, C., 2005. Performance Matched Discretionary Accrual Measures. *Journal of Accounting and Economics,* Vol 39, pp. 163-197.

LARCKER, D. & RICHARDSON, S., 2004. Fees Paid to Audit Firms, Accrual Choices, and Corporate Governance. *Journal of Accounting Research, Vol* 42 No 3, pp. 625-658.

McNICHOLS, M. F., 2002. The Quality of Accruals and Earnings: The Role of Accrual Estimation Errors: Discussion. *The Accounting Review,* Vol 77, pp. 61-69.