

Earnings Persistence and Market Reaction: Evidence from Korea

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Abstract

This paper investigates the persistence of earnings and market reaction in Korean stock markets over the period of 2000-2008. The empirical results of this paper show that Korean stock market has a high level of earnings persistence and this is more attributed to cash flows than accruals. The study also suggests that Korean stock market participants usually react more on cash flows than accruals.

Keywords: Persistence of earnings, Earnings, Cash flows, Accruals, Market reaction

1. Introduction

The main purpose of this paper is investigating the persistence of earnings and market reaction in Korean stock market. Most countries have adopted accrual accounting system to reflect correct financial conditions of business in reporting accounting information. But, because accrual accounting system can provide CEO of business with many opportunities to exercise discretions over the financial statements, the value relevance of accruals and cash flows have been main research concern in accounting field.

Many prior research shows that earnings persistence is more attributed to cash flow than accruals components of earnings, but they also report that market participants usually overact more on accruals than earnings in real investing (Sloan, 1996; Subramanyam and Wild, 1996; DeFond and Park, 2001; Xie, 2001; Beneish and Vargus, 2002; Fairfield, Whisenant and Yohn, 2003; Hanlon, 2005; Pincus et al., 2005).

For example, Sloan (1996) reports that earnings persistence is more attributed to cash flows than accruals by using empirical model of Mishkin (1983). He also provides the evidence of accruals anomaly that market participants usually fixate on accruals in stock pricing.

Even though the persistence of earnings, cash flows and accruals have been investigated by many researchers in developed countries, Korean financial market has few evidence on the value relevance of earnings persistence and market participant's reaction on the cash flows and accruals components of earnings.

This paper has two main purposes. First, the paper examines the persistence of earnings and its main components (cash flows and accruals) from current year and next year. Furthermore, the paper also tests whether Korean investors react more on cash flows or accrual components of earnings.

Empirical results of this paper show that Korean stock market has a high level of earnings persistence and this is more attributed to cash flows than accruals. The study also suggests that Korean stock market participants usually react more on cash flows than accruals. The results are consistent with prior studies.

The rest of the paper proceeds as follows. The next section discusses previous recent studies that investigate the persistence of earnings and its' components and market participants' reaction to it. Section 3 develops the assumptions and empirical models and data used in the study. Section 4 discusses the empirical results of the study regarding the persistence of earnings and its components and market participant's expectations and reactions on them. Section 5 concludes the study.

2. Literature Review

Following Dechow (1994) and Sloan (1996), the paper investigates the information content of earnings, cash flows, and accruals and market reaction on them. Dechow (1994) report that cash flows present the information of future earnings and cash flows. Dechow (1994) also show that current earnings have more information about future potential cash flows that cash flows large due to accrual components of earnings.

In line with Dechow (1994), Sloan (1996) also reports that the cash flow component of earnings is more persistent than accrual component of earnings. He shows that market investors usually fail to correctly distinguish the different level of persistence from both cash flows and accrual component of earnings. This is so called 'accrual anomaly' in securities returns.

Since Dechow (1994) and Sloan (1996) many literatures have examined the persistence of earnings, cash flows, and accruals. Many subsequent studies have extended Dechow (1994) and Sloan (1996) by doing concise test of the persistence and pricing of the earnings, cash flows and accrual components of earnings (Subramanyam, 1996; Dechow, Kothari and Watts, 1998; Xie, 2001; Fairfield, Whisenant and Yohn, 2003; Richardson, Sloan, Soliman and Tuna, 2004; Dechow, Recharadson, and Sloan, 2004; Hanlon, 2005).

For example, Subramanyam (1996) demonstrates that the stock market overprices accruals due to abnormal accruals. Xie (2001) demonstrates that stock market overestimates the persistence of earnings and it also overprices accrual components of earnings. Xie (2001) suggest that the overpricing of earnings and accrual components of earnings is largely attributed to managerial discretions. Hanlon (2005) also demonstrates that market participants constantly overprice the accrual component of earnings and underprice cash flows component of earnings.

In contrast to these previous researches, Dechow, Recharadson, and Sloan (2004) demonstrate that market participants correctly anticipate the persistence of earnings and cash flows components of earnings.

Other literatures in emerging markets report compelling results. For example Navissi, Mirza, and Yao (2006) also report that market participants in china fail to estimate correct information of earnings' persistence and they generally underestimate both accrual and cash flows component of earnings performance. But Na (2007) demonstrates that Korean investors usually overestimate the persistence of accrual component of earnings and they underprice accruals in the Korean stock markets.

3. Research Assumption and Design

3.1 Study Hypothesis

This paper investigates the information contents of earnings, cash flows, and accruals component of earnings performance and market reaction on them. To investigate whether earnings, cash flows and accruals component of earnings have a positive relationship to future earnings performance, this study tests the following hypotheses;

Hypothesis 1 (H-1): Current earnings have a positive function of future earnings performance.

Hypothesis 2 (H-2): Current cash flows component of earnings has a positive function of future earnings performance.

Hypothesis 3 (H-3): Current accruals component of earnings has a positive function of future earnings performance.

And then the study examines market investors' reaction on the persistence information of current earnings, cash flows and accrual component of earnings performance. To test whether market participants overestimate the persistence of earnings, cash flows and accruals component of earnings, the paper test following hypotheses;

Hypothesis 4 (H-4): Market participants overestimate the information of earnings' persistence

Hypothesis 5 (H-5): Market participants overestimate the information of cash flows' persistence

Hypothesis 6 (H-6): Market participants overestimate the information of accruals' persistence

3.2 Empirical Model for Hypotheses

This paper employs following empirical model used in prior researches (Freeman, Ohlson and Penman, 1982; Sloan, 1996).

$$E_t = \gamma_0 + \gamma_1 E_{t-1} + \varepsilon_t \quad (1)$$

Where, E_t (next year operating performance) is defined as operating income scaled by total assets in year t. E_{t-1} is operating income in year t-1 (current year operating performance). γ_0 and γ_1 are the coefficients of main variables in this model. Equation (1) tests earnings persistence by estimating γ_1 .

Prior literatures show that CEOs usually use discretionary accrual items to make desired earnings in accrual accounting system. These studies report that high degree accruals are perceived as less qualified than low degree of accruals and cash flows are perceived as more qualified and related to firm value. In the Korean stock market context, the assumption of prior studies also can be tested. So this paper examines whether earnings persistence is more attributed to accruals or cash flows by testing follow model.

$$E_t = \gamma_0 + \gamma_1 CFO_{t-1} + \gamma_2 ACC_{t-1} + \varepsilon_t \tag{2}$$

Where, ACC_{t-1} is total accruals in year t-1, and CFO_t is operating cash flows in year t. and γ_0 , γ_1 , γ_2 are the coefficients of this equation. Equation (2) measures the relative persistence of accruals and cash flows by estimating γ_1 and γ_2 . If γ_2 is bigger than γ_1 , earnings persistence is more attributed to cash flows than to accruals, it means that Korean investors rely more on cash flows than accruals components of earnings in expecting and anticipating future potential earnings.

This paper also employs the empirical model of Mishkin (1983) and Sloan (1996) to test whether Korean investors use the information of earnings, cash flows and accruals persistence in estimating firm value. The empirical model employed in Mishin (1982) and Sloan (1996) is as following:

$$r_t - E_{t-1}r_t = \beta(X_t - X_t^e) + \varepsilon_t \tag{3}$$

Where, r_t is the holding returns for year t, $E_{t-1}r_t$ is the expectation of the holding returns for year t. X_t is earnings in year t and X_t^e is the forecast of X_t in year t. and β is an earnings response coefficient. If β represents earnings, equation (3) suggests that in the context of efficient market, the significance of current and next year's earnings persistence exist.

$$r_t - E_{t-1}r_t = 0, \tag{3.1}$$

Equation (3.1) indicates that if market is efficient, market participants correctly expect the relationship between earnings persistence and firm value, and then they cannot have any abnormal stock returns (AR_t).

This theoretical model can be restated as the following equation (4). The form of equation (4) enables the study to test whether Korean investors promptly react on earnings persistence or delay until next year's financial reporting.

$$\begin{aligned} E_t &= \gamma_0 + \gamma_1 E_{t-1} + \varepsilon_t \\ AR_t &= \alpha_0 + \beta_1 (E_t - \gamma_0 - \gamma_1 E_{t-1}) + \varepsilon_t \end{aligned} \tag{4}$$

If Korean investors fully anticipate the information of earnings persistence ($\gamma_1 = \gamma_1^e$), market efficient inevitably exist in the Korean stock markets. This paper examines this assumption for both earnings and earnings components by using following equation (5).

$$\begin{aligned} E_t &= \gamma_0 + \gamma_1 CFO_{t-1} + \gamma_2 ACC_{t-1} + \varepsilon_t \\ AR_t &= \alpha_0 + \beta_1 (E_t - \gamma_0 - \gamma_1 CFO_{t-1} - \gamma_2 ACC_{t-1}) + \varepsilon_t \end{aligned} \tag{5}$$

If the firm value is correctly expected by the persistence of cash flows and accruals, $\gamma_1 = \gamma_1^e$ and $\gamma_2 = \gamma_2^e$ in equation (5). This implies that stock mispricing does not exist and there are no abnormal securities returns.

4. Empirical Results

4.1 Sample Selection and Data Source

The empirical test of this paper employs data from two sources. Financial statement data are obtained from the KIS-VALUE (Korea Investors Service-Financial Analysis System) and stock return data are obtained from KISRI (Korea Securities Research Institute) stock databases.

These data sets span the 10-year period from 1999 to 2008. During the process of sample selection, the study includes firms with accounting earnings, cash flows, accruals and other financial data sufficient for empirical analysis, but the paper excludes financial banking & public business firms and impairment of capital firms on KIS-VALUE and KISRI database. Prior to the tests the paper eliminates outliers with Cook's Distance greater than 0.5 and absolute value of student residuals greater than 1. <Table 1> shows the selection procedure of sample firms over the period of 2000-2008 in the Korean stock markets.

Insert Table 1 about here

<Table 2> shows descriptive statistics for firm-year sample firms used in this study. The paper identifies 13,383 firm-year observations for the period 2000–2008. Total means of AR_t is 0.129, and its highest value is 106.578. Total means of E_t is 0.007; its highest value is 28.531. Total means of CF_t is 0.043; its highest value is 1.215. Total means of ACC_t is -0.036; its highest value is 30.901.

Insert Table 2 about here

<Table 3> reports Pearson correlations for sample data used in this study. E_t , CF_t and ACC_t are positively correlated at the 1% level, while AR_t , E_t , CF_t , and ACC_t are not significantly correlated. These correlations suggest that CF_t and ACC_t are related to E_t , but AR_t is not.

Insert Table 3 about here

This paper carries out yearly cross-sectional regressions to investigate earnings quality in the Korean stock markets. <Table 4> shows the regression analysis on the persistence of earnings over the period of 2000-2008.

The results show that the significant earnings persistence in all individual year regressions rejects the null hypothesis at the 1% level of significance. This indicates that there exists a significant relation between current and one year before earnings performance. The results also suggest that earnings are not transitory in the Korean stock markets.

Insert Table 4 about here

The study also carries out the nonlinear generalized least square regressions with yearly cross-sectional samples to investigate the market participants' reaction on the information of earnings persistence in the Korean security markets.

<Table 5> presents the regression analysis of investors' reaction on the information of earnings persistence over the period of 2000-2008. This paper does the nonlinear generalized least square regression of current abnormal returns on one year before earnings. The coefficients of α_1 are between 0.000 and 0.339 and the coefficients of α_2 are between 0.000 and 108.592.

The likelihood ratio statistics in the nonlinear generalized least square regression are significant at the 1% or 5% level of significance except 2000 and 2001. The parameter of the nonlinear generalized least square regression in 2005 and 2006 fail to converge after 100 iterations.

<Table 5> indicates that the investors in Korean stock market fail to anticipate the information of earnings persistence for security prices. The results also suggest that Korean investors underestimate the persistence of earnings.

Insert Table 5 about here

The paper implements yearly cross-sectional regressions to investigate cash flows and accruals components of earnings performance in the Korean stock markets. <Table 6> reports the regression analysis on the relative persistence of cash flows and accruals components of earnings over the period of 2000-2008. The regression results indicate that the coefficients on accruals are between 0.256 and 0.539 and the coefficients on cash flows are between 0.138 and 0.967 at the 1% level of significance.

Most regression results present that the coefficients on accruals are bigger than that of cash flows except 2001. The results indicate that the accrual component of earnings is more persistent than the cash flows component of earnings. This also suggests that the persistence of earnings is significantly attributed more to accruals than to cash flows.

Insert Table 6 about here

The study conducts the nonlinear generalized least square regressions with yearly cross-sectional samples to investigate the market participants' reaction on the information of cash flows and accruals components of earnings persistence in the Korean security markets.

<Table 7> shows the regression analysis of investors' reaction on the information of cash flows and accruals persistence over the period of 2000-2008. This paper does the nonlinear generalized least square regression of current abnormal returns on one year before accruals and cash flows components of earnings.

The coefficients of α_1 are between -0.041 and 0.339 and the coefficients of α_2 are between -0.986 and 74.792. The likelihood ratio statistics ($\chi^2 = \chi^2_1$) in the nonlinear generalized least square regression are significant at the

1% or 5% level of significance except 2000, 2001 and 2004. The parameter of nonlinear generalized least square regressions in 2006 fails to converge after 100 iterations.

The coefficients of α are between -0.929 and 0.499 and the coefficients of β are between -3.258 and 35.058. The likelihood ratio statistics ($\chi^2 = \chi^2$) in the nonlinear generalized least square regression are significance at the 1% or 5% level of significance except 2000 and 2007. The parameter of nonlinear generalized least square regressions in 2006 fails to converge after 100 iterations.

<Table 7> indicates that the investors in Korean stock market fail to anticipate the information of cash flows and accruals components of earnings persistence for security prices. The results also suggest that Korean investors usually underestimate the persistence of cash flows and accruals.

Insert Table 7 about here

5. Conclusions

This study investigates the persistence of earnings, cash flows and accruals and market reactions on them in the Korean financial markets over the period of 1999-2008. The paper also examines the efficiency of Korean stock markets by testing investors' reaction on earnings and its' components.

The empirical results of this paper show that while hypothesis 1 (Current earnings have a positive function of future earnings performance), hypothesis 2 (Current cash flows component of earnings has a positive function of future earnings performance), and hypothesis 3 (Current accruals component of earnings has a positive function of future earnings performance) are supported, Hypothesis 4 (Market participants overestimate the information of earnings' persistence), hypothesis 5 (Market participants overestimate the information of cash flows' persistence), and hypothesis 6 (Market participants overestimate the information of accruals' persistence) are not supported.

From the test result of research hypotheses, the paper reports some evidences on the earnings persistence and market participant reactions in the Korean stock market. Similar to prior literatures, the empirical results of this paper indicates that a high level of earnings persistence exists in the Korean stock markets. But, dissimilar to prior studies the persistence of earnings more contributed to accruals than cash flows components of earnings.

The paper also examines whether Korean investors correctly react on the information of earnings and its components. The results suggest that Korean investors fail to use earnings persistence information and they usually underestimate both accruals than cash flows components of earnings.

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Table 1. Selection of sample firms

Sum of Listed companies at the end of 2000-2008	15,660
Minus (-) :	
Firms that do not settle their accounts in December*	(927)
Financial banking businesses	(252)
Issues in administration	(1,098)
Total sample firms	13,383

* Including firms that change the settling day

Table 2. Descriptive Statistics

Year	Number	Variables	Mean	Standard deviation	Min	Max
2000	1,487	AR _t	0.513	4.395	-2.715	106.578
		E _t	0.039	0.16	-1.714	1.307
		CF _t	0.004	0.153	-1.469	1.229
		ACC _t	0.036	0.127	-0.708	0.811
2001	1,487	AR _t	0.124	0.4	-0.492	6.046
		E _t	0.02	0.201	-2.564	1.207
		CF _t	-0.025	0.174	-2.094	1.307
		ACC _t	0.047	0.135	-1.512	0.656
2002	1,487	AR _t	-0.067	0.683	-1.618	6.716
		E _t	0.04	0.775	-3.237	28.531
		CF _t	-0.017	0.829	-2.801	30.901
		ACC _t	0.056	0.143	-2.37	0.739
2003	1,487	AR _t	0.003	0.211	-0.552	2.458
		E _t	0.013	0.454	-6.656	12.384
		CF _t	-0.038	0.437	-5.998	12.996
		ACC _t	0.052	0.132	-1.787	0.72
2004	1,487	AR _t	-0.056	0.819	-1.574	11.543
		E _t	0.01	0.41	-13.093	0.968
		CF _t	-0.045	0.248	-7.066	0.852
		ACC _t	0.053	0.217	-6.027	0.538
2005	1,487	AR _t	0.238	0.911	-1.035	21.993
		E _t	0.014	0.239	-4.273	0.656
		CF _t	-0.037	0.181	-2.469	0.659
		ACC _t	0.051	0.154	-2.445	1.215
2006	1,487	AR _t	0.272	1.684	-1.352	50.729
		E _t	-0.003	0.266	-3.813	0.506
		CF _t	-0.048	0.217	-3.135	0.533
		ACC _t	0.045	0.135	-1.435	0.617
2007	1,487	AR _t	0.106	0.809	-0.894	18.264
		E _t	-0.014	0.352	-8.526	0.387
		CF _t	-0.046	0.308	-7.423	0.624
		ACC _t	0.032	0.127	-1.103	0.843
2008	1,487	AR _t	0.032	0.664	-1.014	10.153
		E _t	-0.058	0.343	-7.855	0.436
		CF _t	-0.072	0.226	-2.685	0.387
		ACC _t	0.02	0.148	-2.284	0.606

Variable definitions: AR_t= Abnormal returns at the end of fiscal year t, where year t is the event year; E_t = Earnings in period t deflated by total assets of year t; CF_t = Operating Cash Flows in period t deflated by total assets of year t; ACC_t= Total number of shares outstanding in year t deflated by total assets of year t.

Table 3. Pearson Correlations

Variables	AR _t	E _t	CF _t	ACC _t
AR _t	1.000			
E _t	0.012 0.169	1.000		
CF _t	0.009 0.324	0.320 <.0001	1.000	
ACC _t	0.009 0.305	0.906 <.0001	-0.061 <.0001	1.000

Pearson’s coefficient of correlation, two-sided test, Variable definitions: Refer to <Table 2>

Table 4. Regressions Analyzing the Persistence of Earnings

Equation: $E_t = \gamma_0 + \gamma_1 E_{t-1} + \varepsilon_t$

Year	Variables	Coefficients	t value	Adj R ²
2000	Intercept(Y ₀)	0.024	11.58**	0.0814
	$E_{t-1}(Y_1)$	0.185	7.40**	
2001	Intercept(Y ₀)	0.020	8.83**	0.0976
	$E_{t-1}(Y_1)$	0.148	8.99**	
2002	Intercept(Y ₀)	0.022	5.03**	0.0069
	$E_{t-1}(Y_1)$	0.092	2.73**	
2003	Intercept(Y ₀)	0.018	6.04**	0.1130
	$E_{t-1}(Y_1)$	0.155	11.66**	
2004	Intercept(Y ₀)	0.036	19.39**	0.1854
	$E_{t-1}(Y_1)$	0.242	15.24**	
2005	Intercept(Y ₀)	0.026	15.70**	0.5307
	$E_{t-1}(Y_1)$	0.376	34.95**	
2006	Intercept(Y ₀)	0.016	7.94**	0.3808
	$E_{t-1}(Y_1)$	0.377	27.14**	
2007	Intercept(Y ₀)	0.018	8.82**	0.3950
	$E_{t-1}(Y_1)$	0.345	28.80**	
2008	Intercept(Y ₀)	-0.001	-0.48	0.2392
	$E_{t-1}(Y_1)$	0.262	20.30**	

Variable definitions: Refer to <Table 2>, * (**): Significant at the .05 (.01) level.

Table 5. Simultaneous nonlinear least square estimation of the persistence parameters for Earnings

Year	Forecasting equation: $E_t = \gamma_0 + \gamma_1 E_{t-1} + \varepsilon_t$ Valuation equation: $AR_t = \alpha_0 + \beta_1 (E_t - \gamma_0 - \gamma_1 E_{t-1}) + \varepsilon_t$				
	Parameter		Test of market efficiency	Likelihood ratio statistic	Marginal significance level
	γ_1	γ_1'			
2000	0.025	0.000	$\gamma_1 = \gamma_1'$	0.00	1.000
2001	0.148	0.029	$\gamma_1 = \gamma_1'$	0.21	0.6500
2002	0.092	-1.325	$\gamma_1 = \gamma_1'$	39.52	<.0001
2003	0.155	-0.243	$\gamma_1 = \gamma_1'$	23.94	<.0001
2004	0.242	-0.031	$\gamma_1 = \gamma_1'$	6.44	0.0111
2005*	0.339	-3.113	$\gamma_1 = \gamma_1'$.	.
2006*	0.000	108.592	$\gamma_1 = \gamma_1'$.	.
2007	0.344	-1.190	$\gamma_1 = \gamma_1'$	10.28	0.0013
2008	0.262	-0.274	$\gamma_1 = \gamma_1'$	29.04	<.0001

*The parameter estimates failed to converge for ITSUR (iterative seemingly unrelated regression procedure) after 100 iterations using CONVERGE=0.001 as the convergence criteria

Table 6. Regressions Analyzing the Persistence of Cash Flows and Accruals

Equation: $E_t = \gamma_0 + \gamma_1 CFO_{t-1} + \gamma_2 ACC_{t-1} + \varepsilon_t$				
Year	Variables	Coefficients	t value	Adj R ²
2000	Intercept(Y ₀)	0.018	7.96**	0.2084
	$CF_{t-1}(Y_1)$	0.034	1.43	
	$ACC_{t-1}(Y_2)$	0.256	11.30**	
2001	Intercept(Y ₀)	0.006	2.82**	0.3077
	$CF_{t-1}(Y_1)$	0.967	6.08**	
	$ACC_{t-1}(Y_2)$	0.394	18.05**	
2002	Intercept(Y ₀)	0.000	0.10	0.0893
	$CF_{t-1}(Y_1)$	-0.041	-1.07	
	$ACC_{t-1}(Y_2)$	0.363	8.97**	
2003	Intercept(Y ₀)	-0.003	-1.03	0.2303
	$CF_{t-1}(Y_1)$	0.117	8.28**	
	$ACC_{t-1}(Y_2)$	0.436	16.93**	
2004	Intercept(Y ₀)	0.021	10.08**	0.5517
	$CF_{t-1}(Y_1)$	0.154	15.56**	
	$ACC_{t-1}(Y_2)$	0.436	26.30**	
2005	Intercept(Y ₀)	0.022	12.33**	0.5402
	$CF_{t-1}(Y_1)$	0.339	25.65**	
	$ACC_{t-1}(Y_2)$	0.420	30.08**	
2006	Intercept(Y ₀)	0.007	3.38**	0.4231
	$CF_{t-1}(Y_1)$	0.316	21.29**	
	$ACC_{t-1}(Y_2)$	0.498	27.34**	
2007	Intercept(Y ₀)	0.008	3.48**	0.4497
	$CF_{t-1}(Y_1)$	0.274	21.05**	

	$ACC_{t-1}(Y_2)$	0.500	28.15**	
2008	Intercept(Y_0)	-0.016	-6.24**	0.3435
	$CF_{t-1}(Y_1)$	0.138	11.44**	
	$ACC_{t-1}(Y_2)$	0.539	24.39**	

Variable definitions: Refer to <Table 2>, * (**): Significant at the .05 (.01) level.

Table 7. Simultaneous nonlinear least square estimation of the persistence parameters for Cash Flows and Accruals of Earnings Components

Year	Forecasting equation: $E_t = \gamma_0 + \gamma_1 CF_{t-1} + \gamma_2 ACC_{t-1} + c_t$ Valuation equation: $AR_t = \alpha_0 + \beta_1 (E_t - \gamma_0 - \gamma_1 CF_{t-1} - \gamma_2 ACC_{t-1}) + c_t$				Test of market efficiency	Likelihood ratio statistic	Marginal significance level
	γ_0	γ_1	γ_2	β_1			
2000	0.034	0.034	0.256	0.256	$\chi = \chi$	0.00	1.000
					$\chi = \chi$	0.00	1.000
2001	0.097	0.011	0.394	-0.312	$\chi = \chi$	0.15	0.7016
					$\chi = \chi$	5.26	0.0219
2002	-0.041	-0.986	0.362	-3.258	$\chi = \chi$	5.61	0.0178
					$\chi = \chi$	73.81	<0.0001
2003	0.117	-0.314	0.436	-1.521	$\chi = \chi$	6.37	0.0116
					$\chi = \chi$	39.62	<.0001
2004	0.154	0.189	0.436	0.060	$\chi = \chi$	0.38	0.5351
					$\chi = \chi$	15.62	<.0001
2005	0.339	0.419	-0.929	-0.312	$\chi = \chi$	15.14	<.0001
					$\chi = \chi$	4.52	0.0336
2006*	0.000	74.792	0.000	35.058	$\chi = \chi$.	.
					$\chi = \chi$.	.
2007	0.274	-0.280	0.499	-0.009	$\chi = \chi$	5.05	0.0247
					$\chi = \chi$	2.28	0.1312
2008	0.138	0.539	-0.237	-0.237	$\chi = \chi$	16.65	<.0001
					$\chi = \chi$	12.08	0.0005

*The parameter estimates failed to converge for ITSUR (iterative seemingly unrelated regression procedure) after 100 iterations using CONVERGE=0.001 as the convergence criteria