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DETERMINANTS OF DIVIDEND POLICY: AN EMPIRICAL INVESTIGATION OF INDIAN COMPANIES USING PANEL DATA ESTIMATION TECHNIQUE

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ABSTRACT

The decision to pay dividends by companies is among the most researched and contentious topics in corporate finance as, according to some scholars, it has a bearing on companies' valuation. The purpose of this research is to find out important factors that act as determinants of the dividend policy of Indian companies. The study employs secondary time series data gathered from the latest data available from the CMIE (Centre for Monitoring India) Prowess database. The study has been divided into three time periods i.e. 1) 2000-01 to 2009-10, 2) 2010-11 to 2020-21, 3) 2000-01 to 2020-21, by merging the two time periods and the panel data regression technique has been applied. The results of the analysis suggest that Return on assets, Debt to equity ratio, Cash and cash equivalents & Debt to total capital ratio significantly affect dividend yield from 2000-01 to 2009-10 and from 2000-01 to 2020-21, whereas the results of the analysis from period 2010-11 to 2020-21 found Sales/Size, Return on the asset, and Debt to total equity ratio as determinants of dividend policy. These results corroborate the earlier findings that profitability, liquidity, and leverage are important factors in the decision-making of companies regarding the payment of dividends.

INTRODUCTION

The decision to pay dividends or not is one of the most contentious decisions for companies. "The harder we look at the dividend picture the more it seems like a puzzle, with pieces that just do not fit together" (Black, 1998). The puzzle is among the top ten unsolved problems of finance. So it is very hard to dissect the dividend policy of the companies. The decision of firms to declare dividends or to retain earnings for future growth has always been dynamic. A vast amount of literature available on this study suggests theoretical and empirical support for variables such as corporate size, age, ownership structure, market risk, cash holdings, leverage, growth opportunities, net working capital, and profitability of the firms as important factors as determinants of dividend policy for companies.

In light of the brief above argument presented, the present study intends to find out the factors that act as determinants of dividend policy for 356 Indian companies under study using the panel data regression analysis technique. The analysis of this study has been divided into three time periods i.e 1) From the financial year 2000-01 to 2009-10, 2) From the financial year 2010-11 to 2020-21, 3) From the financial year 2000-01 to 2020-21 by merging the above two time periods to find out the significant factors that act as determinants of dividend payment by companies. In this study banking and financial services providing companies have been excluded as we assume that they differ in business practices and have different financial parameters than industries in other sectors.

Trends in Dividend Yield

Figure 1 below shows the average dividend yield of all 356 companies understudy from the financial year 2000-01 to 2009-10. It shows that the average dividend yield showed an increasing trend though it started falling from 2005-06 till 2008-09

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which could be attributed to the global financial crisis and India too was not fully immune to it and thus companies refrained from paying dividends. But again it picked up its increasing trajectory from there onwards.

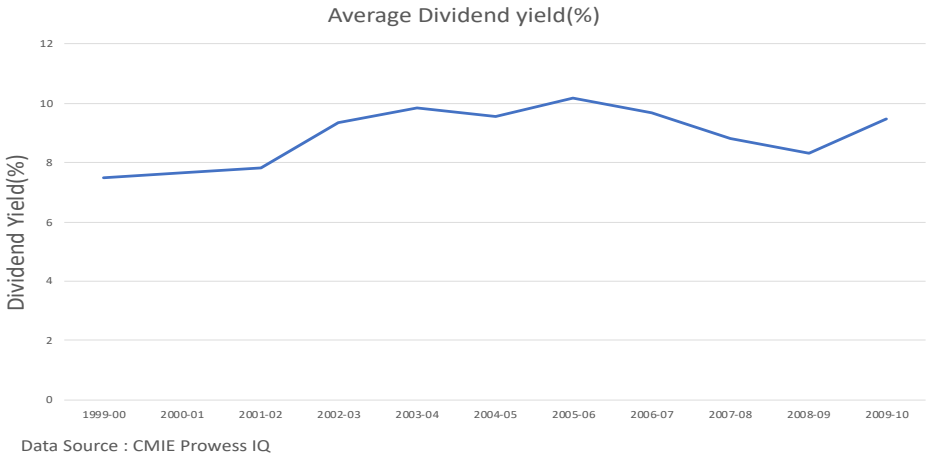

Figure 1. Above shows the average dividend yield of companies from 2000-01 to 2009-10.

Figure 2 below shows the average dividend yield of all the companies understudy from the financial years 2010-11 to 2020-21. It also shows an increasing trend though it was on the decline from the financial year 2015-16 till 2017-18 which could be attributed to major structural changes within India's economy like the implementation of Goods and Services Tax (GST) move toward the digital economy, tax amendments laws, etc. So the companies once again refrained from paying dividends as they had to adjust to these changes.

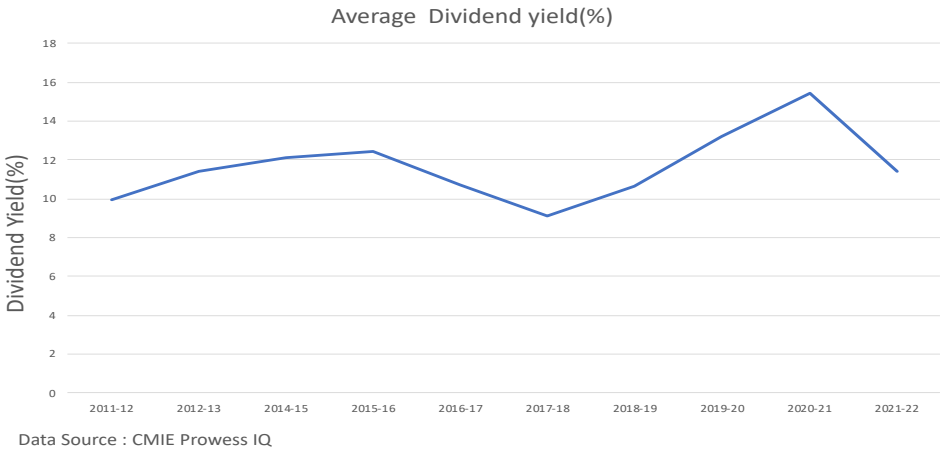

Figure 2. Above shows the average dividend yield of companies from 2010-11 to 2020-21.

Figure 3 below shows the average dividend yield of all 356 companies from the financial year 2000-01 to 2020-2021 by merging the above two time periods. It shows a slight increasing trend in average dividend yield with a few ups and downs.

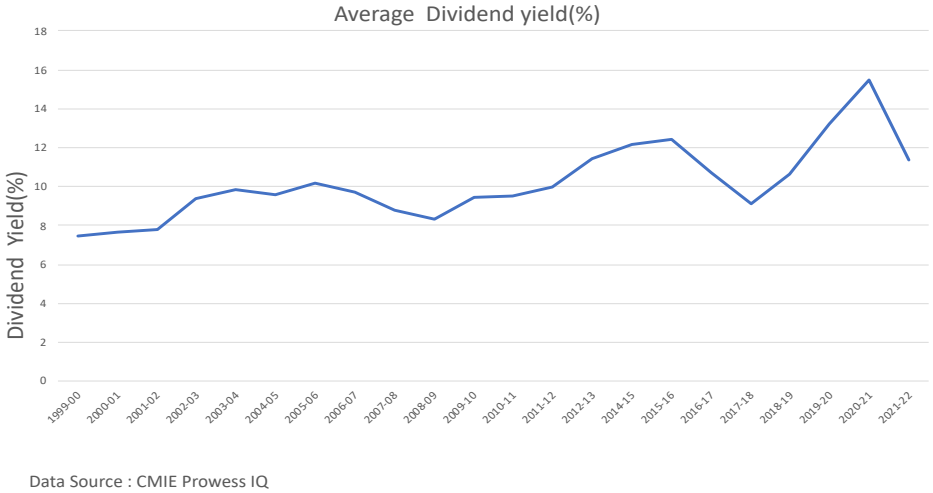

Figure 3. Above the shows average dividend yield of companies from 2000-01 to 2020-21.

REVIEW OF LITERATURE

According to some scholars, the decision to pay dividend has an important bearing on the valuation of the firms while others believe that dividend decisions are irrelevant and does not have any effect on variables affecting firms. A dividend decision is irrelevant in the absence of taxes, transaction costs, or other market imperfections, and the investment decisions of a firm are not affected by its dividend policy (Miller & Modigliani, 1961). Also, it has been found in many studies that dividend has no significant relation with size and industry classification, while it has an inverse relation with the growth of the companies.

In the United States, Canada, United Kingdom, Germany, France, and Japan, the propensity to pay dividends is higher among larger and more profitable firms (Denis & Osobov, 2008). Also, profitable firms with more stable net earnings, ownership concentration, and market liquidity have a positive impact on dividend payout policy. The study done in Pakistan to find out determinants of dividend policy using the dynamic panel data analysis technique found stable net earnings, liquidity, and ownership concentration have positive effects whereas investment opportunity and leverage have negative effects on dividend payment decisions by companies (Yusof & Ismail, 2009). Also, the study done in Srilanka for 191 firms and 1337 firms year observation using binary logistic regression and fixed effect panel data technique found that past dividend decisions, earnings, investment opportunities, profitability, free cash flow (FCF), corporate governance, state ownership, firm size and industry influence as the key determinants of propensity to pay dividends. In addition to this past dividends, investment opportunities, profitability, and dividend premium are identified as the determinants of dividend payout. As per a study done for the U.A.E. (United Arab Emirates) firms, profitability and size are the most important considerations of dividend payout decisions. In another study done for 799 companies in 15 countries over 14 years, the key significant determinants of dividend payout decisions were found to be free cash flow, growth, liquidity, profitability, and size (Madra-Sawicka & Ulrichs, 2020). Also, a few other pieces of the literature suggest liquidity, size, and profitability have a positive relationship with dividend payment decisions by the companies.

The study done in the Indian context using the panel data regression technique concludes that in the automobiles sector liquidity/cash flow, dividend distribution tax, investment opportunities, and retained earnings are the significant factors that influence the dividend payout ratio whereas in the pharmaceuticals sector profitability, debt to equity ratio, sales growth and retained earnings are the significant factor for deciding dividend payout ratio (Nathani & Gangil, 2019).

Profitability, liquidity, leverage, risk, size of the firm, and inflation were also found to be the major determinants of dividend policy of selected NSE(National Stock Exchange) listed firms in India (Brahmaiah et al., 2018). Investment opportunity, financial leverage, size of the company, business risk, firm life cycle, profitability, tax, and liquidity were found to be the major determinants of the dividend policy for Indian companies (Labhane & Mahakud, 2016). The study done using pooled ordinary least square and fixed effect panel data technique found that size, profitability, and interest coverage ratios have a significant positive relation to dividend policy, and business risk and debt level have a significantly negative relationship with payment of dividends (Pinto & Rastogi, 2019).

DATA & METHODOLOGY

List of Variables

The following is the list of variables with their definitions used in this study –

- **Dividend percent / Dividend Yield-** It is a financial ratio that shows the percentage of dividends a company pays out relative to its share price in the financial year (Dividend / Share price). It is used as a dependent variable.
- **Sales-** It is defined as the activity of selling products or services. It is also *taken as a proxy for the size* of the company in this study.
- **Return on assets-** It is obtained as "net profit after tax divided by its total assets" of a company which shows the profitability of a company.
- **Current ratio-** It is the liquidity ratio and obtained as all "current assets divided by its current liabilities of a company".
- **Quick ratio-** Also known as acid test ratio, it short-term or term liquidity position of a company. It is calculated as "current assets minus inventory divided by current liabilities".
- **Debt to equity ratio-** It is a ratio used to evaluate a company's financial leverage and is calculated as the "company's total liabilities divided by its shareholder's equity".
- **Net cash flow from operating activities to total asset ratio-** It is obtained as "net cash flow generated from operating activities of a business divided by its total assets".
- **Cash & Cash equivalents-** Cash and cash equivalents are a line item on the balance sheet stating the amount of all cash or other assets that are readily convertible into cash.
- **Retained earnings to total equity ratio-** It measures how much retained earnings the company is keeping within when compared to its total equity.
- **Debt to total capital ratio-** It is calculated as "interest-bearing total term liabilities (short and long term) divided by total capital (total debt + shareholder's equity)". It shows the financial leverage of the company.

In this study, analysis is done for 356 companies across three time periods – 1) From the financial year 2000-01 to 2009-2010, 2) From the financial year 2010-2011 to 2020-2021, 3) From the financial year 2000-01 to 2020-2021 by combining the above two time periods. Banking and financial services providing companies have been excluded from the study as we assume that they differ in business practices (lending and borrowing) and have different financial parameters than industries in other sectors.

The panel data regression technique has been employed to find out the variables affecting dividend payment decisions by the firms. *The results are reported based on the most robust model of panel data regression technique i.e model used is robust to standard errors disturbances being heteroscedastic or autocorrelated or both if the test indicates the presence of such disturbances.*

The equation used the for Panel data regression technique in the study is as follows-

$$Div\ yield_{i,t} = \alpha + \beta_1 sales_{i,t} + \beta_2 Return\ on\ asset_{i,t} + \beta_3 Current\ ratio_{i,t} + \beta_4 Quick\ ratio_{i,t} + \beta_5 Debt\ to\ equity\ ratio_{i,t} + \beta_6 Net\ operating\ cash\ flow\ to\ total\ asset\ ratio_{i,t} + \beta_7 Cash\ \&\ cash\ equivalents_{i,t} + \beta_8\ Retained\ earnings\ to\ total\ equity\ ratio_{i,t} + \beta_9 Debt\ to\ total\ capital\ ratio_{i,t} + \eta_i + \varepsilon_{i,t}$$

Where,

η_i shows unobservable firm effects, $\varepsilon_{i,t}$ shows the effect of unobservable cross-section variables changing over time. α is a constant term, and $\beta_{1\ to\ 9}$ are coefficients that show the magnitude of change in the dependent variable due to change in each of the individual independent variables respectively.

The data source used in the study is CMIE (Centre for Monitoring India) Prowess.

EMPIRICAL RESULTS & FINDINGS

Return on assets, Debt to equity ratio, Cash and cash equivalents & Debt to total capital ratio were found to be significantly affecting dividend yield from the financial year 2000-01 to 2009-10 (result shown below in Table 1).

Table 1. Below shows the results of Panel data regression results for the period 2000-01 to 2009-10.

	Robust					
Divpercent	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
Sales	-1.58e-06	1.24e-06	-1.27	0.205	-4.02e-06	8.68e-07
ROA	15.11666	4.000729	3.78	0.000	7.243503	22.98981
Currentratio	.2063839	.4004855	0.52	0.607	-.5817434	.9945112
Quickratio	-.4230762	.4866113	-0.87	0.385	-1.380693	.5345406
Debttoequit~o	-.0014024	.0004352	-3.22	0.001	-.0022589	-.0005459
Nocftota	1.640437	2.588111	0.63	0.527	-3.452783	6.733656
Cashandcash~s	.0000466	.0000134	3.48	0.001	.0000202	.0000729
Retototaleq~y	-.0000535	.0000495	-1.08	0.280	-.0001508	.0000439
Debttototal~o	-.0557873	.0155427	-3.59	0.000	-.0863743	-.0252003
_cons	9.28502	.5192132	17.88	0.000	8.263245	10.30679

Source: Results obtained from Stata 16.

The results above in Table 1 have been reported using the "Fixed effect Cluster" variant of the panel data regression technique in Stata 16 as the Hausman test suggests the use of the fixed-effect model (*Appendix A.1*) and is the most appropriate variant to be used when the estimates of the standard errors are robust to disturbances being heteroscedastic and *autocorrelated (Appendix A.2 and A.3 respectively). (https://www.princeton.edu/~otorres/Panel101.pdf)*

Sales/Size, Return on the asset, and Debt to total equity ratio was found to be significantly affecting dividend yield from the financial year 2010-2011 to 2020-2021 (result shown below in Table 2).

Table 2. Below shows the results of Panel data regression result for the period 2010-11 to 2020-21.

	Robust					
Divpercent	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
Sales	8.47e-06	2.75e-06	3.08	0.002	3.06e-06	.0000139
ROA	43.52311	8.825933	4.93	0.000	26.15453	60.89169
Currentratio	1.246671	1.246429	1.00	0.318	-1.206181	3.699522
Quickratio	-1.688633	1.592382	-1.06	0.290	-4.822287	1.445021
Debttoequit~o	.0963707	.0469315	2.05	0.041	.0040142	.1887273
Nocftota	4.653729	3.83322	1.21	0.226	-2.889675	12.19713
Cashandcash~s	-3.33e-08	.00001	-0.00	0.997	-.0000197	.0000197
Retototaleq~o	-.0043646	.0022172	-1.97	0.050	-.0087279	-1.23e-06
Debttototal~o	-.0115922	.0214151	-0.54	0.589	-.0537352	.0305507
_cons	7.251368	.8931895	8.12	0.000	5.493658	9.009078

Source: Results obtained from Stata 16.

The results above in Table 2 have been reported using the same variant of panel data regression technique as the Hausman test suggests the use fixed-effect model (*Appendix B.1*) and standard error estimates are robust to disturbances being heteroscedastic (*Appendix B.2*).

Return on assets, Debt to equity ratio, Cash and cash equivalents & Debt to total capital ratio were again found to be significantly affecting dividend yield of two time periods merged from the financial year 2000-01 to 2020-2021 (result shown below in Table 3) as consistent with the findings of the first study.

Table 3. Below shows the results of Panel data regression results for the period 2000-01 to 2020-21.

	Robust					
Divpercent	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
Sales	-1.58e-06	1.24e-06	-1.27	0.205	-4.02e-06	8.68e-07
ROA	15.11666	4.000729	3.78	0.000	7.243503	22.98981
Currentratio	.2063839	.4004855	0.52	0.607	-.5817434	.9945112
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Debttototal~o	-.0557873	.0155427	-3.59	0.000	-.0863743	-.0252003
_cons	9.28502	.5192132	17.88	0.000	8.263245	10.30679

Source: Results obtained from Stata 16.

The results above in Table 3 have been reported once again using the "Fixed effect Cluster" variant of the panel data regression technique same as in the first study as the Hausman test suggests the use of the fixed-effect model (*Appendix C.1*) and it is a robust method to be used where the standard errors disturbances are heteroscedastic and autocorrelated (*Appendix C.2 and C.3 respectively*).

CONCLUDING REMARKS

The following three conclusions can be made based on the above results of this study-

- The dividend yield is directly related to the Profitability of the firms as per findings in earlier studies. As more profitable the firm, the more its ability to pay dividends to shareholders.
- Leverage has a negative impact on the payment of dividends by firms once again consistent with the findings of the previous studies.
- The liquidity of firms has a positive relationship with dividend yield as the more liquid the firms, they have more ability to pay cash dividends.

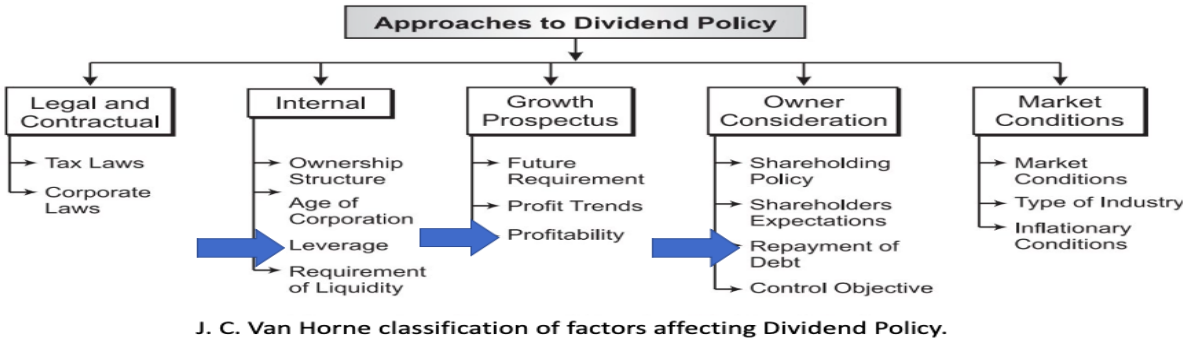

Figure 4. Shows J.C. Van Horne's classification of factors affecting Dividend Policy.

The above findings can be put into an above-shown figure of J.C. Van Horne's classification of factors affecting dividend policy (shown with blue arrows).

Author Contributions: Conceptualization, R.A. and S.K.; Data Curation, R.A. and S.K.; Methodology, R.A.; Validation, R.A. and S.K.; Visualization, R.A. and S.K.; Formal Analysis, R.A.; Investigation, R.A.; Resources, R.A., Software, R.A.; Writing – Original Draft, R.A.; Writing – Review & Editing, S.K.; Supervision, S.K.; Project Administration, S.K.; Funding Acquisition, R.A. Authors have read and agreed to the published version of the manuscript.

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Conflicts of Interest: The authors declare no conflict of interest.

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APPENDICES

Appendix A

1) Hausman fixed random

Coefficients

	(b) random	(B) Difference	(b-B) S.E.	sqrt(diag(V_b-V_B))	fixed
Sales	-1.58e-06	-5.68e-07	-1.01e-06	1.38e-06	
ROA	15.11666	19.97453	-4.857872	.6234698	
Currentratio	.2063839	.2309103	-.0245264	.2066785	
Quickratio	-.4230762	-.4337633	.0106871	.2268247	
Debttoequi~o	-.0014024	-.0019628	.0005604	.	
Nocftota	1.640437	4.789302	-3.148865	.4447369	
Cashandcas~s	.0000466	.0000365	.0000101	7.02e-06	
Retototale~y	-.0000535	-.0000806	.0000271	.0000205	
Debttotota~o	-.0557873	-.0647497	.0089623	.0058542	

b = consistent under Ho and Ha; obtained from xtreg B = inconsistent under Ha, efficient under Ho; obtained from xtreg Test: Ho: difference in coefficients not systematic

chi2(**6**) = (b-B)'[(V_b-V_B)^(-1)](b-B)
= **81.36**
Prob>chi2 = **0.0000**
(V_b-V_B is not positive definite

2) xttest3

Modified Wald test for groupwise heteroskedasticity in fixed effect regression model **H0: sigma(i)^2 = sigma^2 for all i**

chi2 (300) = **1.2e+06** Prob>chi2 = **0.0000**

3) xtserial Divpercent Sales ROA Currentratio Quickratio Debttoequityratio Nocft
> ota Cashandcashequivalents Retototalequity Debttototalcapitalratio

Wooldridge test for autocorrelation in panel data
H0: no first-order autocorrelation
F(1, 296) = **11.166**
Prob > F = **0.0009**

Appendix B

1) Hausman random fixed

similar scale.

Coefficients

	(b) fixed	(B) Difference	(b-B) S.E.	sqrt(diag(V_b-V_B))	random
Sales	1.55e-06	8.47e-06	-6.93e-06	.	
ROA	59.12369	43.52311	15.60058	.	
Currentratio	-1.104143	1.246671	-2.350813	.	
Quickratio	1.071532	-1.688633	2.760166	.	
Debttoequi~o	-.0063944	.0963707	-.1027652	.	
Nocftota	7.88746	4.653729	3.233731	.	
Cashandcas~s	4.48e-06	-3.33e-08	4.51e-06	.	
Retototale~o	-.0051832	-.0043646	-.0008186	.	
Debttotota~o	-.0351521	-.0115922	-.0235599	.	

b = consistent under Ho and Ha; obtained from xtreg B = inconsistent under Ha, efficient under Ho; obtained from xtreg Test: Ho: difference in coefficients not systematic

chi2(**7**) = (b-B)'[(V_b-V_B)^(-1)](b-B)
= **482.64**
Prob>chi2 = **0.0000**
(V_b-V_B is not positive definite)

2) xttest3
Modified Wald test for groupwise heteroskedasticity in fixed effect regression model **H0: sigma(i)^2 = sigma^2 for all i**

chi2 (301) = **5.5e+05** Prob>chi2 = **0.0000**

3) xtserial Divpercent Sales ROA Currentratio Quickratio Debttoequityratio Nocft
> ota Cashandcashequivalents Retototalequity Debttototalcapitalratio

Wooldridge test for autocorrelation in panel data
H0: no first-order autocorrelation
F(1, 298) = **0.791**
Prob > F = **0.3746**

Appendix C

1) hausman fixed random
Note: the rank of the differenced variance matrix (**6**) does not equal the number of coefficients being tested (**9**); be sure this is what you expect, or there may be problems computing the test. Examine the output of your estimators for anything unexpected and possibly consider scaling your variables so that the coefficients are on a similar scale.

____ Coefficients

	(b) random	(B) Difference	(b-B)	sqrt(diag(V_b-V_B)) S.E.	fixed
Sales	-1.58e-06	-5.68e-07	-1.01e-06	1.38e-06	
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Currentratio	.2063839	.2309103	-.0245264	.2066785	
Quickratio	-.4230762	-.4337633	.0106871	.2268247	
Debttoequi~o	-.0014024	-.0019628	.0005604	.	
Nocftota	1.640437	4.789302	-3.148865	.4447369	
Cashandcas~s	.0000466	.0000365	.0000101	7.02e-06	
Retototale~y	-.0000535	-.0000806	.0000271	.0000205	
Debttotota~o	-.0557873	-.0647497	.0089623	.0058542	

b = consistent under Ho and Ha; obtained from xtreg B = inconsistent under Ha, efficient under Ho; obtained from xtreg Test: Ho: difference in coefficients not systematic

chi2(**6**) = (b-B)'[(V_b-V_B)^(-1)](b-B)
= **81.36**
Prob>chi2 = **0.0000**
(V_b-V_B is not positive definite)

2) xttest3
Modified Wald test for groupwise heteroskedasticity in fixed effect regression model **H0: sigma(i)^2 = sigma^2 for all i**

chi2 (300) = **1.2e+06** Prob>chi2 = **0.0000**

xtserial Divpercent Sales ROA Currentratio Quickratio Debttoequityratio Nocft Cashandcashequivalents Retototalequity Debttototalcapitalratio > ota Cashandcashequivalents Retototalequity Debttototalcapitalratio

3) Wooldridge test for autocorrelation in panel data
H0: no first-order autocorrelation
F(1, 296) = **11.166**
Prob > F = **0.000**

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