Demographics, dividend clienteles and the dividend premium

Lee, King Fuei

Schroder Investment Management

December 2010

Demographics, Dividend Clienteles and the Dividend Premium

King Fuei LEE[1]

Schroder Investment Management

Preliminary draft, 2011

Abstract

The catering theory of dividends proposed that corporate dividend policy is driven by prevailing investor demand for dividend payers, and that managers cater to investors by paying dividends when the dividend premium is high. While earlier research found that the dividend premium is not driven by traditional clienteles derived from market imperfections such as taxes, transaction costs, or institutional investment constraints, we find empirical evidence that demographic clienteles are an important source of the time-varying demand for dividend payers. In particular, we find that, as consistent with the behavioural life-cycle theory and the marginal opinion theory of stock price, the dividend premium is positively driven by demographic clientele variation represented by changes in the proportion of the older population. Our results are robust when controlled for the factors of investor sentiment, signalling, agency costs and time trend.

JEL Classification: G000, G350, C320

Keywords: Dividend policy, demographics, dividend premium, dividend clienteles

[1] King Fuei Lee, Schroder Investment Management, 65 Chulia Street #46-00 OCBC Centre Singapore 049513, Tel: (+65) 6535 3411, Fax: (+65) 6535 3486, Email: king.lee@schroders.com

Demographics, Dividend Clienteles and the Dividend Premium

1. Introduction

Modigliani and Miller (1961) proposed in their theory of dividend policy irrelevance that in a world of perfect information, full capital mobility, no taxes and no agency costs, the dividend policy of a company should have no impact on its value. However these assumptions rarely hold true in the real world. The catering theory of dividend policy (Baker and Wurgler, 2004a) relaxes the assumption of market efficiency and proposed that managers cater to investors by paying dividends when investors put a stock price premium on payers, and by not paying dividends when investors prefer nonpayers. According to the catering theory, corporate dividend policy is therefore driven by prevailing investor demand for dividend payers which is represented by the dividend premium, defined as the log difference in the average market-to-book ratio of dividend payers to nonpayers.

Empirical evidence has generally been supportive. Baker and Wurgler (2004b) studied US companies on the COMPUSTAT between the period of 1963 to 2000, and found that the "disappearing dividends" phenomena observed by Fama and French (2001) can be largely explained by the catering theory. Li and Lie (2006) found similar catering effects among US firms when they examined changes in corporate payout ratios to the market dividend premium, while Ferris, Sen and Yui (2006) extended the analysis to the UK where they concluded that a shift in catering incentives most likely drove the declining propensity to pay dividends over the sub-period of 1998-2002.

Despite strong empirical evidence of the importance of dividend premium as a determinant of dividend policy, there has been sparse research on the factors driving the dividend premium. Liu and Shan (2007) attempted to fill this gap by examining the relation of dividend premium to proxies of agency costs and signalling motivations, namely the differences in cash holdings and in future profitability between dividend payers and nonpayers respectively. Yet, their positive findings are viewed as inconclusive since their analysis is conducted without consideration for time trends which substantially affects their conclusions. In fact, the notion that the dividend premium reflects time-varying contracting problems is rejected by Baker and Wurgler (2004a) as being inconsistent with the observation of improving corporate governance and declining propensity of dividend payout in the 1960s.

Baker and Wurgler (2004a) also attempted to identify whether traditional dividend clienteles are the source of the time-varying demand for dividend payers. They were however unable to match up the dividend premium to any plausible proxies for clienteles. For example, when they included a tax control variable in their multivariate regression, they found that the added tax control variable did not appear to impact the dividend premium much, and thus rejected tax clientele as a driver of the dividend premium. They also rejected transaction costs clienteles as an explanation, while ruling out institutional investor clienteles because of the difficulty in reconciling the rise in institutional ownership since the 1980s with the time-varying pattern in the 1960s.

This paper investigates the effects of changes in demographic clienteles on the dividend premium. We hypothesise that in a world where stock prices are determined by marginal opinion (Williams, 1938; Smith, 1967) and dividend preferences of retail investors are influenced by behavioural life-cycle considerations (Thaler and Shefrin, 1988), demographic variations may induce changes in demographic clienteles that then drives the dividend premium. In particular, we

find strong empirical evidence that the dividend premium is positively related to changes in the proportion of the older-to-younger population. Our results are robust when controlled for the factors of investor sentiment, signalling, agency costs and time trend.

This paper contributes to current literature by adding to the understanding of the drivers of the dividend premium through an examination of demographic clientele changes as a source of the time-varying demand for dividend payers. To our knowledge, there has not been any work done in this aspect.

The rest of this paper is structured as follows: Section 2 discusses the behavioural life-cycle hypothesis and the marginal opinion theory of stock price, and introduces our hypothesis. Section 3 describes the data sample and the methodology pursued. The empirical findings are reported in Section 4, while robustness tests are conducted in Section 5. Section 6 concludes the paper.

2. Demographic Clientele Variations and the Dividend Premium

2.1 Behavioural Life-Cycle Theory and the Dividend Preferences of Older Investors

According to the behavioural life-cycle theory (Thaler and Shefrin, 1988), households treat components of their wealth as nonfungible. In particular, wealth is assumed to be broken into three mental accounts, namely current income, current assets and future income, with the temptation to spend being greatest for current income and least for future income. The behavioural life-cycle theory therefore hypothesises that in the later stage of a household's life cycle when they reach retirement and begin to dis-save, the investor perception of the non-

fungibility between dividends and capital gains should lead to a preference for dividend-paying stocks by older investors for consumption purposes.

Empirical evidence has generally been supportive. Graham and Kumar (2006) studied the stock holdings and trading behaviour of 77,995 households over the period of 1991-1996 and found that, compared to younger investors, older investors allocate a greater proportion of their equity portfolios to dividend paying stocks. This suggests that senior investors have a greater preference for dividends.

2.2 Marginal Opinion Theory of Stock Price

Given the dividend preference of older investors, it is reasonable to conjecture that when the general population has a greater proportion of older people, then the greater degree of buying of dividend-paying stocks by these senior investors should lead to a high dividend premium. Such a conjecture however assumes that stock prices are determined by the opinion of the average investor. If share prices are instead determined by the marginal investor, then the implications are different.

The concept of marginal opinion as the determinant of stock prices was first raised by Williams (1938) and subsequently extended by Smith (1967). According to the marginal opinion theory, in a market comprising of a number of interested parties who each possess an opinion as to the worth of the stock, the price of the stock is not set by the majority, regardless of how overwhelming it is, but by the last owner. This means that marginal opinion will determine the market price.

If the stock prices of dividend-paying and non-paying stocks are determined by the marginal investor rather than the average investor, then it means that rather than being related to the absolute demographic structure which reflects the average investor opinion, dividend premium should be related to changes in the demographic structure which proxies for the marginal investor opinion i.e. demographic clientele variation.

2.3 Hypothesis of Dividend Premium and Changes in Demographic Clienteles

We hypothesise that in a world where stock prices are determined by the marginal investor and where components of wealth are mentally treated as being non-fungible, the preference for dividend-paying stocks by older investors means that the dividend premium should be positively related to changes in the proportion of the older population, a proxy for the marginal investor opinion. In essence, the larger the increase in the proportion of the older population is, the greater the marginal investor preference for dividend-paying stocks and hence the higher the dividend premium. Our hypothesis is therefore that the time-varying demand for dividend payers is driven by variations in the demographic clienteles.

3. Data Sample and Methodology

This section briefly discusses the data sources and the variables' definitions.

The dividend premium $P^{D\text{-}ND}$ is the difference between the logs of the value-weighted market-to-book ratios for dividend payers to nonpayers, and the data is downloaded from the

website of Jeffrey Wurgler[2]. Following Graham and Kumar (2006), we use the older-to-younger ratio *Old/Young*, defined as the proportion of population aged above 65 to those aged under 45, as the variable representing the demographic structure. Demographic variation is therefore expressed as the annual change in the older-to-younger ratio *dOld/Young*

$$dOld/Young_t = Old/Young_t - Old/Young_{t-1} \quad (1)$$

We also employ an alternative measure of the demographic variation variable *dConsumers/Savers* defined as the annual change in the prime consumers-to-prime savers ratio in our robustness test, where prime consumers are persons aged above 65 while prime savers are persons aged from 45-65. The US population data used for the calculations of the two measures of demographic variations is downloaded from the US Census Bureau[3] website.

In our other robustness checks, we include measures of investor sentiment, signalling and agency costs as control variables. Our chosen measure of investor sentiment is the closed-end fund discount *CEFD* which is the value-weighted discount on closed-end funds. Data for the variable is obtained from the website of Jeffrey Wurgler. Following Liu and Shan (2007), we also include measures of signalling and agency costs as control variables. The measure of signalling used is the profitability premium *E/A* which is defined as the difference between the natural logs of the value-weighted future returns-on-assets ratios for dividend payers to nonpayers, while the measure of agency costs is the cash premium *Cash/A* which is the difference between the natural logs of the value-weighted cash-to-asset ratios for dividend payers to nonpayers. Data for both variables are obtained from Liu and Shan (2007).

[2] Available at http://pages.stern.nyu.edu/~jwurgler/.
[3] Available at http://www.census.gov.

The time period employed in this study is from 1961 to 2007 which represents the period for which the data for dividend premium is available. Following the methodology of Liu and Shan (2007), we employ multivariate OLS regression to estimate the relation. The regression is expressed as

$$P^{D\text{-}ND}{}_t = \alpha_0 + \alpha_1\, dOld/Young_t + \alpha_2\, CEFD_t + \alpha_3\, E/A_{t+1} + \alpha_4\, Cash/A_{t-1} + \alpha_5 t + \varepsilon_t \qquad (2)$$

where α_i is the regression coefficient of explanatory variable *i*, and

ε_t is the random disturbance term.

4. Empirical Findings

Figure 1 shows the time series plots of the value-weighted dividend premium and the demographic variation variable. It is observed that while both variables are not perfectly synchronous, they are visibly positively related to each other. Indeed it can be seen from the correlation matrix in Table 2 that the contemporaneous correlation between dividend premium and the demographic variation measures of annual change in older-to-younger ratio is 0.457 at 5% significance level.

Table 1 shows the descriptive statistics of the dividend premium, the demographic variation variables as well as the control variables, while Table 2 shows their unit root test statistics and the correlation matrix. The unit root test employed here is the Kwiatkowski-Phillips-Schmidt-Shin (KPSS) test (Kwiatkowski, Phillips, Schmidt and Shin, 1992) which uses the null hypotheses of linear stationarity and trend stationarity respectively. It can be seen that for the demographic variation variables and the control variables, the unit root tests generally support the

null hypotheses of linear stationarity and trend stationarity. For the dividend premium variable, the KPSS tests appear to reject the notion of stationarity, a finding that is similar to with that of Baker and Wurgler (2004a). As they highlighted, there are theoretical reasons to expect the dividend premium to be stationary and not grow without bound. The practical message is therefore to also examine the robustness of the regression results to the inclusion of time trends.

The theoretical backing for and our econometric findings of stationarity properties possessed by the variables of dividend premium, demographic variation and the control variables supports the employment of ordinary least squares regression techniques to test our hypothesis. Column 1 of Table 3 shows the OLS regressions of the value-weighted dividend premium against the annual change in older-to-younger ratio over the period of 1961 to 2007. It can be seen from our regression results that the annual change in the older-to-younger ratio is a positive and statistically-significant determinant of the dividend premium. This means that the dividend premium is high when the proportion of older population to younger population increases, while the premium is low when the proportion of older population to younger population falls.

Column 2 of Table 3 shows the multivariate regression with the inclusion of a time trend. It can be seen that the annual change in older-to-younger ratio continues to be positively related to the dividend premium at 1% significance level. The regression coefficient of the time trend is also highly significant at 1% level. Our results therefore support our hypothesis that the time-varying demand for dividend payers is positively related to variations in the demographic structure and our findings are robust to the inclusion of time trend.

5. Robustness Checks and Future Work

5.1 Alternative Definition of Demographic Variation Variable

While our measure of demographic structure is adopted from Graham and Kumar (2006), there are alternative definitions of the demographic structure used in other research. In their analysis of the effects of demographic structure on asset prices in Asia, Eskesen, Lueth, and Syed (2008) have defined the demographic structure as the ratio of prime consumers (aged 65+) to prime savers (aged 40-65). This definition of demographic structure is also used by Krueger (2004).

We have therefore adopted the definition of Eskesen, Lueth and Syed (2008) as an alternative definition of the demographic structure and calculated the equivalent demographic variation variable as the annual change in the prime consumers-to-prime savers ratio.

Figure 2 shows the time series plots of the dividend premium to the annual change in the prime consumers-to-prime savers ratio. It can be seen that the two variables appear to be strongly positively related. In fact Table 2 shows that the correlation between them is 0.394 with 5% significance level. The result of the multivariate regression is shown in Column 3 of Table 3. It can be seen that the alternative definition of demographic variation remains an important determinant of the dividend premium at 1% significance level. Our earlier finding is therefore robust to the alternative definition of the demographic variation measure.

5.2 Investor Sentiment

In trying to identify the drivers of the dividend premium, Baker and Wurgler (2004a) found initial support for a sentiment-based explanation. In particular, they compared the dividend premium to the closed-end fund discount, a measure of investor sentiment that is also favoured by

Zweig (1973) and Lee, Shleifer, and Thaler (1991), and concluded that their results provide affirmative support for a sentiment interpretation.

We therefore include the closed-end fund discount as a control variable in our multivariate regression to investigate the possibility that the demographic variation measure is only serving as a proxy for investor sentiment. Column 4 of Table 3 shows the results. It can be seen that demographic variation remains an important determinant of dividend premium at 1% significance level even with the inclusion of investor sentiment as an additional explanatory variable. The closed-end fund discount variable is also positively correlated to dividend premium at 5% significance level, a finding that is consistent with the conclusion of Baker and Wurgler (2004a).

5.3 Agency Costs and Signalling

While the idea of the dividend premium reflecting time-varying contracting problems is rejected by Baker and Wurgler (2004a), Liu and Shan (2007) found evidence that the dividend premium is higher when the need to mitigate the agency problem is greater. In particular, they examined the relation of dividend premium to proxy measures of signalling and agency costs, namely the profitability premium and the cash premium respectively. They found that the dividend premium is positively related to the difference in cash holdings at the beginning of the year between dividend payers and nonpayers, and is negatively related to the difference in future profitability between dividend payers and nonpayers. They interpret this as investors valuing dividend payers with a higher premium when dividend payers have more cash and fewer profitable future investment projects than nonpayers, and concluded that this is consistent with the agency costs theory of dividends.

It is worth noting that in the correlation matrix in Table 2, the cash premium variable is highly negatively correlated to the time trend at -0.945 with 5% significance level. Given the lack of inclusion of a time trend in the analysis of Liu and Shan (2007), it is highly likely that their finding of the significance of the cash premium variable is only a reflection of the importance of the time trend, and that the cash premium variable only served as a proxy for the time trend in their regression.

While the conclusions of Liu and Shan (2007) are best viewed as inconclusive, we have nevertheless included the profitability premium and cash premium as control variables for completeness. Column 5 of Table 3 shows the regression of the dividend premium against the annual change in older-to-younger ratio, the profitability premium and the cash premium. It can be seen that demographic variation remains an important determinant of dividend premium at 10% significance level while the cash premium variable is highly significant at 1% level. The profitability premium is not significant.

Column 6 of Table 6 shows the regression of the dividend premium against all the control variables including the time trend. Demographic variation is positively-related to dividend premium at 5% significance level while the closed-end fund discount is also significant at 1% level. The cash premium variable however loses its significance when a time trend is included, thus confirming our earlier suspicion that the cash premium variable is only a proxy for the time trend in the analysis of Liu and Shan (2007).

Our robustness checks have therefore shown that changes in the demographic clientele is an important determinant of the dividend premium even when controlled for investor sentiment, signalling, agency costs and time trend.

5.4 Future work

While not within the scope of the paper, we believe that following the conclusions of our paper establishing the link between the dividend premium and changes in demographic clienteles, future work can be focused on an investigation of how the effects of demographic clientele variations are translated to actual corporate dividend policy. There is also the potential to explore the effects of demographic clientele changes on the stock performance of dividend-paying companies versus non-dividend-paying companies.

6. Conclusion

The catering theory of dividends proposed that corporate dividend policy is driven by prevailing investor demand for dividend payers, and that managers cater to investors by paying dividends when the dividend premium is high. While Baker and Wurgler (2004a) found that the dividend premium is not driven by traditional clienteles derived from market imperfections such as taxes, transaction costs, or institutional investment constraints, we hypothesise that changes in the demographic clientele can be an important source of the time-varying demand for dividend payers. In particular, we conduct multivariate regressions and find empirical evidence that demographic variation as represented by the annual change in the older-to-younger ratio is a significant determinant of the dividend premium. This is consistent with our hypothesis as well as the behavioural life-cycle hypothesis and the marginal opinion theory of stock price. Our findings are robust to the inclusion of control variables of investor sentiment, signalling, agency costs and time trend, and to alternative definitions of the demographic structure.

References:

1. Baker, M. and Wurgler, J., 2004a. A Catering Theory of Dividends. *Journal of Finance* 59, 1125-1165.
2. Baker, M. and Wurgler, J., 2004b. Appearing and Disappearing Dividends: The Link to Catering Incentives. *Journal of Financial Economics* 73, 271–288.
3. Eskesen, L., Lueth, E. and Syed, M., 2008. The Graying of Asia: Demographics, Capital Flows, and Financial Markets. *IMF Regional Economic Outlook: Asia and Pacific, November 2008*, 41-57.
4. Fama, E. and French, K., 2001. Disappearing Dividends: Changing Firm Characteristics or Lower Propensity To Pay?. *Journal of Financial Economics* 60, 3-44.
5. Ferris, S., Sen, N. and Yui, H., 2006. God Save the Queen and Her Dividends: Corporate Payouts in the U.K. *Journal of Business* 79, 1149–1173.
6. Graham, J. and Kumar, A., 2006. Do Dividend Clienteles Exist? Evidence on Dividend Preferences of Retail Investors. *Journal of Finance* 61, 1305-1336.
7. Kwiatkowski, D., Phillips, P.C.B., Schmidt, P. and Shin, Y., 1992. Testing the Null of Stationarity Against the Alternative of a Unit Root. *Journal of Econometrics* 54, 159-178.
8. Krüger, D., 2004. The Effects of Demographic Changes on Aggregate Savings: Some Implications from the Life Cycle Model. In *Capital Markets in the Long Term: Demography, economic Development and Funded Pension Systems*, Center for Financial Studies and Allianz, Frankfurt am Main, 2004.
9. Lee, C.M., Shleifer, A. and Thaler, R., 1991. Investor Sentiment and the Closed-end Fund Puzzle. *Journal of Finance* 46, 75–110.
10. Li, W. and Lie E., 2006. Dividend Changes and Catering Incentives. *Journal of Financial Economics* 80, 293-308.
11. Liu, L. and Shan, L., 2007. What is Dividend Premium?. *Financial Management Association*

Annual Meeting 2007. Online conference proceedings.

12. Modigliani, F. and Miller, M., 1961. Dividend Policy, Growth, and the Valuation of Shares. *Journal of Business* XXXIV, 235-64.
13. Smith, R.G.E., 1967. The 'Marginal Opinion' Theory of Stock Price. *Financial Analysts Journal* 23, 127-132.
14. Thaler, R.H. and Shefrin, H.H., 1988. The Behavioral Life-cycle Hypothesis. *Economic Inquiry* 26, 609-643.
15. Williams, J., 1938. *The Theory of Investment Value*, Cambridge, Mass. Harvard University Press.
16. Zweig, M.E., 1973. An Investor Expectations Stock Price Predictive Model Using Closed-end Fund Premiums. *Journal of Finance* 28, 67–87.

Figure 1: Time Series Plots of Dividend Premium and Annual Change in Older-to-Younger Ratio, 1961 - 2007

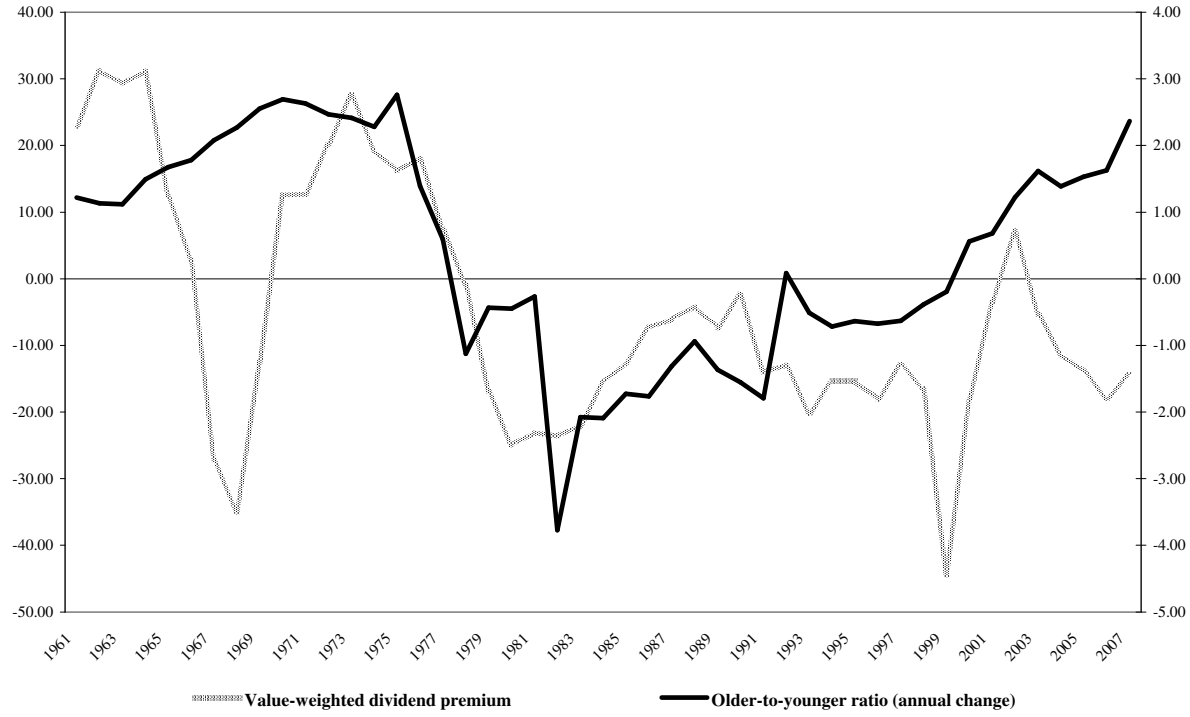

Figure 2: Time Series Plots of Dividend Premium and Annual Change in Prime Consumers-to-Prime Savers Ratio, 1961 - 2007

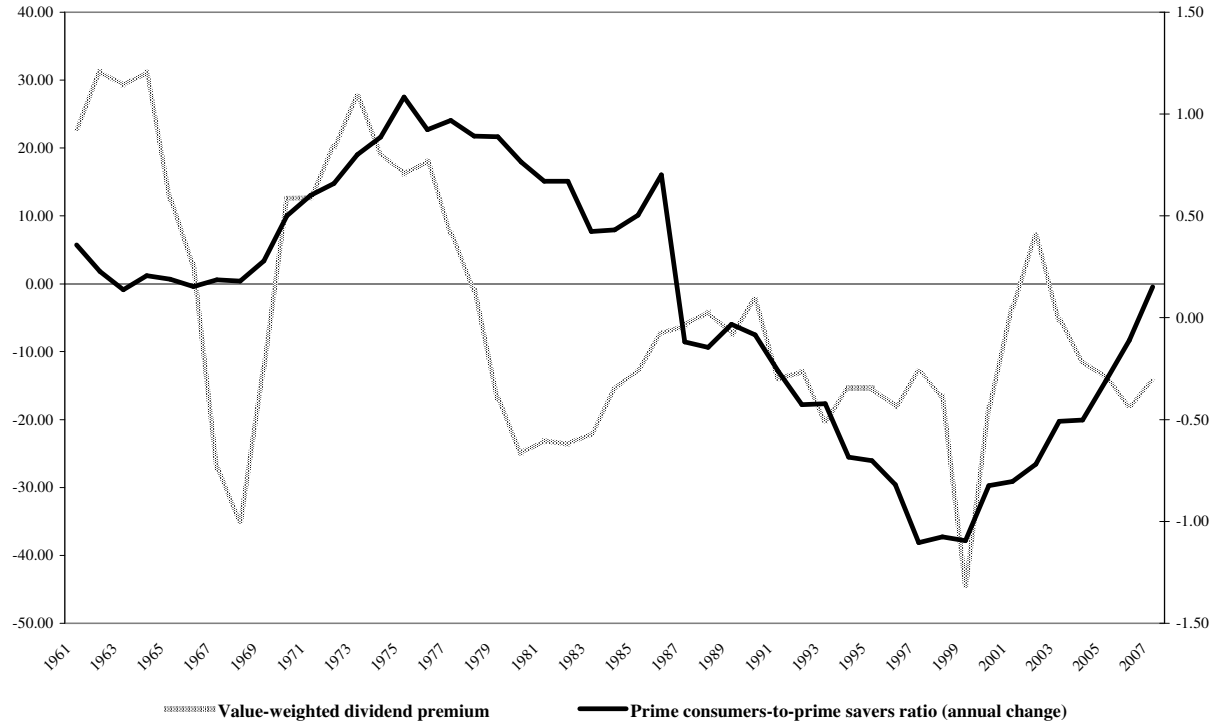

Table 1: Descriptive Statistics

	Value-weighted dividend premium P^{D-ND}	Annual change in older-to-younger ratio *dOld/Young*	Ann chg in prime consumers-to-prime savers ratio *dConsumers/Savers*	Closed-end fund discount *CEFD*	Profitability Premium *E/A*	Cash Premium *Cash/A*	Year *t*
Mean	-4.79	0.41	0.08	8.64	50.67	-61.69	1984
Standard deviation	18.26	1.63	0.62	7.23	36.75	75.60	13.71
Maximum	31.23	2.76	1.08	23.53	239.55	88.67	2007
Minimum	-44.43	-3.77	-1.10	-10.91	15.80	-188.97	1961
Number of observations	47	47	47	47	43	43	47

Table 2: Unit Root Statistics and Correlation Matrix

	Unit Root		Correlation matrix						
	KPSS: Level stationarity	KPSS: Trend stationarity	$P^{D\text{-}ND}$	*dOld/Young*	*dConsumers/Savers*	*CEFD*	*E/A*	*Cash/A*	t
$P^{D\text{-}ND}$	0.423*	0.189**	1.000	0.457**	0.394**	0.348**	-0.081	0.535**	-0.546**
dOld/Young	0.293	0.107	0.457**	1.000	0.150	0.065	-0.030	0.500**	-0.303**
dConsumers/Savers	0.173	0.124	0.394**	0.150	1.000	0.261*	-0.427**	0.748***	-0.664**
CEFD	0.141	0.122*	0.348**	0.065	0.261*	1.000	-0.207	0.248	-0.054
E/A	0.343	0.146*	-0.081	-0.030	-0.427**	-0.207	1.000	-0.450**	0.407**
Cash/A	0.439*	0.105	0.535**	0.500**	0.748**	0.248	-0.450**	1.000	-0.945**
t	-	-	-0.546**	-0.303**	-0.664**	-0.054	0.407**	-0.945**	1.000

*Note: Significance levels: ** = 5%, * = 10%.*

Table 3: Regressions of Dividend Premium against Annual Change in Older-to-Younger Ratio and Control Variables, 1961-2007

Multivariate regressions of dividend premium against measures of demographic variation, investor sentiment, signalling, agency costs and time trend.

$$P^{D\text{-}ND}{}_t = \alpha_0 + \alpha_1\, dOld/Young_t + \alpha_2\, CEFD_t + \alpha_3\, E/A_{t+1} + \alpha_4\, Cash/A_{t-1} + \alpha_5 t + \varepsilon_t$$

The dividend premium $P^{D\text{-}ND}$ is the difference between the logs of the value-weighted market-to-book ratios for dividend payers to nonpayers, and is downloaded from the website of Jeffrey Wurgler. The demographic variation measures are given by *dOld/Young* and *dConsumers/Savers* which represent the annual change in older-to-younger ratio and the annual change in prime consumers-to-prime savers ratio respectively. Investor sentiment is represented by the closed-end fund discount *CEFD* which is obtained from the website of Jeffrey Wurgler. The profitability premium *E/A* is the difference between the natural logs of the value-weighted returns on assets ratios for dividend payers to nonpayers, while cash premium *Cash/A* is the difference between the natural logs of the value-weighted cash-to-asset ratios for dividend payers to nonpayers. Both variables are obtained from Liu and Shan (2007). t represents the year.

	Column					
	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Variable	*Value-weighted Dividend Premium $P^{D\text{-}ND}$*					
Explanatory Variables						
dOld/Young	5.125***	3.603***	-	4.892***	3.208*	3.443**
	(3.448)	(2.606)	-	(3.480)	(1.905)	(2.226)
dConsumers/Savers	-	-	11.555***	-	-	-
	-	-	(2.883)	-	-	-
CEFD	-	-	-	0.809**	-	1.042***
	-	-	-	(2.553)	-	(3.112)
E/A	-	-	-	-	0.066	0.081
	-	-	-	-	(0.894)	(1.202)
Cash/A	-	-	-	-	0.110***	-0.051
	-	-	-	-	(2.668)	(-0.492)
t	-	-0.597***	-	-	-	-0.870
	-	(-3.637)	-	-	-	(-1.506)
Constant	-6.882***	1179.046***	-5.692**	-13.770***	-2.173	1702.75
	(-2.785)	(3.616)	(-2.282)	(-3.861)	(-0.532)	(1.495)
R-squared	0.209	0.392	0.156	0.311	0.377	0.507
Observations	47	47	47	47	43	43

*Note: T-statistics are in parentheses. Significance levels: *** = 1%, ** = 5%, * = 10%.*