Fire the Caterer: A Test of Catering Theory for Corporate Dividend Payout Policy

by

Alexander W. Lue

[Previous/Other degree information: S.B. EECS, M.I.T., 2011; S.B. BE, M.I.T., 2011]

Submitted to the Department of Electrical Engineering and Computer Science
in Partial Fulfillment of the Requirements for the Degree of
Master of Engineering in Electrical Engineering and Computer Science
at the Massachusetts Institute of Technology

May 20, 2011
[June 2011]

Author ______________________________
Department of Electrical Engineering and Computer Science
May 20, 2011

Certified by ______________________________
Professor Paul Asquith
Gordon Y. Billard Professor of Finance, Sloan School of Management

Accepted by ______________________________
Dr. Christopher J. Terman
Chairman, Masters of Engineering Thesis Committee

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Abstract

We propose that the catering theory of dividends will not hold when tested with an extended sample period, different formulations of the dividend premium, and subsets of our sample divided by industry. The catering theory implies that managers cater to irrational and time-varying investor demand for dividends. This demand can be proxied by a dividend premium, a comparison of the market-to-book ratio of payers versus non-payers. The dividend premium that the catering model is based on suffers from a very arbitrary derivation. We find that coefficients for the regression of catering using an extended sample period and different derivations of the dividend premium give results with smaller economic and statistical significance. Furthermore, tests of our sample by industry show that the dividend premium, supposedly a market-wide measure that affects all firms, has different effects on various industries. Though the catering theory finds significance given a particular methodology, further analysis shows that the model is based on spurious correlation, and not true causation.

Acknowledgements

The author would especially like to thank Paul Asquith for his supervision, experience, and original idea behind this thesis, as well as William Mullins for his invaluable guidance, advice, and help in finishing the thesis. In addition, we also thank Thom Covert, Reining Chen, and Jeri Seidman for their insights and coding help, and Caroline Hane-Weijman, Yida Gao, Steven Gan, and Amie Guo for their editing advice. Finally, we thank Parag Pathak, Nittai Bergman, Raj Iyer, and Brian Akins for their helpful comments.

Thesis Supervisor: Paul Asquith, William Mullins
Title: Gordon Y. Billard Professor of Finance, Sloan School of Management; PhD. in Finance, Sloan School of Management

I. Introduction

Firms have two common methods of returning value to their equity shareholders: through capital gains such as share buybacks, and through dividend payouts. The decision to choose one over another is influenced by a multitude of different factors: capital gains and dividend income are treated differently from a tax perspective, transaction costs differ between the two, and dividends usually come with the expectation of continued payouts while share buybacks are seen are more one-time events. However, unlike share buybacks, the proportion of firms paying dividends has fluctuated greatly, dropping to almost a quarter of its 1978 level by 2000. There have been multiple explanations for this time-varying preference to pay dividends; current literature tries to explain this change through time-varying market-based factors such an investor dividend premium and changing tax incentives, as well as through time-varying firm-specific factors such as changing firm sizes, investment opportunities, profitability, and life-cycles.

Using the stock price and accounting databases CRSP and Compustat, Fama and French examine time-varying trends in firms' decision to pay dividends over the time period 1962-2000. They find that of the non-financial and non-utility firms publicly traded on the NYSE, 78.0% of firms pay dividends in 1962. The proportion of dividend payers remains relatively constant until 1978, where 69.6% of firms on NYSE, AMEX, and NASDAQ pay dividends. In the years following, the proportion of firms paying dividends decreases steadily, reaching 22.6% in 2000.

The generally accepted rationale behind this drop in firms paying dividends is attributed to a fundamental change in firm characteristics for publicly traded companies from 1962-2010. Fama and French examine whether three main firm-specific factors, size, investment opportunity, and profitability, can predict whether firms decide to institute dividends. Using

1963-1977 as a base period for logit regressions, Fama and French predict proportions of dividend payers from 1978 onwards using their three factor firm characteristic model. However, their extrapolated proportion of dividend payers only partially explains the drop in payers; the error in the fit of this model is called the propensity to pay. It is measured as the remaining difference between their expected and actual proportions of payers. The existence of a significant propensity to pay therefore signifies that further research is needed to explore other factors causing firms to continue dropping dividends.

One market-based explanation attempting to answer this mystery is Baker and Wurgler's catering theory explaining existence of a "dividend premium" that the market values for firms who pay dividends. This premium is derives from investors' behavior; investors have time-varying preferences for equities of firms paying dividends at different points in time, which they express through a higher value on the price of the equity. Baker and Wurgler's theory, then, is that based on this measured market-wide dividend premium, firm managers "cater" their company's dividend policy to reflect and take advantage of this irrational behavior on investors' part. The dividend premium is calculated by taking the log difference between market-to-book ratios of payers compared to non-payers. This dividend premium statistic, they find, is directly correlated with the year-on-year change in the propensity to pay based on Fama and French's firm-specific model, explaining the time-varying change in propensity to pay and the reason for declining dividends.

We propose that Baker and Wurgler's catering theory of dividends is fundamentally flawed. Though it is likely that market to book ratios of payers versus non-payers are correlated with changes in propensity to pay, this by no means proves causality between the two statistics. In addition, the concept behind a "dividend premium" is one based on investor irrationality; no attempt is made to explain the trends in the dividend premium, and their conclusion simply explains the puzzle of disappearing dividends using the puzzle of time-varying dividend premiums.

The remainder of the paper will be structured as follows; we will first discuss the current literature on dividends in section II. Then, we will elaborate on our methodology for selecting our sample of firms in section III. Afterwards, in section IV, we give the results from our test of the catering theory with an extended sample period, different derivations of the dividend premium, and subsamples of firms divided by industry. We follow with a discussion of the results and its implications in section V, and conclude in section VI.

II. Literature Review

The literature on dividends is extensive. Dividends are an important way of returning value to investors, and Lintner (1956) first explored a firm's dividend payout decision and how it changed. Firms set dividend payouts as a ratio of their net earnings; this is because earnings are the most effective and convincing measure of a firm's ability to pay dividends. However, Lintner finds that most firms do not set dividend payouts; instead, they set changes in dividend payouts according to an ideal payout ratio. According to Lintner's model, the change in dividend payouts year to year is a function of the difference between the firm's target dividend payout and its current dividend payout. One consequence of this model is that dividends become "sticky". Management becomes reluctant to make dividend changes that will be reversed in the short term, because stockholder reaction to cutting dividends is very negative.

Lintner's findings explain dividend policy for firms who pay dividends. However, the question of why firms pay dividends still remains. Miller and Modigliani (1961) show that investors are theoretically dividend-agnostic. Given a choice between similar firms with differing dividend policies, disregarding external factors such as transaction costs and taxation, investors should value the firms equally. The reason why firms even pay dividends in the first place was further explored by Black (1976). Given that capital gains were taxed advantageously compared to dividends at that time, Black concluded that rationally, stockholders should prefer firms with smaller or no dividends. Firms paying dividends would lose financial flexibility when faced with investment opportunities; yet firms still pay dividends, even when cutting them is a low-cost way to make money. Black first proposes the idea of investor demand for dividend paying stocks in his paper, but does not empirically test the theory. Instead, he concludes that current literature still does not have a good reason as for why firms pay dividends.

Literature examining dividends and their effects on daily returns by Asquith and Mullins (1983) found dividends to be a reliable means of communication between management and stockholders. They showed that firms signaled profitability and positive outlooks with dividend announcement and share repurchases. Other means of communication such as earnings forecasts, financial statements, or management statements do not have the credibility of being backed by cash flows to investors. Signaling thus explains the prevalence of dividends in modern corporate finance; stockholders face information asymmetry in their investments, and dividends are a reliable, simple, and conspicuous way for management to communicate ample cash flow and profitability. In addition, the regular frequency of dividends speaks to management's confidence in their ability to fund future payouts.

Fama and French (2001) revisit the dividend issue and find that fewer firms pay dividends today than in the past. In looking at characteristics of dividend payers and non-payers, they find that payers are larger, have higher profitability measures, and have lower growth opportunities than dividend non-payers. They used aggregate earnings before interest to assets ratio and aggregate common stock earnings over book equity to compare profitability, R&D expenditures, market to book value of assets, and year by year asset growth to approximate growth opportunities, and book and market values of assets and common stock to compare size. Taking these observations from payers and non-payers in their sample from 1962-1977 as a control period for a logit regression, Fama and French predict the probability of a firm paying dividends given its current size, profitability, and growth opportunities for firms in their experimental period (1978-2000). They find that changing firm characteristics do not completely explain the decline in dividends seen after 1978. Firms that, according to their model, should pay dividends, do not, giving rise to a propensity to pay factor that accounts for the remaining discrepancy in dividend payer proportions.

The presence of an omitted variable could be the reason behind Fama and French 's failure to predict the drop in the proportion of firms paying dividends from 1978-1998. In their wake, other papers have tried coming up with both firm-specific and market-specific factors explaining the cause of the decrease in propensity to pay. Notable among them is Baker and Wurgler's (2003) paper mentioned above, which postulates the existence of the time-varying investor demand for firms that pay dividends, what they call the dividend premium, and the firm's decision to set a dividend policy to cater to this premium. Baker and Wurgler explore several stock market-based measures of dividend premium, such as the difference in log prices of Citizens Utilities cash dividend and stock dividend shares; the cumulative abnormal return for a three-day window around the firm's first dividend declaration date, thereby measuring the announcement effect of initiating a dividend; and the difference between future returns of indices of payers and non-payers. Ultimately, Baker and Wurgler use difference between logs of average market to book ratios of payers and non-payers as their measure dividend premium, and find that this measure is correlated with a firm's propensity to initiate dividends. In a following paper, Baker and Wurgler (2004) find that the dividend premium is correlated closely with the year-on-year derivative with respect to time of the propensity to pay.

While Baker and Wurgler take the approach that a market-specific factor is causing the change in propensity to pay, another paper by DeAngelo and DeAngelo (2006) proposes another time-varying firm characteristic that is markedly different for payers versus non-payers. They find that firms with a higher earned versus contributed capital mix, measured as the ratio of retained earnings versus total equity or total assets are more likely to pay dividends, as those said firms are more likely to be in their mature phase, self-financing with sizeable profits, and therefore financially stable enough to pay dividends. DeAngelo and DeAngelo add their capital mix factor to Fama and French's logit regression using the original three firm factors distinguishing dividend payers from non-payers: size, profitability, and growth opportunities, Replicating Fama and French's logit regression with the addition of capital mix, DeAngelo and DeAngelo predict the probability of a firm paying dividends given its current size, profitability, growth opportunities, and capital mix for firms in their experimental period (1978-2000). However, while controlling for changes in firm's earned versus contributed capital mix, they find an even higher reduction in a firm's propensity to pay than Fama and French found. In other words, there are a large number of firms in recent years whose high earned capital mix (proxied by positive retained earnings to total earnings ratio) identify them as mature firms; however, puzzlingly they fail to pay dividends. This is the root of the "disappearing dividends" phenomenon that Fama and French first discovered.

Another market-specific factor that may affect dividends is the dividend tax itself. Traditionally, capital allocated towards equity could go towards reinvestment, share repurchases, or dividends, resulting in either capital gains on the firm's stock price, or dividends distributed to equity holders. However, the two increases in value to investors are taxed at different rates (dividends taxed at income, while capital gains are taxed more favorably) during our sample period. A paper by Chetty and Saez (2005) examines the change in dividend payout policy after the 2003 tax cuts setting dividend income tax rates equal to capital gains rates, finding an increase in dividend initiations and amounts after the tax cuts. In addition they also examined equity ownership of firms, finding higher rates of dividend initiations among firms whose ownerships would be more acutely affected by the tax changes. Firms with high levels of executive ownership as opposed to executive options holdings, and firms controlled by taxable institutions compared to those controlled by tax-exempt institutions, experienced a stronger response to the tax cut.

III. Data Description

We follow the methodology of Fama and French (2001) (FF henceforth) and Baker and Wurgler (2004a and 2004b) (BW henceforth). We amend their approach slightly due to changes in data availability since their papers were written and to improve sample accuracy. The key passage from FF reads:

"The COMPUSTAT sample for calendar year t... includes those firms with fiscal year ends in t that have the following data (COMPUSTAT data items in parentheses): Total assets (6), stock price (199) and shares outstanding (25) at the end of the fiscal year, income before extraordinary items (18), interest expense (15), [cash] dividends per share by ex-date (26), preferred dividends (19), and (a) preferred stock liquidating value (10), (b) preferred stock redemption value (56), or (c) preferred stock carrying value (130). Firms must also have (a) stockholder's equity (216), (b) liabilities (181), or (c) common equity (60) and preferred stock par value (130). Total assets must be available in years t and t - 1. The other items must be available in t ... We exclude firms with book equity below $250,000 or assets below $500,000. To ensure that firms are publicly traded, the COMPUSTAT sample includes only firms with CRSP share codes of 10 or 11, and we use only the fiscal years a firm is in the CRSP database at its fiscal year end ... We exclude utilities (SIC codes 4900 to 4949) and financial firms (SIC codes 6000 to 6999)."

Thus, our data comes from two sources: Compustat and CRSP. Since we use a longer time period (1963 to 2009) the data is slightly different to that used in preceding papers. FF use data from the period from 1963-1998, while BW use data from the period 1963-2000. In 2007 Compustat changed its database from what is now called Legacy to Xpressfeed. In 2007 CRSP also changed the method of linking the two databases. While CRSP and Compustat both use CUSIPS to identify companies and securities, they also establish permanent identifiers since CUSIPS change over time: Compustat uses GVKEY as a permanent company identifier, while CRSP uses PERMNO as a permanent security identifier. Unfortunately, the matching between

GVKEY and PERMNO is not one-to-one. There are three matching problems using GVKEY and PERMNO.

The first matching problem is that a GVKEY can have more than one set of data in Compustat in a calendar year. This occurs when a firm changes its fiscal year. In that calendar year Compustat lists data from both the old fiscal year and the new fiscal year separately under the same GVKEY. The second matching problem is that some PERMNOs (i.e. securities) are matched to more than one GVKEY in a calendar year. This occurs because of a merger between two companies (and thus two GVKEYS). A given PERMNO may match to one firm's GVKEY prior to the merger, but match to the merged firm's GVKEY post-merger. The third matching problem is that some GVKEYs are matched to more than one PERMNO in a calendar year. This occurs when a company has dual class shares and thus two PERMNOs for the same GVKEY. We deal with each case in turn.

The first matching problem is when more than one set of data exists in Compustat under the same GVKEY in a calendar year. This is generally due to firms changing their fiscal year end and reporting twice in a calendar year. We use the data from the later reporting date in these cases. The second matching problem is that some PERMNOs (i.e. securities) are matched by the table to more than one GVKEY (i.e. firm) in a calendar year. This arises from using the current link table, which matches PERMNOs to GVKEYs, provided by CRSP, and is usually caused by a merger between two firms. We hand code these cases, keeping the PERMNO observation which matches the share price associated with the GVKEY. If security prices are missing we keep the PERMNO that matches the number of shares outstanding. Finally, we consider cases where some GVKEYs are matched to more than one PERMNO in a calendar year. This is generally due to the existence of dual class shares for these companies. We keep the dividend paying class of stock when there is only one class that pays dividends. If there is more than one class that pays dividends, or if no class pays dividends we keep the class with highest total trading volume over the sample period in which we observe dual class shares. After these three adjustments, our final database has unique PERMNOs and GVKEYs in each calendar year.

In addition to using the new Compustat Xpressfeed database and the new CRSP-Compustat link table, we supplement the FF data in three ways. First, FF and BW use share prices from Compustat only. This causes FF and BW to drop firms with missing Compustat closing price at fiscal year-end. In addition, sometimes CRSP and Compustat have different fiscal year end prices. In both these instances we use the CRSP prices, allowing us to include some firms that they drop.

Second, FF drop firms with missing "cash dividends per share by ex-date fiscal" (i.e. cash dividends) in Compustat. We replace all the Compustat dividend data with dividend data from CRSP both because of greater data availability and because CRSP dividends are more disaggregated. In CRSP, dividends with distribution codes below 1500 are cash dividends (non-liquidating), while those with distribution codes above 2000 are liquidating dividends. Compustat combines these two categories of dividends to get a total dividend, sometimes resulting in significant differences with CRSP cash dividends. Since dividends are a binary variable (payer or non-payer), in FF and BW, we use only CRSP dividends with codes below 1500. That is, we define a dividend payer as a firm that pays a cash dividend. If a firm only pays a liquidating dividend in a given year, we classify them as a non-payer.

Finally, FF and BW drop firms with missing common shares outstanding and missing preferred stock (constructed as in the FF extract above). Occasionally these items are missing for only a single year. If the data is available in Compustat in both the prior and following year and if the values are equal, we fill in the missing observation with that value.

After these criteria, we have a sample of firms with data from both CRSP and Compustat, as well as a unique identifier for each firm that we can use to join by and keep track of firms across time. Our sample is an improvement upon BW and FF's sample in several ways; firstly, our data is more reliable in the fact that we use CRSP data over Compustat data for share prices and dividends. Next, our data sample is more accurate due to our identification and elimination of duplicate GVKEY's, PERMNOs, dual-class stocks, and tracking stocks. Finally, our sample uses the updated version of Compustat Xpressfeed, which at the time of BW and FF's publications had not come out yet.

IV. Results

Time Trends in Dividend and Non-Dividend Paying Firms

Table 1 reports the number of dividend paying and non-dividend paying firms on CRSP by year from 1963-2009. The CRSP database contains AMEX and NYSE exchange-listed stocks from 1963 onwards; NASDAQ exchange-listed stocks are added in 1973. Within each category, dividend or non-dividend paying, we further divide our sample into Continuing, Switching, and New Listing. Continuing dividend-paying firms are those that pay dividends the prior year as well, continuing non-dividend paying firms are those that did not pay dividends the prior year. Switching firms are those that change their dividend-paying status from one year to the next, i.e. from a payer to a non-payer, or from a non-payer to a payer. Newly listed are firms that did not exist in our filtered CRSP database in the prior year. For example, in 1972, when NASDAQ firms first became part of the CRSP database, there are 2,247 total firms, 1,337 dividend payers and 910 non-dividend payers. Of the 1,337 dividend payers, 1,006 are continuing, which means they all paid dividends in 1971 as well. Another 52 switched dividend paying status, that is, they were in the CRSP database in 1971 but were non-dividend payers. Finally, 279 firms are newly listed, which means they were not in the CRSP database in 1971, but were dividend paying stocks when they entered in 1972. The comparable numbers for the 910 non-dividend payers, in columns 7-10 are 603 continuing, 56 switching, and 251 newly listed. Columns 6 and 11 give the percentage of payers and nonpayers respectively in each year.

The total number of firms in our sample increases from 755 firms in 1963 until a peak of 4,993 in 1996. From 1996 to 2009, the number of firms decreases monotonically, dropping to 2,688 firms in 2009. While the total number of firms increases, the total number of dividend payers increases steadily until 1977, going from an initial 653 dividend payers to a maximum of 2,073 payers. After 1977, the number of payers drops steadily until 2000, where it levels off and remains relatively stable around 800-900 firms. The large drop in the proportion of dividend payers from 1978 to 2000, sometimes called "disappearing dividends" trend can therefore be explained by firstly an increase in the total number of firms listed on the three exchanges, AMEX, NYSE, and NASDAQ, as well as a decrease in the number of dividend payers on those exchanges.

The trends in continuing, switching, and newly listed payers and nonpayers give further insight into the cause of the disappearing dividend phenomenon. The number of switching payers and nonpayers remains relatively small for our entire sample period, presumably because of the costs associated with the signaling from deviating from an existing dividend policy. However, our number of newly listed nonpayers rises from 26 in 1963 to a peak of 714 in 1996 and decreases afterwards to 95 in 2008. We compare this to the number of newly listed payers, which has been less than 100 for our entire sample with the exception of the years 1972, 1973, and 1975 (due to the inclusion of NASDAQ firms). Therefore, the disappearing dividend phenomenon is due to the large numbers of firms that list as nonpayers, as opposed to existing payers dropping their dividend policies.

Figure 1 compares the number of firms in our sample to the number of firms that Baker Wurgler find in their respective samples as a check of the accuracy of our replication. In comparing the total number of firms in our sample (payers and nonpayers combined), we have consistently more firms than Baker-Wurgler for their entire sample period. We believe this difference is due to our use of the Xpressfeed Compustat data file, and Baker-Wurgler's use of the legacy Compustat data. In addition, in obtaining firm-level annual data, we combine both CRSP and Compustat data in order to find another source of information for line items, which Baker-Wurgler do not do. This is a likely cause for our increased sample size. Our sample size is larger compared to Fama-French for the time period from 1977-1993. Afterwards, their total number of firms overtakes ours.

An important derived variable from our payer and nonpayer sample sizes is the dividend paying percentage of firms in our sample, which we show in Figure 2. Later in our regressions, our dependent variables are not calculated as absolute numbers of payers; instead, we predict payer percentages. This is our motivation for comparing differences between our, Fama-French's, and Baker-Wurgler's payer percentage for our sample period. Fama-French only give payer percentages for the period 1977-1998, which we match to within an average of 1.2% over the period 1978-1998. Baker-Wurgler's paying percentages match to ours within an average of

0.7% over the period 1966-2000. However, within the first three years of our sample from 1963-1965, we differ from Baker-Wurgler's paying percentage by almost 10%. This is motivated by a significant change in stock price data stored in Compustat for firms before 1966, giving us a different sample from Baker-Wurgler for those years.

Characteristics of Dividend Payers and Nonpayers

We can draw general conclusions about the types of firms that pay dividends and those that do not by looking at the value-weighted average of financial ratios of payers and non-payers. We examine ratios that proxy for firm profitability, investment opportunity, and size. Profitable firms usually have more cash flow available for equity, which can be returned to shareholders through either share buybacks or dividends. Thus, we expect to see more profitable firms paying dividends, a fact that we observe throughout our sample period. On the other hand, availability of investment opportunities diverts cash flow away from shareholders; if a firm is pouring money into growth opportunities, it will consequently have less cash flow available for equity. Finally, firms that are larger are usually older and more established; they have ample assets and cash reserves to initiate and continue dividends compared with firms that are smaller and newer.

Profitability

Dividend payers are, on the whole, more profitable than non-payers. Firms that pay dividends usually produce ample free cash flows in order to fund the dividend payments and keep financial slack. To see if this assumption holds, we can compare profitability by using the earnings-to-assets (E_t/A_t) and common-stock earnings to book equity (Y_t/BE_t) ratio. The definitions for the variables are as follows:

$$E_t/A_t = \frac{Earnings\ before\ Extraordinary\ Items + Interest\ Expense + I/S\ Deferred\ Taxes}{Book\ Assets}$$

$$Y_t/BE_t = \frac{Earnings\ before\ Extraordinary\ Items - Preferred\ Dividends + I/S\ Deferred\ Taxes}{Book\ Equity}$$

We calculate value-weighted averages of E_t/A_t and Y_t/BE_t for payers and non-payers separately for each year in our time period from 1963-2009. In Table 2a, we examine the value-weighted averages of E_t/A_t and Y_t/BE_t. Profitability increases in the first half of our period from 1963 to around 1980; during this period, E_t/A_t rises from 8.1% to 10.4% for payers, and from 5.2% to 8.1% for non-payers. Similarly, Y_t/BE_t rises from 11.5% to 15.7% for payers and from 7.3% to 12.4% for non-payers. Afterwards, from around 1980 to 2009, we observe a decrease in profitability; E_t/A_t drops to a minimum of 4.9% for payers and -0.9% for non-payers in 2001. Likewise, Y_t/BE_t plummets to a low of 8.2% in 2001 for payers, and -6.0% in 2000 for non-payers. The average E_t/A_t over our entire period for payers is 7.9%, compared to an average of 4.8% for non-payers, and the average Y_t/BE_t for payers is 12.9%, compared to an average of 4.9% for non-payers.

Investment Opportunities

Firms that make a decision to pay dividends have chosen to return capital to shareholders, instead of investing in growth opportunities. In the same vein, firms that do not pay dividends believe that there are positive NPV investments that they should be allocating capital to instead.

Therefore, we expect to see high measures of investment opportunities for non-payers. One proxy for investment opportunity is asset growth rate, or dA_t/A_t, as one of the primary drivers of asset growth is the availability of investment opportunities. Another measure of growth opportunities is the market-to-book ratio, or V_t/A_t. The dA_t/A_t and V_t/A_t are calculated as follows:

$$dA_t/A_t = \frac{Book\ Assets_t - Book\ Assets_{t-1}}{Book\ Assets}$$

$$V_t/A_t = \frac{Book\ Assets - Book\ Equity + Market\ Equity}{Book\ Assets}$$

Table 2a shows value-weighted averages of dA_t/A_t for both payers and non-payers. Non-payers experience average asset growth rates of 11.4% for our sample period, while payers only experience asset growth rates of 8.0% for the same period. In addition, the standard deviation of dA_t/A_t for non-payers is 6.6%, twice that of payers, which is 3.5%. This is because nonpaying firms generally comprise a more variable mix of firms; though their total assets do grow faster during times of economic expansion, their financial stability during times of economic recession cause their dA_t/A_t to have more variation. We also report V_t/A_t for both payers and non-payers in Table 2a. We observe a steadily increasing trend in V_t/A_t for our sample size between the years of 1974 and 1999; the V_t/A_t of payers increases from 1.00 to 2.07 over the time period from 1974 to 1999, while the V_t/A_t of non-payers increases from 0.89 to 2.43 for the same period. We suspect that this 26-year increasing trend is not completely caused by a corresponding increase in investment opportunity for firms in our sample from 1973 to 1999, making V_t/A_t an inaccurate proxy for profitability.

Size

Dividend payers are, on average, larger than non-payers. Table 2a gives total assets at fiscal year-end for dividend payers and non-payers. In 1963, at the beginning of our period, the total assets of payers are 4.3 times larger than those of non-payers. Aside from a brief dip in 1972 owing to the inclusion of all NASDAQ-listed firms, total assets have been growing relatively steadily for both payers and non-payers. However, the spread between payers and non-payers has grown larger; for example, in 2009, the total assets of payers are 6.9 times as large as average total assets of non-payers.

Annual Logit Regressions of Dividend Payment

We observe three main factors in deciding whether a firm pays dividends: profitability, availability of investment opportunities, and size. Though the effect of these factors on the decision to pay dividends has been confirmed by looking at summary statistics, we can further quantitatively measure the effect each of these factors have on a firm's decision to pay dividends over our sample period by running a logit regression. Our regression will solve for our dependent variable (whether a firm pays dividends or not), and calculate coefficients for our independent variables (profitability, investment opportunity, and size). Our proxy for profitability will be earnings to assets ratio (Et/At), our proxy for investment opportunity will be change in total assets over each year (dAt/At), as well as market to book ratio (Vt/At), and our proxy for size will be the percentage of NYSE-listed firms with equal or smaller market capitalizations than our target firm (NYPt). Our equation for calculating the percentage a firm pays dividends is given by:

$$div(firm_t^i) = \frac{e^z}{e^z + 1}$$

$$z_{M/B} = Int + \beta_1(NYP_t) + \beta_2(V_t/A_t) + \beta_3(dA_t/A_t) + \beta_4(E_t/A_t)$$

$$z_{No\ M/B} = Int + \beta_1(NYP_t) + \beta_2(dA_t/A_t) + \beta_3(E_t/A_t)$$

where $firm_t^i$ represents firm *i* in our sample in year *t*, and the $div(firm)$ function returns a 1 if the firm pays dividends in that year, and a 0 if the firm does not.

We run two versions of the logit regression explaining dividend payment; one that uses both Vt/At and dAt/At to proxy investment opportunity, and one that uses only dAt/At. Fama-French use both regressions, citing the possibility that Vt/At is a somewhat questionable proxy for investment opportunity. Ideally, the explanatory variables of the logit regression should be firm characteristics, and changes in these variables should be caused by fundamental changes in the nature of the firms themselves. However, according to asset pricing theory, increases in market to book ratio could be due to increasing profitability of current assets, increasing profitability or availability of investments, or lower discount rates for future cash flows. Therefore, as Vt/At is comprised of both firm-level and market-level factors, a change in Vt/At therefore could be predicated by a change in the underlying investment opportunities available for the firm, or a change in the discount rate. As a result, we run two logit regressions, one with Vt/At and one without.

Table 3 examines trends in the coefficients over our time period. We find that the explanatory coefficients seem to experience a regime change during our sample period in the year 1978. This change is particularly conspicuous for the coefficient for E_t/A_t. Examining our regression with Vt/At as an explanatory factor, we observe a large decrease in the explanatory power of Et/At from 1963 to 2009; in the beginning of our sample period from 1963-1967, the coefficient for Et/At is 19.3. The Et/At coefficient then experiences a sharp decline until 1978-1982, dropping to 8.53 for that five-year period and staying relatively constant until the end of our sample period. In addition, we observe a similar but proportionally smaller trend in our regression omitting Vt/At as an explanatory variable; the five-year average of the Et/At coefficient at the beginning of our sample period is 14.02, and the five-year average of the Et/At coefficient drops to 5.83 for the years 1978-1982, where it remains relatively constant thereafter. The regime change is not as noticeable in other coefficients. For the most part, coefficients implying a negative correlation remain negative for our entire period, and coefficients implying a positive correlation remain positive for our entire period. One exception is the coefficient for dAt/At, which becomes slightly positive during the years 1975-1978, but remains negative for the rest of the sample period from 1979-2009.

Fama-French give their coefficients found from running both logit regressions on their samples for the years 1963-1998. However, because they only give five-year averages, we cannot compare our coefficients on a one-to-one basis with theirs. Figure 3 shows that Fama-French's coefficients seem to follow the same general trend that we have observed in our coefficients. Their Et/At coefficient decreases steadily until 1978 like ours, where it remains relatively constant until the end of their sample period in1998. The other coefficients track ours closely, giving us confidence in our replication of their results.

Predictive Logit Regression

With the coefficients from the logit regression describing how our explanatory variables affect a firm's decision to pay dividends, we can test how well changing firm characteristics in size, investment opportunity, and profitability affect dividend payout policy over our sample period from 1963-2009. Fama-French use a control period, 1963-1977, to "train" their logit coefficients; they average each coefficient for each of the 15 years in the control period, and apply those coefficients to the rest of their sample period from 1978 onwards. Our equation for calculating expected payer percentages is as follows:

$$actual_t - expected_t = PTP_t$$

$$expected_t = \sum_{i=1}^{n_t} \frac{logit(firm_t^i)}{n_t}$$

$$logit(firm_t^i) = \frac{e^z}{e^z + 1}$$

$$z_{M/B} = Int + \beta_1(NYP_t^i) + \beta_2(V_t^i/A_t^i) + \beta_3(dA_t^i/A_t^i) + \beta_4(E_t^i/A_t^i)$$

$$z_{No\ M/B} = Int + \beta_1(NYP_t^i) + \beta_2(dA_t^i/A_t^i) + \beta_3(E_t^i/A_t^i)$$

where $firm_t^i$ represents firm i in our sample in year t; NYP_t^i, V_t^i, A_t^i, dA_t^i, and E_t^i represent the corresponding line items from firm i in our sample in year t; and the $logit(firm_t^i)$ function returns a value $(0,1)$ representing the probability that firm i will pay dividends in year t. The propensity to pay, or PTP, represents the unexplained error between the expected number of payers, which controls for changing firm characteristics, and the actual number of payers.

There are four distinct and consecutive trends in the propensity to pay over our sample period. The first trend is one of decreasing PTP from 1963-1973; afterwards, we see a short increase in PTP from 1974-1978; following that is a long decrease in PTP from 1979-2002, where the PTP drops from close to 0% to -25% in our regression with Vt/At, and -35% in our regression without. The final trend is one of a slowly increasing PTP from 2002 onwards; PTP increases to a maximum of -22% in our regression with Vt/At, and -28% in our regression without. When our PTP is graphed alongside Baker-Wurgler's and Fama-French's, we find that for the regression with Vt/At, on average, we differ from Fama-French by 2.5%, and from Baker-Wurgler by 1.3%. For the regression without Vt/At, on average, we differ from Fama-French by 2.4%, and from Baker-Wurgler by 1.4%. Later in the paper, we derive the change in PTP year over year, a dependent variable in Baker-Wurgler's catering theory model. Therefore, we also show our change in PTP alongside Fama-French's and Baker-Wurgler's.

Dividend Premium

The dividend premium is a proxy for the variations in market prices between firms with comparable investment strategies and differing dividend strategies. This difference is caused by time-varying uninformed demand for firms that pay dividends. Building on this concept, we follow Baker Wurgler's calculation for the dividend premium. We take the difference between the logs of the average market-to-book ratios of dividend payers and non-payers as a measure of the difference in the market's uninformed demand for payers. We use the logs of the market-to-book ratios because the ratios are on average approximately log-normally distributed, giving a standardized measure of the dividend premium that is comparable across our time-series. We follow Fama and French (2001)'s calculation of market-to-book ratio, with one exception; market equity is calculated as the closing stock price at the calendar year end multiplied by total shares outstanding. Book equity calculated as described above in the "Data and Variable Definitions" section. The market-to-book ratio is defined as follows:

$$Market\ to\ Book\ Ratio = \frac{Book\ Assets - Book\ Equity + Market\ Equity_{Calendar\ YE}}{Book\ Assets}$$

The market-to-book ratios are calculated using the equation above, and we obtain both equal-weighted and value-weighted (by book assets) averages for all the payers and non-payers in our sample in a calendar year. We obtain the equal-weighted and value-weighted dividend from taking the difference of the logs of these averages.

If we assume Baker Wurgler's theory behind the dividend premium is correct, we should be able to get a sense for relative levels of uninformed demand for dividend paying stocks from 1963 to 2009. We can do this by examining trends in our dividend premium measurements as shown in Table 4. In the first few years of our sample from 1963-1966, dividend payers are priced at a premium compared to non-payers. This is reversed for three years from 1967-1969, where the value-weighted dividend premium dips to a low of -29.4%, showing that the uninformed demand for payers dropped and the uninformed demand for non-payers rose. From

1970 until 1977, the dividend premium rises again, favoring payers. Afterwards, from 1978 to 1996, the dividend premium experiences a sharp fall and remains negative for the entire time. The dividend premium experiences a sharp dip in 1999, possibly due to the technology-focused bubble valuing internet startups, most of whom did not pay dividends, more favorably. Baker Wurgler end their dividend premium calculation at 2000, but we are able to expand the sample period, increasing it from 2000 to 2009. During this period, the equal-weighted dividend premium is negative, favoring non-payers, while the value-weighted dividend premium is changes between positive and negative. Examining the difference between our equal-weighted and value-weighted averages, we find that on average, the value-weighted dividend premium is 20.8% higher than the equal-weighted dividend premium, favoring payers more than non-payers. In other words, investors value dividends more positively for larger companies, which fit the model given by our regression coefficients.

Explanatory Regression

Following Baker and Wurgler (BW) we run a regression of the change in the propensity to pay variable on the lagged dividend premium. BW use two versions of the left-hand-side variable (propensity to pay). The first is constructed using the logit coefficients from a specification including market-to-book, while the second omits market-to-book. However, BW only use the **book** value-weighted dividend premium, calculated using the **calendar** year-end market equity over the fiscal year-end book equity, as the explanatory variable. Moreover, they run two specifications of the regression of change in propensity to pay on the dividend premium;

one includes a dummy variable for the Nixon price and wage controls in the three years from 1972-1974, the other does not. The specifications are as follows:

$$\Delta PTP_t = a + b * div\ premium_{t-1} + c * Nixon_t + v_t$$

$$\Delta PTP_t = a + b * div\ premium_{t-1} + v_t$$

Because BW's choice of dividend premium seems arbitrary, we test all possible combinations of the dividend premium for both the univariate regression (without the Nixon dummy) and the bivariate regression (with the Nixon dummy), as well as using both versions of the propensity to pay variable. There are two key dimensions along which the above regressions can vary. Firstly, on how to weight the market-to-book values that make up the dividend premium (equal weighted, book-value weighted or market-value weighted), and secondly, on when the market equity is measured (at fiscal year-end or calendar year-end). We therefore have a total of six dividend premium variables – one of which is the book-value weighted calendar year-end dividend premium that BW use, and five alternate formulations.

BW run their regressions on two time periods: 1963-1977, and 1963-2000. Their strongest result comes from the bivariate regression using both the dividend premium and the Nixon dummy to explain the change in propensity to pay based on the Fama French model including market-to-book. For this they report a coefficient of 1.53 (t-statistic of 4.8) on the dividend premium explanatory variable. Without the Nixon variable, both the economic and statistical significance of the coefficient drops; they report a coefficient of 1.04 (t-statistic of 2.4) on the univariate regression. When BW use the Fama French model without market-to-book, they get coefficients on the dividend premium of 1.22 (t-statistic of 3.1) and 1.15 (t-statistic of 3.2) for the bivariate and univariate regressions respectively.

We first examine our regression results using the Fama-French model without market-to-book, as this model does not suffer from an inconsistent interpretation of the market-to-book variable. The inconsistency derives from the Fama French using market-to-book as a proxy for investment opportunity in their logit regressions, and BW using market-to-book later in their dividend premium calculation as a measure of time varying investor demand for dividends. Because of this, we therefore place more emphasis on results using Fama-French's model excluding market-to-book so that it is interpreted as a measure of investor demand.

Table 5a shows regression results from 1963-1977. We find a coefficient of 1.02 (t-statistic of 2.476) using a book-value weighted calendar year-end derived dividend premium. This is comparable to BW's derivation of their dividend premium and to their coefficient of 1.23 (t-statistic of 5.7). Using different versions of the dividend premium, we get coefficients with lower economic and statistical significance. With a book-value weighted fiscal year-end dividend premium, we find a coefficient of 0.7165 (t-statistic of 2.142). When weighted with market-value, we find coefficients of 0.7916 (t-statistic of 3.377) and 0.292 (t-statistic of 0.822) for a calendar year-end and fiscal year-end derived dividend premium, respectively.

Examining the time period 1963-2000, we find a coefficient of 0.8145 (t-statistic of 1.891) using a book-value weighted calendar year-end dividend premium, compared to BW's coefficient of 1.15 (t-statistic of 3.2). However, using the other derivations of the dividend premium, we find statistically insignificant coefficients of 0.6604, 0.5209, and 0.3493 for the book-value weighted fiscal, market-value weighted calendar, and market-value weighted fiscal year-end dividend premium. When we include our extended sample period, running a regression on the years from 1963-2009, we find results that are weaker still, and our fit worsens. Our regression using a book-value weighted calendar year-end derived dividend premium, comparable to BW's derivation, yields a coefficient of 0.6638 (t-statistic of 1.769). The R-squared decreases from 12.3% for 1963-2000 to 8.7% for 1963-2009. Adding the years 2001-2009 to BW's model gives smaller economic and statistical significance. Statistically insignificant coefficients of 0.4831, 0.3606, and 0.1595 were obtained for 1963-2009 using the book-value weighted fiscal, market-value weighted calendar, and market-value weighted fiscal year-end dividend premium.

We also run an out-of-sample test using the periods 1978-2000 and 1978-2009, which BW do not have results for. For the period from 1978-2000, we find that only the book value-weighted fiscal year-end dividend premium gives us a significant coefficient of 0.3079 (t-statistic of 1.895), and for the period from 1978-2009, we find no significant coefficients.

Adding the Nixon dummy variable to our regression gives larger coefficients. Table 5b shows regressions over the time period from 1963-1977, 1963-2000, and 1963-2009 for all of our dividend premium derivations. For the in-sample training period, we find coefficients of 01.1286 (t-statistic of 2.139) for the book value-weighted calendar year-end dividend premium, compared to BW's coefficient of 1.34 (t-statistic of 5.0). Likewise, we obtain a coefficient of 0.9021 (t-statistic of 1.835) for the book value-weighted calendar year-end dividend premium for the period 1963-2000, compared to BW's coefficient of 1.22 (t-statistic of 3.1). Once we include our extended sample, we see the same trend as before; the dividend premium coefficient drops in economic and statistical significance to 0.7511 (t-statistic of 1.816). Our fit also worsens from an R-squared of 13% for the time period 1963-2000 to 9.5% for 1963-2009.

Table 5d shows bivariate regression coefficients with the Nixon dummy for various sample periods using the Fama-French model including market-to-book. Including more factors in the Fama-French model increases the fit and the significance of the coefficients. For the period from 1963-1977, we find a coefficient of 1.7342 (t-statistic of 2.137) for the book-value weighted calendar year-end dividend premium, compared to BW's coefficient of 1.7 (t-statistic of 2.2). Furthermore, our result for the period from 1963-2000 for the book-value weighted calendar year-end dividend premium is 1.3089 (t-statistic of 3.019), compared to BW's result of 1.53 (t-statistic of 4.8). However, once we extend our sample period to 2009, our fit and significance drops; the regression for the book-value weighted calendar year-end dividend premium yields a coefficient of 1.1291 (t-statistic of 3.065). The R-squared drops from 16.7% for 1963-2000 to 14.9% for 1963-2009.

Overall, our results are consistent with BW's coefficients when we apply their exact methodology to calculating the dividend premium. However, extending the sample period from BW's of 1963-2000 to 2009 not only decreases the economic significance of our coefficients, but also worsens the fit of our regression. In addition, constructing the dividend premium differently, for example by using the fiscal year-end market equity value compared to the calendar year-end value, and market value-weighting instead of book value-weighting, all give coefficients with smaller economic and statistical significance.

We also divide our sample to test if the catering theory holds across subsections divided by various industries. If the dividend premium is truly a market-level measure of investor demand, firms across all industries should set their dividend policy to cater to this premium. We run the univariate version of the second-stage regression (omitting the Nixon dummy variable) for industries divided by their historical standard industry classifier, or SIC code over our training period 1963-1977, BW's sample period 1963-2000, and our extended sample period 1963-2009. Table 6 reports our coefficients for BW's second-stage regression using the dividend premium as calculated per BW's methodology (book value-weighted calendar year-end), and as calculated consistent with existing literature (market value-weighted fiscal year-end). The service and manufacturing industries have insignificant coefficients, showing no relationship between the dividend premium and the change in propensity to pay. Furthermore, firms in the mining industry actually show a negative correlation between the dividend premium and the propensity to pay. Using firms in the transport, wholesale trade, and retail trade industries yield varying levels of significance depending on the dividend premium methodology and the FF model used. Finally, when comparing the BW sample period to our extended sample period, we find that the fit in almost all cases decreases when we add 10 years of data to our sample.

V. Discussion

Concerns with the Catering Theory Model

BW's catering theory links market-level investor demand to firm-level dividend policy decisions. However, their methodology and proxies for inputs into their model are questionable. BW start by replicating Fama-French's paper on disappearing dividends. They use the Fama-French logit regression that describes dividend policy with firm-level factors, namely, size, investment opportunity, and profitability. Taking fitted coefficients from a training period of 1963-1977, Baker-Wurgler extrapolate predicted dividend paying percentages for the years

1978-2000. Herein lies our first concern; the Fama-French model uses a non-linear logit regression to examine the effects of size, investment opportunity, and profitability on firm-level dividend decisions. BW average the same non-linear coefficients for the training period and use this to extrapolate values for the rest of their sample period following the Fama-MacBeth (1973) procedure. However, because the model is non-linear, a simple arithmetic average of the coefficients does not accurately represent the effects of Fama-French's firm-level factors across the training period.

After extrapolating fitted dividend paying percentages across their sample period, BW use the change in their regression error term, the propensity to pay, as their dependent variable. This change is a function of the variation in the error term over time, and therefore assumes the Fama-French model that generates the error term is well specified. If the Fama-French model is misspecified, the error term will vary over time for reasons unrelated to any dividend decision. BW end up using the change in an error term as a dependent variable when they are not certain that the regression generating the error term is well specified. In addition, their model does not take into account the level of the dividend; it is about the change in the propensity to pay versus a dividend premium. The propensity to pay reflects all the other factors that make a firm a dividend payer or not, excluding size, asset growth, profitability, and MTB.

Furthermore, BW never examine a true out-of-sample test on their model. All their regressions testing the effect of the dividend premium on the change in propensity to pay include the original training period of 1963-1977. Figure 3 shows the coefficients for the Fama-French explanatory factors across our entire sample; we can see a structural break in the effect of profitability on dividend policy. For the Fama-French regression using market-to-book, the average coefficient for profitability from 1963-1977 is 15.67. For the out-of-sample period from

1978-2009, the average coefficient for profitability is 6.51. For the Fama-French regression without market-to-book, we see a similar trend; the average coefficient for profitability drops from 10.45 to 5.03 from the in-sample training period to the out-of-sample 1978-2009 period. If there is a structural break in our proxy for profitability, then we cannot use the 1963-1977 period as a training period. We are incorrectly assuming that earnings-to-assets will have a constant interpretation over our entire regression period.

Derivation of the Dividend Premium Variable

BW use a dividend premium calculated as the log difference between the market-to-book of dividend paying firms and non-dividend-paying firms. They weight market-to-book by book value of total assets. However, we run into an inconsistency in our interpretation of market-to-book, as the Fama-French dividend model already uses market-to-book as a proxy for investment opportunity. We will end up using market-to-book to reflect both a firm-level growth opportunity factor, as well as market-level investor behavioral preference. BW account for this inconsistency; they suggest excluding market-to-book from the Fama-French model. We report our regression results for both models, and we find that coefficients for the regression of the dividend premium on the change in propensity to pay yield more significant results when we include market-to-book.

Setting aside the inconsistent interpretation of the dividend premium, the BW's actual methodology used in the derivation of the dividend premium is suspect to questionable composition. BW use market value from calendar year end and book value from fiscal year-end to make the market-to-book variable for the dividend premium. However, they use market value at fiscal year-end to make the market-to-book variable in the Fama-French logit regressions. We therefore test their results with a dividend premium using market-to-book calculated at fiscal year-end, consistent with Fama-French's methodology and with the time period of the denominator of our market-to-book measurement. Our coefficients for regressions using fiscal year-end market to book unfailingly show that our fit worsens and both our economic and statistical significance falls.

Finally, BW average the dividend premium using a value-weighted technique. Using an equal-weighted average would expose the dividend premium to the market-to-book outlier values of smaller firms who would skew the average. Smaller firms would have market-to-books that were not representative of the larger sample; for example, in 1999, multiple small non-paying firms had market-to-book values higher than 100 because of the tech bubble. With an equal-weighted average, these small firms that had a negligible market capitalization compared to the larger non-dividend paying firms would be equal contributors to the dividend premium. As a result, BW use a value-weighted average; they weight using book total assets at fiscal year-end. This method is inaccurate; the balance sheet item book total assets is a purely accounting measure that is subject to capital structure. The preferred method of weighting is to use the market value of firms, which BW do not do. We run BW's second stage regression with both our book value-weighted and market value-weighted dividend premium, and we find that our coefficients for regressions using a market-weighted dividend premium give smaller economic and statistical significance.

The methodology that BW use is subject to many seemingly arbitrary decisions; each decision point that BW cross leads to a second-stage regression with higher economic significance and a better fit for the path that BW take. We test all other alternative formulations of the dividend premium that BW ignore. Our findings lead us to the conclusion that the catering theory effect is spurious, a random effect due to a seemingly coincidental time-series trend that BW happen to find. This trend disappears when we extend the sample period from BW's original 1963-2000 to 2009. It also disappears when we formulate the dividend premium using other methodologies. In addition, when we test the catering theory across industry cross-sections, we find that BW's model does not hold for several industries, namely, manufacturing, service, retail trade, and mining. However, if the dividend premium is supposedly representative of a market-wide investor sentiment, firm managers should uniformly cater to investor demand and industry should be irrelevant. The fact that we see differing results for differing industries implies an omitted firm-level characteristic in our specification of the Fama-French model of dividend payout.

VI. Conclusion

The disappearing dividends puzzle is one of the unsolved question s of corporate finance. Fama French first examine this phenomenon; they create a model of firm-level dividend policy dependent on size, profitability, and investment opportunities. However, their model is imperfect. Baker Wurgler attempt to improve this model; they explain the change in the error in FF's model as a function of a market-level investor demand, which they call the dividend premium. Though BW find significance in their model, we cannot accept their findings at face value for several reasons. We discover that their methodology is suspect, and their model holds neither for an extended sample, nor for a cross-sectional breakdown of firms by industry.

We have examined the BW model from three different angles. We have extended the sample on BW's terms following their original methodology and found that our fit worsens and economic significance decreases with an additional 10 years' worth of data. Next, we examined the BW model by industry and found varying results; for certain industries, the catering theory model holds, whereas for others, the model does not. This implies a misspecification in BW's model, as the dividend premium is defined as a market-level measure and managers should not interpret it differently across industries. Finally, we reformulate all differing variations of the dividend premium. We find that second-stage regression results with BW's methodology provide the strongest results, whereas the generally accepted derivation of the dividend premium yields results with less or no significance. Given our results, we cannot accept BW's catering theory of dividends.

Further opportunities for research include adding additional variables, both firm-level and market-level, to FF model. One possibility is DeAngelo and DeAngelo's measure of a firm's lifecycle, proxied by the mix of retained earnings in stockholders equity. Another variable we considered is the marginal tax rate on dividends relative to the rate on capital gains, which measures investors' tax-specific demand for dividends. Future work would measure if the disappearing dividend trend could be explained by these variables, instead of BW's dividend premium.

BW's catering theory of dividends has spawned an entire literature based on firms catering to irrational behavior in the form of time-varying trends of investor demand. Polk and Sapienza describe a catering theory where firms decide their level of investment based upon an irrational and time-varying market-level premium on investment. Rajgopal, Shivakumar, and Simpson formulate a catering theory based on a time-varying market-level demand for earnings surprises. As a result, firms manage earnings by increasing their propensity to use abnormal accruals. Greenwood and Hansen use a catering theory to explain equity issuances by firms; they claim time-varying investor demand for particular characteristics of firms leads to a stock premium, which firms take advantage of by issuing new equity. Though the empirical results of these papers might not be inaccurate, the underlying theory that their models are based on is, as we have shown, suspect. It is all too easy to find correlation between an empirical phenomenon and a proxy of irrational behavior. However, before such theories are accepted as fact, they must be thoroughly tested, lest they fall prey to the same mistakes that Baker and Wurgler made.

VII. Bibliography

Asquith, P., and D. Mullins. 1983. The Impact of Initiating Dividend Payments on Shareholders' Wealth. *Journal of Business* 56:77–96.

Baker, M., and J. Wurgler. 2004a. Appearing and Disappearing Dividends: The Link to Catering Incentives. *Journal of Financial Economics* 73:271–88.

Baker, M., and J. Wurgler. 2004b. A Catering Theory of Dividends. *Journal of Finance* 59:1125–165.

Black, F., and M. Scholes. 1974. The Effects of Dividend Yield and Dividend Policy on Common Stock Prices and Returns. *Journal of Financial Economics* 1:1-22

Chetty, R., and E. Saez. 2005. Dividend Taxes and Corporate Behavior: Evidence from the 2003 Tax Cut. *Quarterly Journal of Economics* 120:791–833.

DeAngelo, H., L. DeAngelo, and D. Skinner. 2004. Are Dividends Disappearing? Dividend Concentration and the Consolidation of Earnings. *Journal of Financial Economics* 72:425–56.

Fama, E., and K. French. 2001a. Disappearing Dividends: Changing Firm Characteristics or Lower Propensity to Pay? *Journal of Financial Economics* 60:3–44.

Hoberg, G., and N. Prabhala. 2009. Disappearing Dividends, Catering, and Risk. *Review of Financial Studies* 22:79-156.

Jensen, M. 1986. Agency Costs of Free Cash Flow, Corporate Finance, and Takeovers. *American Economic Review* 76:323–29.

Lintner, J. 1956. Distribution of Incomes of Corporations Among Dividends, Retained Earnings, and Taxes. *American Economic Review* 46:97–113.

Miller, M., and K. Rock. 1985. Dividend Policy under Asymmetric Information. *Journal of Finance* 40:1031-51.

Miller, M., and F. Modigliani. 1961. Dividend Policy, Growth, and the Valuation of Shares. *Journal of Business.* 34:411-33.

Table 1: Number of Dividend Payers and Non-Payers by Year

	SAMPLE	PAYERS					NON-PAYERS				
YEAR	TOTAL	TOTAL	Continue	Switch	New Lists	%Payers	TOTAL	Continue	Switch	New Lists	%Nonpayers
1963	755	653	547	14	92	86.5%	102	67	9	26	13.5%
1964	840	734	646	20	68	87.4%	106	79	10	17	12.6%
1965	944	820	712	25	83	86.9%	124	83	9	32	13.1%
1966	1,124	876	788	19	69	77.9%	248	104	10	134	22.1%
1967	1,237	937	861	12	64	75.7%	300	224	19	57	24.3%
1968	1,371	991	906	17	68	72.3%	380	274	22	84	27.7%
1969	1,526	1,067	963	28	76	69.9%	459	341	21	97	30.1%
1970	1,675	1,099	1,018	20	61	65.6%	576	435	53	88	34.4%
1971	1,751	1,079	1,008	26	45	61.6%	672	522	80	70	38.4%
1972	2,247	1,337	1,006	52	279	59.5%	910	603	56	251	40.5%
1973	2,874	1,658	1,296	108	254	57.7%	1,216	766	27	423	42.3%
1974	2,879	1,780	1,576	160	44	61.8%	1,099	977	40	82	38.2%
1975	3,123	1,895	1,662	129	104	60.7%	1,228	917	72	239	39.3%
1976	3,121	1,985	1,765	185	35	63.6%	1,136	985	64	87	36.4%
1977	3,071	2,073	1,865	172	36	67.5%	998	907	38	53	32.5%
1978	3,042	2,069	1,889	116	64	68.0%	973	811	57	105	32.0%
1979	3,094	1,999	1,887	82	30	64.6%	1,095	836	54	205	35.4%
1980	3,114	1,937	1,830	68	39	62.2%	1,177	937	70	170	37.8%
1981	3,271	1,810	1,714	55	41	55.3%	1,461	1,011	95	355	44.7%
1982	3,400	1,730	1,638	43	49	50.9%	1,670	1,269	86	315	49.1%
1983	3,603	1,620	1,542	46	32	45.0%	1,983	1,475	109	399	55.0%
1984	3,712	1,553	1,452	62	39	41.8%	2,159	1,689	53	417	58.2%
1985	3,666	1,490	1,387	71	32	40.6%	2,176	1,782	56	338	59.4%
1986	3,783	1,354	1,275	48	31	35.8%	2,429	1,874	91	464	64.2%
1987	3,985	1,291	1,186	69	36	32.4%	2,694	2,082	69	543	67.6%
1988	3,863	1,239	1,123	89	27	32.1%	2,624	2,239	61	324	67.9%
1989	3,706	1,208	1,090	91	27	32.6%	2,498	2,182	62	254	67.4%
1990	3,632	1,182	1,096	61	25	32.5%	2,450	2,129	61	260	67.5%
1991	3,704	1,152	1,084	54	14	31.1%	2,552	2,137	70	345	68.9%
1992	3,869	1,163	1,057	77	29	30.1%	2,706	2,188	70	448	69.9%
1993	4,238	1,166	1,072	66	28	27.5%	3,072	2,436	60	576	72.5%
1994	4,488	1,189	1,089	66	34	26.5%	3,299	2,725	57	517	73.5%
1995	4,629	1,188	1,096	71	21	25.7%	3,441	2,882	36	523	74.3%
1996	4,993	1,167	1,094	39	34	23.4%	3,826	3,064	48	714	76.6%
1997	4,955	1,111	1,043	42	26	22.4%	3,844	3,263	56	525	77.6%
1998	4,633	1,056	1,004	38	14	22.8%	3,577	3,166	32	379	77.2%
1999	4,378	989	936	31	22	22.6%	3,389	2,969	34	386	77.4%
2000	4,175	881	848	28	5	21.1%	3,294	2,821	54	419	78.9%
2001	3,632	808	773	27	8	22.2%	2,824	2,620	47	157	77.8%
2002	3,387	741	714	21	6	21.9%	2,646	2,468	54	124	78.1%
2003	3,236	797	697	93	7	24.6%	2,439	2,290	30	119	75.4%
2004	3,223	874	758	104	12	27.1%	2,349	2,134	23	192	72.9%
2005	3,129	905	812	77	16	28.9%	2,224	2,042	13	169	71.1%
2006	3,066	896	830	54	12	29.2%	2,170	1,949	28	193	70.8%
2007	3,033	861	796	57	8	28.4%	2,172	1,918	29	225	71.6%
2008	2,828	824	772	43	9	29.1%	2,004	1,864	34	106	70.9%
2009	2,688	739	707	28	4	27.5%	1,949	1,754	100	95	72.5%

Table 2: Coefficients of Logit Regression by Year

YEAR	REGRESSION W/ M/B					REGRESSION W/ M/B			
	INT	NYP	dAt/At	Et/At	Vt/At	INT	NYP	dAt/At	Et/At
1963	0.37	2.61	0.63	21.31	-0.67	0.00	2.14	0.08	16.85
1964	0.19	2.80	-2.08	22.97	-0.46	-0.10	2.53	-2.13	19.18
1965	0.50	3.24	0.16	13.72	-0.44	0.20	2.84	-0.07	10.71
1966	-0.40	4.25	-1.20	20.67	-0.75	-0.78	3.63	-1.24	14.29
1967	0.02	4.29	-1.74	18.24	-0.68	-0.41	3.59	-1.93	9.50
1968	0.22	3.78	-2.27	23.30	-0.80	-0.45	3.45	-2.67	11.61
1969	0.09	3.66	-3.54	17.85	-0.63	-0.23	3.09	-4.11	10.93
1970	-0.29	4.34	-1.49	13.31	-0.75	-0.77	3.69	-1.73	8.27
1971	-0.71	3.99	-1.74	11.85	-0.44	-0.98	3.55	-1.72	7.89
1972	-1.23	3.81	-1.91	19.70	-0.50	-1.28	3.11	-2.44	13.33
1973	-0.91	4.52	-1.43	12.77	-0.75	-1.08	3.50	-2.01	8.15
1974	-0.28	4.99	-0.31	7.90	-1.35	-1.01	4.04	-0.50	5.01
1975	-0.01	5.29	0.52	8.43	-1.51	-0.96	4.12	0.08	5.48
1976	0.01	5.30	0.54	14.72	-1.77	-1.10	4.08	-0.10	9.75
1977	0.11	4.66	0.93	8.37	-1.03	-0.64	4.28	0.55	5.87
1978	0.29	4.82	0.52	9.52	-1.28	-0.62	4.35	-0.14	5.84
1979	0.38	5.28	-0.01	8.11	-1.29	-0.65	4.43	-0.48	4.79
1980	0.21	4.64	-0.76	7.36	-0.92	-0.63	3.86	-1.92	5.59
1981	0.03	4.99	-1.51	8.99	-1.13	-0.98	4.28	-2.86	6.85
1982	0.12	5.57	-0.39	6.72	-1.28	-1.14	4.55	-1.30	5.06
1983	-0.23	4.73	-0.88	8.39	-0.96	-1.36	4.07	-2.29	6.83
1984	-0.36	5.37	-0.95	7.02	-1.19	-1.63	4.73	-1.69	5.60
1985	-0.54	5.33	-0.93	6.18	-0.91	-1.63	4.85	-1.43	5.05
1986	-0.88	5.00	-1.14	6.26	-0.76	-1.81	4.49	-1.53	5.08
1987	-1.32	4.89	-0.62	5.94	-0.69	-2.12	4.36	-0.89	4.74
1988	-1.33	5.05	-0.11	6.08	-0.78	-2.20	4.63	-0.30	4.48
1989	-1.39	5.18	-0.91	7.38	-0.74	-2.22	4.66	-1.06	5.42
1990	-1.38	5.19	-0.66	5.67	-0.87	-2.23	4.52	-0.91	3.83
1991	-1.38	4.86	-0.09	4.45	-0.66	-2.13	4.01	-0.25	3.16
1992	-1.35	4.67	-0.56	5.15	-0.68	-2.14	3.97	-1.13	3.75
1993	-1.32	4.46	-1.47	6.52	-0.68	-2.17	3.85	-2.05	4.74
1994	-1.29	4.26	-0.73	6.84	-0.86	-2.27	3.59	-1.13	4.47
1995	-1.27	4.14	-1.70	7.81	-0.78	-2.14	3.38	-2.39	5.67
1996	-1.44	4.05	-2.14	6.17	-0.62	-2.20	3.43	-2.74	5.15
1997	-1.67	4.06	-1.74	6.04	-0.54	-2.36	3.45	-2.01	4.92
1998	-1.93	3.99	-1.61	5.71	-0.42	-2.39	3.33	-1.75	4.94
1999	-1.85	3.77	-1.14	7.04	-0.52	-2.30	2.74	-1.72	6.17
2000	-1.92	3.57	-1.53	6.07	-0.46	-2.28	2.65	-1.94	5.35
2001	-1.64	3.31	-0.47	5.33	-0.57	-2.21	2.42	-0.66	4.61
2002	-1.97	3.56	-0.71	6.19	-0.58	-2.52	2.94	-0.88	4.76
2003	-1.58	3.14	-1.00	5.81	-0.51	-2.25	2.71	-1.35	4.97
2004	-1.42	3.00	-2.15	7.98	-0.49	-2.08	2.64	-1.95	5.82
2005	-1.45	2.88	-0.13	6.48	-0.46	-2.11	2.60	-0.16	4.61
2006	-1.37	2.86	-2.06	4.76	-0.32	-1.88	2.71	-2.27	4.22
2007	-1.35	2.88	-2.54	6.40	-0.40	-1.92	2.60	-2.68	5.44
2008	-1.59	2.86	-2.35	4.91	-0.38	-2.00	2.56	-2.36	4.43
2009	-1.79	3.02	-2.19	5.14	-0.33	-2.22	2.82	-2.34	4.69

Table 3: Predicted Number of Payers and Propensity to Pay by Year

	REGRESSION W/ M/B			REGRESSION W/ M/B		
YEAR	Expected	Actual	PTP	Expected	Actual	PTP
1963	78.2%	87.2%	9.1%	78.6%	87.2%	8.7%
1964	78.1%	88.1%	9.9%	78.7%	88.1%	9.4%
1965	74.9%	87.3%	12.4%	77.1%	87.3%	10.2%
1966	74.3%	78.1%	3.8%	75.3%	78.1%	2.8%
1967	67.3%	75.8%	8.6%	74.0%	75.8%	1.8%
1968	61.7%	72.4%	10.7%	71.9%	72.4%	0.6%
1969	66.5%	70.0%	3.4%	71.7%	70.0%	-1.7%
1970	68.6%	65.7%	-2.9%	70.0%	65.7%	-4.3%
1971	66.8%	61.7%	-5.1%	70.3%	61.7%	-8.6%
1972	67.1%	59.6%	-7.6%	71.0%	59.6%	-11.4%
1973	72.8%	57.7%	-15.0%	70.8%	57.7%	-13.1%
1974	76.9%	61.9%	-15.1%	72.2%	61.9%	-10.3%
1975	73.4%	60.7%	-12.7%	70.3%	60.7%	-9.6%
1976	72.4%	63.6%	-8.8%	69.5%	63.6%	-5.9%
1977	71.6%	67.6%	-4.0%	68.8%	67.6%	-1.2%
1978	72.4%	68.1%	-4.4%	69.8%	68.1%	-1.7%
1979	70.8%	64.6%	-6.1%	69.2%	64.6%	-4.6%
1980	68.6%	62.3%	-6.4%	69.4%	62.3%	-7.2%
1981	66.4%	55.4%	-11.0%	67.7%	55.4%	-12.3%
1982	61.6%	50.9%	-10.7%	63.3%	50.9%	-12.4%
1983	55.2%	45.0%	-10.2%	61.3%	45.0%	-16.3%
1984	58.7%	41.9%	-16.8%	61.0%	41.9%	-19.1%
1985	54.6%	40.7%	-13.9%	58.5%	40.7%	-17.9%
1986	51.0%	35.9%	-15.0%	56.2%	35.9%	-20.3%
1987	52.2%	32.5%	-19.6%	56.7%	32.5%	-24.1%
1988	53.4%	32.2%	-21.2%	56.8%	32.2%	-24.6%
1989	53.5%	32.7%	-20.8%	57.8%	32.7%	-25.1%
1990	56.6%	32.6%	-24.0%	59.4%	32.6%	-26.8%
1991	51.8%	31.2%	-20.6%	58.2%	31.2%	-27.0%
1992	51.0%	30.1%	-20.9%	57.7%	30.1%	-27.5%
1993	48.4%	27.5%	-20.8%	56.0%	27.5%	-28.5%
1994	50.8%	26.5%	-24.2%	56.3%	26.5%	-29.8%
1995	49.0%	25.7%	-23.3%	56.4%	25.7%	-30.7%
1996	46.7%	23.4%	-23.4%	54.7%	23.4%	-31.3%
1997	46.4%	22.4%	-24.0%	54.2%	22.4%	-31.7%
1998	48.7%	22.8%	-25.9%	55.4%	22.8%	-32.6%
1999	48.4%	22.6%	-25.8%	56.2%	22.6%	-33.6%
2000	47.8%	21.1%	-26.7%	54.4%	21.1%	-33.3%
2001	47.6%	22.2%	-25.4%	54.2%	22.2%	-32.0%
2002	51.3%	21.8%	-29.5%	56.1%	21.8%	-34.2%
2003	50.5%	24.6%	-26.0%	58.6%	24.6%	-34.0%
2004	51.6%	27.1%	-24.6%	60.3%	27.1%	-33.2%
2005	52.7%	28.9%	-23.8%	61.0%	28.9%	-32.1%
2006	52.1%	29.2%	-22.9%	60.4%	29.2%	-31.2%
2007	51.9%	28.4%	-23.5%	59.6%	28.4%	-31.3%
2008	54.1%	29.1%	-25.0%	57.9%	29.1%	-28.8%
2009	53.5%	28.2%	-25.3%	59.2%	28.2%	-31.0%

Table 4: Dividend Premium for Fiscal and Calendar Year End Market-to-Book by Year

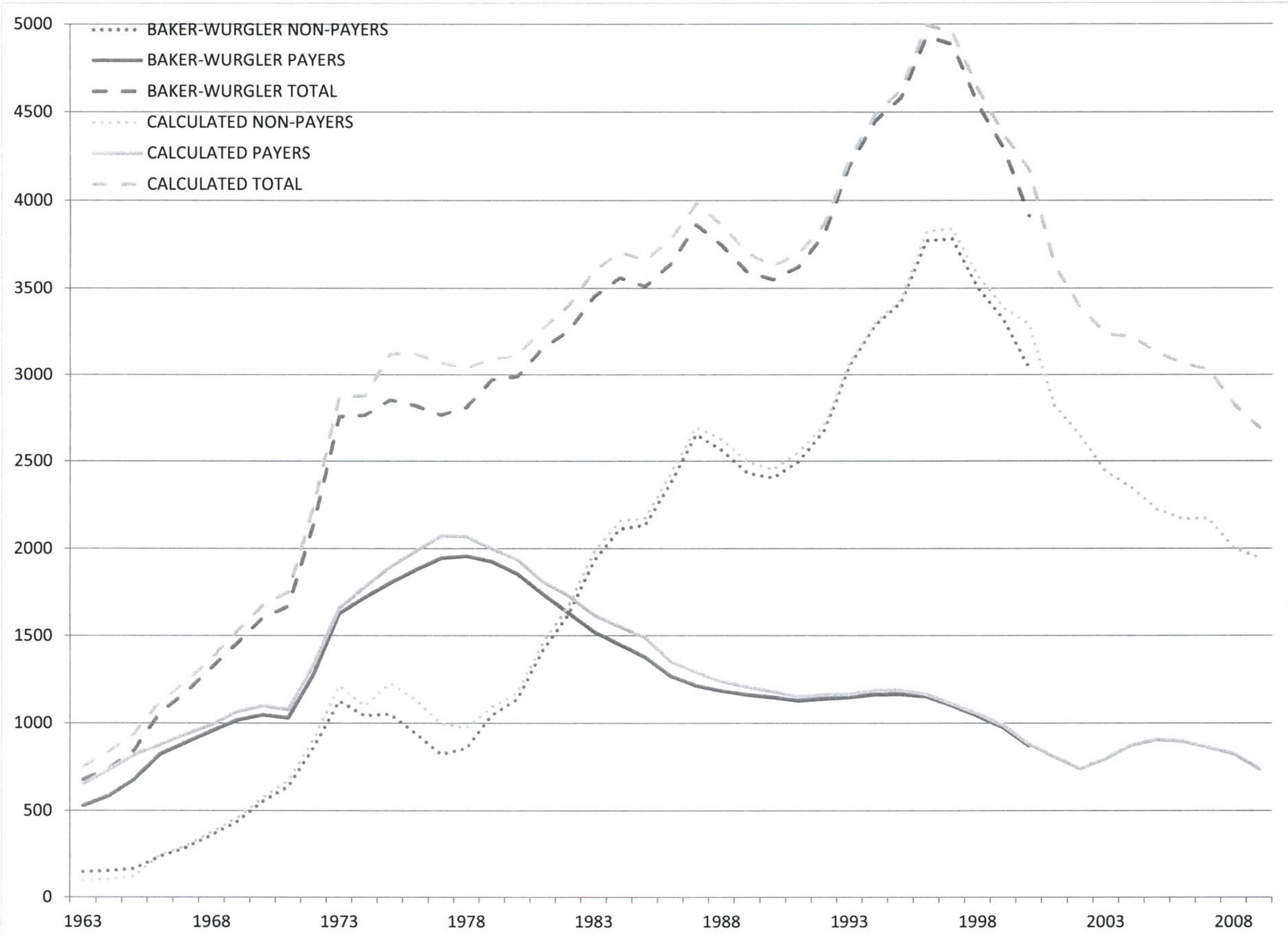
	CALCULATED - FISCAL YEAR END						CALCULATED - CALENDAR YEAR END					
	Payers		Nonpayers		Dividend Premium		Payers		Nonpayers		Dividend Premium	
YEAR	EW	VW	EW	VW	EW	VW	EW	VW	EW	VW	EW	VW
1963	1.49	1.63	1.28	1.23	15.0%	28.1%	1.51	1.65	1.31	1.30	13.9%	23.7%
1964	1.58	1.72	1.27	1.25	21.8%	31.4%	1.61	1.73	1.34	1.26	18.4%	31.6%
1965	1.70	1.74	1.58	1.38	7.5%	23.6%	1.77	1.75	1.77	1.57	-0.2%	11.4%
1966	1.51	1.48	1.61	1.40	-6.6%	5.3%	1.50	1.47	1.56	1.44	-4.1%	1.5%
1967	1.78	1.60	2.41	1.89	-30.6%	-16.6%	1.88	1.62	2.77	2.18	-38.7%	-29.4%
1968	1.91	1.62	2.70	2.01	-34.6%	-21.8%	2.02	1.64	3.00	2.17	-39.6%	-28.2%
1969	1.62	1.42	1.97	1.54	-19.6%	-8.5%	1.61	1.42	1.93	1.54	-18.0%	-8.1%
1970	1.38	1.35	1.35	1.14	2.5%	17.4%	1.44	1.37	1.36	1.15	5.7%	17.4%
1971	1.58	1.43	1.44	1.19	9.2%	18.8%	1.63	1.46	1.47	1.21	10.7%	19.0%
1972	1.68	1.55	1.54	1.24	8.6%	21.9%	1.69	1.57	1.50	1.23	11.7%	24.4%
1973	1.24	1.31	1.23	1.03	1.6%	24.0%	1.17	1.27	1.14	0.99	3.0%	25.0%
1974	0.94	1.00	0.95	0.89	-0.6%	12.6%	0.90	0.98	0.85	0.84	5.2%	15.9%
1975	1.00	1.09	1.02	0.93	-2.0%	16.2%	1.01	1.10	1.01	0.93	-0.2%	16.6%
1976	1.07	1.15	1.10	0.98	-2.5%	15.8%	1.09	1.16	1.13	0.99	-3.3%	16.1%
1977	1.06	1.04	1.13	0.98	-6.4%	6.8%	1.09	1.05	1.18	0.99	-8.3%	5.7%
1978	1.08	1.02	1.27	1.06	-16.5%	-3.8%	1.08	1.01	1.27	1.05	-16.0%	-3.8%
1979	1.12	1.02	1.64	1.14	-37.8%	-10.2%	1.16	1.03	1.84	1.18	-46.0%	-13.6%
1980	1.23	1.10	2.27	1.27	-61.4%	-13.7%	1.32	1.12	2.69	1.40	-71.6%	-22.3%
1981	1.19	1.00	2.07	1.30	-55.4%	-25.8%	1.18	1.00	1.89	1.28	-47.6%	-24.3%
1982	1.17	1.02	1.85	1.18	-45.5%	-14.1%	1.29	1.05	2.13	1.30	-50.5%	-20.9%
1983	1.42	1.13	2.42	1.52	-53.5%	-29.8%	1.44	1.13	2.26	1.47	-44.9%	-26.0%
1984	1.28	1.10	1.82	1.28	-35.4%	-14.9%	1.30	1.11	1.68	1.27	-26.0%	-13.6%
1985	1.37	1.18	1.98	1.32	-36.6%	-11.2%	1.43	1.20	2.03	1.37	-34.8%	-13.6%
1986	1.47	1.26	2.22	1.34	-41.5%	-6.7%	1.46	1.26	2.07	1.33	-34.9%	-5.7%
1987	1.47	1.27	2.16	1.37	-38.6%	-7.7%	1.37	1.24	1.78	1.27	-26.5%	-2.3%
1988	1.42	1.23	1.95	1.30	-32.1%	-6.0%	1.43	1.23	1.93	1.30	-29.8%	-5.4%
1989	1.51	1.32	2.02	1.39	-29.1%	-4.5%	1.54	1.34	2.00	1.41	-26.5%	-5.3%
1990	1.36	1.26	1.78	1.24	-27.1%	1.3%	1.34	1.26	1.64	1.21	-20.2%	4.5%
1991	1.54	1.39	2.28	1.39	-39.4%	0.0%	1.62	1.42	2.55	1.47	-45.4%	-3.2%
1992	1.61	1.45	2.22	1.49	-32.1%	-2.7%	1.67	1.47	2.33	1.55	-33.0%	-5.5%
1993	1.68	1.50	2.31	1.60	-32.1%	-6.2%	1.71	1.51	2.50	1.65	-37.6%	-9.4%
1994	1.57	1.46	2.02	1.53	-25.0%	-5.1%	1.57	1.46	2.03	1.57	-25.3%	-7.3%
1995	1.63	1.61	2.42	1.76	-39.2%	-8.7%	1.68	1.63	2.57	1.83	-42.8%	-11.6%
1996	1.69	1.69	2.71	1.75	-47.4%	-3.5%	1.75	1.72	2.39	1.84	-31.2%	-6.9%
1997	1.83	1.90	2.27	1.88	-21.8%	1.1%	1.91	1.94	2.32	1.92	-19.6%	1.2%
1998	1.80	2.12	2.15	1.88	-17.8%	11.9%	1.85	2.19	2.20	2.05	-17.2%	6.7%
1999	1.69	2.07	3.18	2.43	-63.4%	-16.1%	1.73	2.13	3.72	2.88	-76.6%	-29.8%
2000	1.65	1.93	2.43	2.34	-38.7%	-19.0%	1.66	1.92	2.15	2.03	-25.9%	-5.5%
2001	1.60	1.78	2.02	1.71	-22.9%	3.7%	1.64	1.80	2.09	1.71	-24.2%	4.6%
2002	1.55	1.61	1.64	1.49	-5.7%	7.9%	1.52	1.58	1.58	1.45	-3.7%	8.3%
2003	1.69	1.66	2.20	1.63	-26.7%	2.1%	1.80	1.71	2.42	1.71	-29.6%	0.0%
2004	1.85	1.68	2.45	1.76	-28.3%	-4.5%	1.91	1.70	2.57	1.80	-29.5%	-5.7%
2005	1.87	1.63	2.29	1.84	-20.5%	-11.6%	1.92	1.65	2.36	1.85	-20.8%	-11.2%
2006	1.89	1.71	2.39	1.77	-23.5%	-3.4%	1.92	1.72	2.44	1.82	-24.0%	-5.6%
2007	1.85	1.78	2.33	1.69	-23.2%	5.0%	1.80	1.77	2.31	1.70	-25.0%	3.9%
2008	1.47	1.44	1.53	1.39	-4.6%	3.5%	1.36	1.39	1.37	1.28	-0.9%	8.8%
2009	1.57	1.46	1.75	1.44	-10.6%	1.0%	1.66	1.50	1.85	1.50	-10.8%	0.2%
Mean	1.50	1.45	1.93	1.46	-0.23	0.00	1.53	1.46	1.96	1.49	-0.2	0.0
SD	0.26	0.30	0.50	0.34	0.20	0.14	0.27	0.31	0.58	0.39	0.2	0.2

			1963-2009				1963-2000				1963-1977				1978-2000				1963-2009			
W/ MTB W/out Nixon	Market	Fiscal	0.3112				0.4600				0.8159				0.4425				0.3644			
			(0.742)				(1.025)				(0.948)				(1.090)				(0.989)			
		Calendar		0.4477				0.5519				1.1894*				0.3877				0.4072		
				(1.086)				(1.204)				(2.098)				(1.028)				(1.192)		
	Book	Fiscal			0.5715				0.7388*				1.0193				0.7198**				0.5377	
					(1.498)				(1.785)				(1.400)				(2.262)				(1.588)	
		Calendar				0.6800*				0.7953*				1.1373*				0.6757*				0.6090*
						(1.785)				(1.850)				(1.806)				(1.972)				(2.005)
		R-squared	0.9%	1.9%	3.2%	4.5%	1.8%	2.6%	4.7%	5.4%	3.0%	6.4%	4.7%	5.9%	3.6%	2.8%	9.6%	8.4%	2.5%	3.1%	5.4%	7.0%
W/ MTB W/ Nixon	Market	Fiscal	0.6252				0.8064				1.1651				0.4425				0.3644			
			(1.382)				(1.635)				(1.101)				(1.090)				(0.989)			
		Calendar		0.7845*				0.9176*				1.6676**				0.3877				0.4072		
				(1.833)				(1.879)				(2.478)				(1.028)				(1.192)		
	Book	Fiscal			0.9656**				1.1870**				1.4706				0.7198**				0.5377	
					(2.165)				(2.311)				(1.474)				(2.262)				(1.588)	
		Calendar				1.1291***				1.3089***				1.7342*				0.6757*				0.6090*
						(3.065)				(3.019)				(2.137)				(1.972)				(2.005)
		R-squared	0.9%	1.9%	3.2%	4.5%	1.8%	2.6%	4.7%	5.4%	3.0%	6.4%	4.7%	5.9%	3.6%	2.8%	9.6%	8.4%	2.5%	3.1%	5.4%	7.0%
W/out MTB W/out Nixon	Market	Fiscal	0.1595				0.3493				0.2920				-0.1167				-0.0963			
			(0.367)				(0.732)				(0.822)				(-0.430)				(-0.368)			
		Calendar		0.3606				0.5209				0.7916***				0.0626				0.1155		
				(0.796)				(1.015)				(3.377)				(0.152)				(0.310)		
	Book	Fiscal			0.4831				0.6604				0.7165*				0.3079*				0.2753	
					(1.237)				(1.537)				(2.142)				(1.895)				(1.036)	
		Calendar				0.6638*				0.8145*				1.0151**				0.3974				0.4191
						(1.769)				(1.891)				(2.476)				(1.237)				(1.303)
		R-squared	0.9%	1.9%	3.2%	4.5%	1.8%	2.6%	4.7%	5.4%	3.0%	6.4%	4.7%	5.9%	3.6%	2.8%	9.6%	8.4%	2.5%	3.1%	5.4%	7.0%
W/out MTB W/ Nixon	Market	Fiscal	0.1504				0.3353				0.3071				-0.1167				-0.0963			
			(0.319)				(0.638)				(0.787)				(-0.430)				(-0.368)			
		Calendar		0.3799				0.5317				0.8533**				0.0626				0.1155		
				(0.771)				(0.937)				(2.848)				(0.152)				(0.310)		
	Book	Fiscal			0.5285				0.7037				0.7697				0.3079*				0.2753	
					(1.198)				(1.406)				(1.632)				(1.895)				(1.036)	
		Calendar				0.7511*				0.9021*				1.1286*				0.3974				0.4191
						(1.816)				(1.835)				(2.139)				(1.237)				(1.303)
		R-squared	0.9%	1.9%	3.2%	4.5%	1.8%	2.6%	4.7%	5.4%	3.0%	6.4%	4.7%	5.9%	3.6%	2.8%	9.6%	8.4%	2.5%	3.1%	5.4%	7.0%

Table 5: Second-Stage Regression Results over Varying Time Periods

Table 6: Second-Stage Regression Results by Industry

Industry	Specification		1963-2009		1963-2000		1963-1977	
Mining	W/ MTB	Preferred Method	**-1.3193*** (-1.945)		**-1.4376*** (-1.858)		**-0.8448** (-0.731)	
		BW Method		**-1.4296*** (-1.936)		**-1.5581**** (-2.060)		**-0.8922** (-0.921)
		R-squared	*4.0%*	*4.7%*	*4.4%*	*5.2%*	*1.2%*	*1.3%*
	W/out MTB	Preferred Method	**-1.7469***** (-2.697)		**-1.9126**** (-2.499)		**-1.6186** (-1.701)	
		BW Method		**-1.8022***** (-2.730)		**-1.9674***** (-2.795)		**-1.3951*** (-1.816)
		R-squared	*7.1%*	*7.5%*	*7.9%*	*8.4%*	*5.4%*	*4.0%*
Manufacturing	W/ MTB	Preferred Method	**-0.0150** (-0.038)		**0.2288** (0.543)		**-0.3972** (-0.353)	
		BW Method		**0.2914** (0.760)		**0.4963** (1.192)		**0.6344** (1.000)
		R-squared	–	*0.8%*	*0.5%*	*2.2%*	*0.8%*	*2.1%*
	W/out MTB	Preferred Method	**0.0380** (0.101)		**0.3703** (0.925)		**-0.3696** (-0.734)	
		BW Method		**0.3915** (1.067)		**0.7321*** (1.896)		**0.8497**** (2.172)
		R-squared	–	*3.3%*	*2.9%*	*11.3%*	*1.7%*	*9.2%*
Transport	W/ MTB	Preferred Method	**1.5006***** (3.212)		**1.9175***** (3.688)		**2.7459***** (4.670)	
		BW Method		**1.3317***** (2.850)		**1.6178***** (2.897)		**2.3308***** (3.770)
		R-squared	*10.0%*	*7.8%*	*18.0%*	*12.8%*	*21.7%*	*15.6%*
	W/out MTB	Preferred Method	**1.2350***** (2.719)		**1.6518***** (3.222)		**2.1935***** (4.034)	
		BW Method		**1.1363**** (2.459)		**1.4200**** (2.558)		**1.8405***** (3.265)
		R-squared	*6.9%*	*5.9%*	*13.9%*	*10.3%*	*13.9%*	*9.8%*
Wholesale Trade	W/ MTB	Preferred Method	**0.3782** (0.402)		**-0.0406** (-0.037)		**-0.1980** (-0.087)	
		BW Method		**2.0022**** (2.049)		**2.0491*** (1.932)		**4.0810*** (2.061)
		R-squared	*0.3%*	*8.1%*	–	*7.9%*	–	*15.0%*
	W/out MTB	Preferred Method	**0.3158** (0.441)		**-0.0376** (-0.038)		**-0.7261** (-0.355)	
		BW Method		**2.0343**** (2.076)		**2.1861*** (1.931)		**4.0844** (1.571)
		R-squared	*0.2%*	*10.1%*	–	*10.6%*	*0.5%*	*15.6%*
Retail Trade	W/ MTB	Preferred Method	**2.2628** (1.596)		**2.6911*** (1.751)		**6.2768***** (4.725)	
		BW Method		**1.1799** (1.182)		**1.3033** (1.168)		**4.1895*** (1.889)
		R-squared	*14.8%*	*4.0%*	*19.4%*	*4.6%*	*49.5%*	*22.1%*
	W/out MTB	Preferred Method	**1.8100**** (2.499)		**2.3642***** (4.546)		**3.4260***** (5.931)	
		BW Method		**1.5755**** (2.289)		**1.9427***** (2.725)		**3.0434**** (2.167)
		R-squared	*22.4%*	*17.0%*	*38.8%*	*26.2%*	*48.1%*	*38.0%*
Service	W/ MTB	Preferred Method	**0.7916** (0.999)		**1.0479** (1.065)		**3.0517***** (3.024)	
		BW Method		**0.8441** (1.255)		**1.0801** (1.237)		**1.9492**** (2.217)
		R-squared	*2.9%*	*3.3%*	*4.2%*	*4.5%*	*17.2%*	*7.0%*
	W/out MTB	Preferred Method	**0.1079** (0.131)		**0.1463** (0.150)		**1.9434**** (2.423)	
		BW Method		**0.0708** (0.091)		**0.1652** (0.176)		**1.2765** (1.769)
		R-squared	*0.1%*	–	*0.1%*	*0.1%*	*7.2%*	*3.1%*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BAKER-WURGLER PAYERS
BAKER-WURGLER TOTAL
CALCULATED NON-PAYERS
CALCULATED PAYERS
CALCULATED TOTAL
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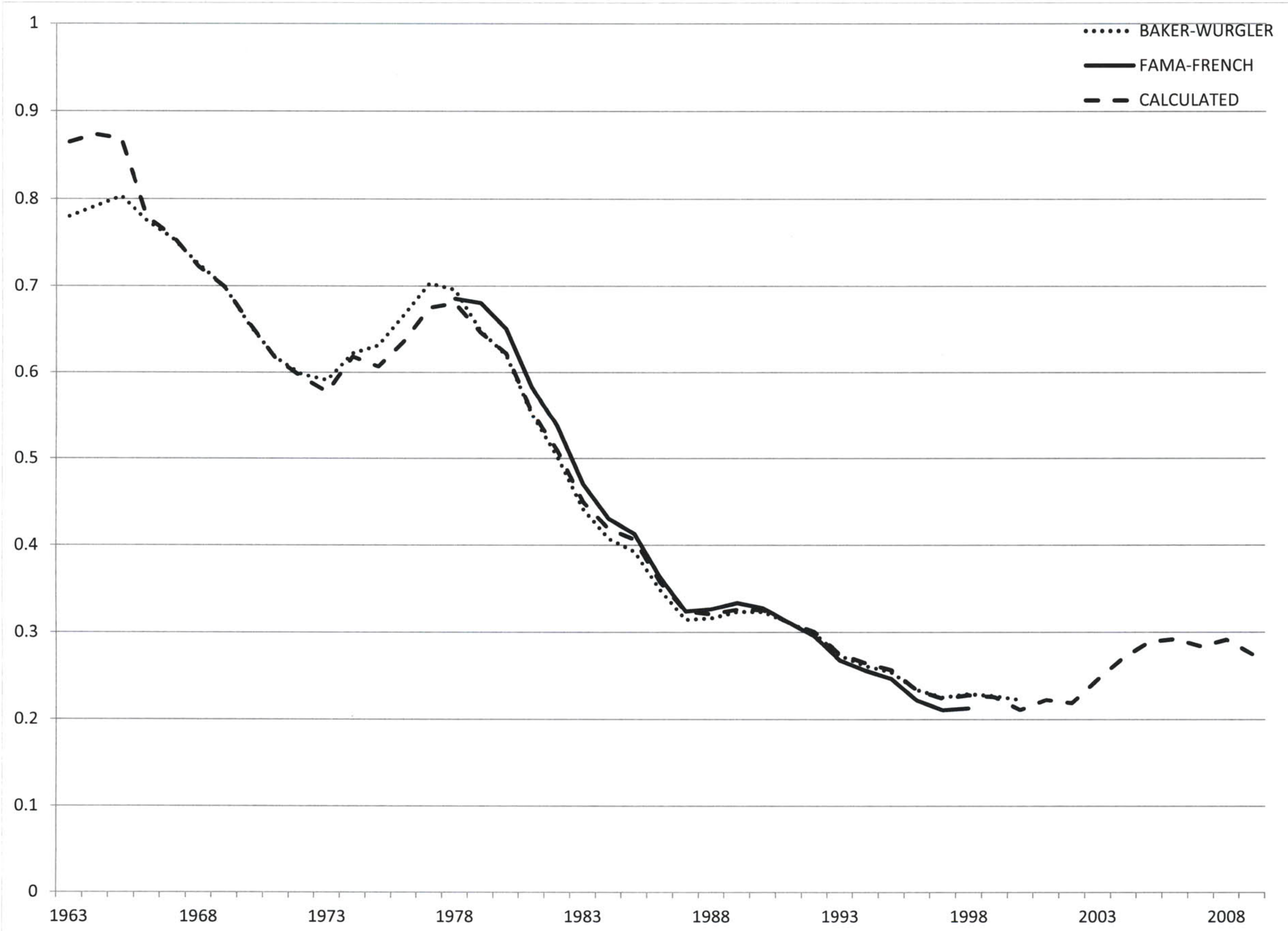

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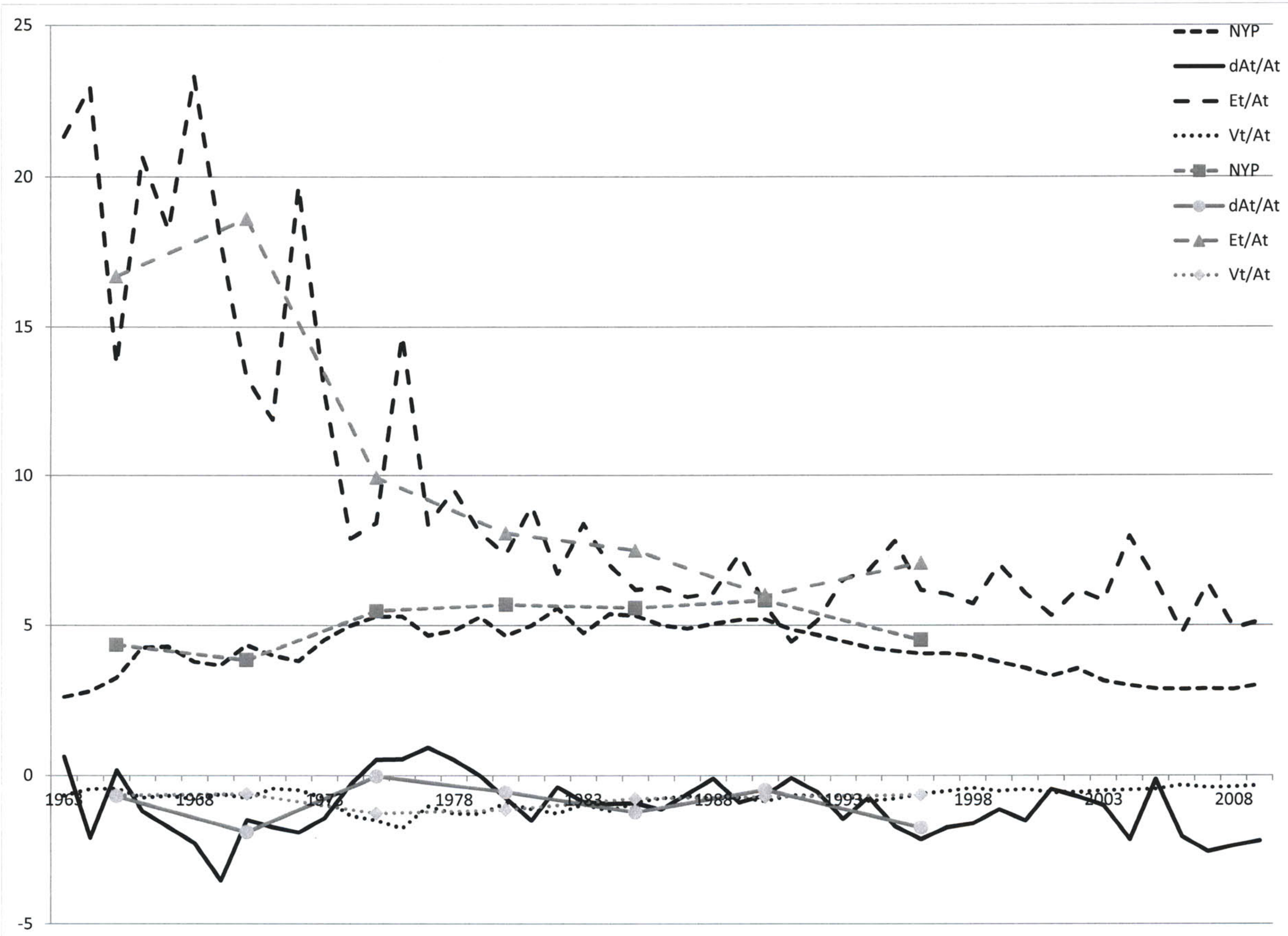

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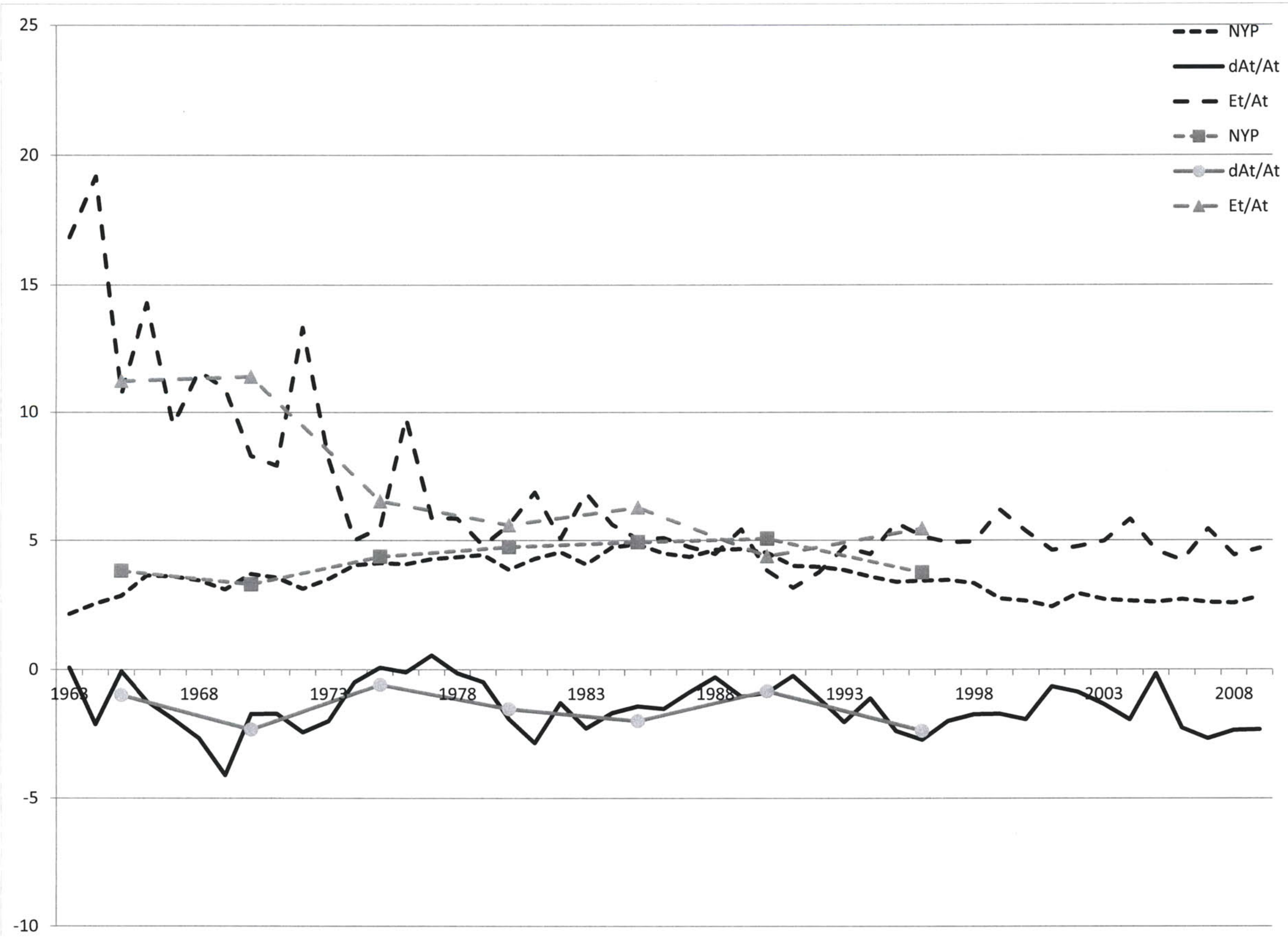

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