

Direct Evidence of Dividend Tax Clienteles

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Abstract

We study a dataset of more than 40,000 stock portfolios held by individuals and organizations in the Swedish stock market. The dividend yields on those portfolios are systematically related to investors' relative tax preferences for dividends versus capital gains. The yield spread between portfolios held by tax-neutral and investment funds is about 50 basis points. Tax-neutral investors tilt their portfolios towards dividend-paying stocks by eight percentage points. More than 30,000 portfolios are held by closely-held corporations despite triple taxation at a combined marginal tax rate as high as 83%. We conclude that there are dividend tax clienteles in the market.

Keywords: Dividend tax clienteles, capital gains tax, stock ownership.

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1 Introduction

Corporations pay dividends and investors pay taxes on those dividends. Investors also pay taxes on capital gains when they sell their shares, but they can choose when they want to do so. Some investors are tax neutral, and other pay taxes on dividends but not on capital gains. Theory suggests that investors can reduce the overall tax bill by sorting themselves into clienteles where low-tax investors collect the dividends and high-tax investors realize capital gains.¹ Understanding how the differential taxation of dividends and capital gains influences investors' stock portfolios has implications for the pricing of financial securities, for corporations which issue securities, and for governments which collect taxes.

There is a large literature that examines the tax clientele hypothesis with indirect measures. One strand of research examines the price and volume patterns around the ex-dividend day. Elton and Gruber (1970) argue that the patterns of ex-dividend day returns are consistent with tax clienteles in the stock market, while Kalay (1982) and Boyd and Jagannathan (1994) challenge this interpretation.² A second strand relates stock returns and dividend yields. A return premium on high-yield stocks would induce low-tax investors to hold high-yield stocks and high-tax investors to hold low-yield stocks. Several studies run cross-sectional regressions of returns on dividend yields, but reach different conclusions (e.g., Black and Scholes (1974), Litzenberger and Ramaswamy (1979), Miller and Scholes (1982)). A third strand of research examines institutional ownership. Del Guercio (1996) and Grinstein and Michaely (2005) document that institutions prefer dividend-paying stocks, and Michaely, Thaler, and Womack (1995) and Dhaliwal, Erickson, and Trezevant (1999) document changes in institutional ownership around dividend initiations and omissions. These studies are often inconclusive on tax effects because the tax status of the institutional investor cannot be determined.

There are also direct tests of the tax clientele hypothesis. Lewellen, Stanley, Lease, and Schlar-

¹See, for example, Miller and Modigliani (1961), Brennan (1970), Litzenberger and Ramaswamy (1980), and Allen, Bernardo, and Welch (2000).

²The core of the critique is that investors with different marginal tax rates trade around the ex-dividend day until prices reflect transaction costs rather than tax rates. Trading would mitigate the need for forming tax clienteles, but the evidence suggests that relatively small amounts of stocks are traded, usually less than 1% of the stock (e.g., Michaely and Vila (1996)).

baum (1977) and Pettit (1977) study the stock portfolios of 2,500 individual investors from a retail brokerage house. Both studies correlate dividend yields with proxies for marginal tax rates, but reach opposite conclusions. Scholz (1992) looks at self-reported data by 4,000 individuals on the Survey of Consumer Finances and finds evidence consistent with dividend tax clienteles. Most recently, Graham and Kumar (2005) report that high-age, low-income individuals invest more in high-yield stocks using a dataset of 60,000 individual investors. Those studies suffer from two weaknesses: Data include small subsets of individuals and no organizations, which own most shares, and the marginal tax rate of individuals is difficult to estimate.

We study the tax clientele hypothesis using stock ownership data from Sweden. The dataset is comprehensive; it includes more than 40,000 domestic stock portfolios with a market share of 54%. The tax structure is ideal for estimating tax clientele effects: Tax rates are flat and variation across investors arises only from different tax treatment of individuals and across organizations. There are three main tax clienteles in the Swedish stock market. First, individuals are taxed at the 30% rate and businesses at the 28% rate. These investors prefer capital gains over dividends, because tax on capital gains can be postponed. Second, many organizations such as Government entities, charities, and pension funds are tax neutral. Relative to individuals and businesses, tax-neutral investors prefer dividends. Third, the taxation of investment funds is asymmetric: Dividends pass through and are taxed by the recipient, while capital gains accrue tax free within the fund. This means that investment funds have a stronger preference for capital gains over dividends than any of the other investors.

In this tax environment, we document the following results:

- Tax-neutral investors over-weight dividend-paying stocks by eight to ten percentage points. Investment funds over-weight by four percentage points, while businesses and individuals under-weight by four percentage points.
- Tax-neutral investors earn approximately 50 basis points higher dividend yield on their portfolios than investment funds.
- Tax-neutral investors earn higher dividend yield on their portfolios than individuals and busi-

nesses, though the magnitude of the yield spread depends on the econometric specification. In some specifications the yield spread is more than 100 basis points.

- More than 30,000 stock portfolios are held by corporations despite that income on such portfolios is subject to triple taxation. We argue that the existence of those portfolios is a consequence of taxation.

We conclude that there are dividend tax clienteles in the Swedish stock market. This result is not a priori obvious. Shareholders trade off taxes and diversification, and a plausible null hypothesis is that the benefits of portfolio diversification swamp the benefits from reducing the tax bill. The finding of tax clientele effects in the Swedish stock market adds to a broader tax literature that examines the trade off between taxes and risk-taking across asset classes (see Poterba and Samwick (2002) and references). For example, the formation of tax clienteles across stocks and bonds is central to the capital structure theory of Miller (1977).³ If there are tax clientele effects in the stock market, where the benefits of diversification ought to be the strongest, then tax clienteles are also likely to form across assets where the diversification benefits are weaker.⁴

The rest of the paper is organized as follows: Section 2 explains the relevant details of the Swedish tax code. Descriptive statistics for the sample stock portfolios and the empirical results are reported in Section 3. The curious phenomenon of corporations that hold stock portfolios is analyzed in Section 4. Section 5 concludes the paper and points to directions for future research.

2 Institutional Background and Data

2.1 Data

We study Swedish exchange-listed firms in 2001-2004. Financial data are taken from Thomson Financial and the Stockholm Stock Exchange. Descriptive statistics on the sample firms and their payout policies can be seen in Table 1. The top panel shows that the number of firms is

³See also Auerbach and King (1983) who examine Miller's model when investors trade off taxes and risk. Miller (1977) ignores risk in his analysis.

⁴For example, the persistent yield spread between regular treasury securities and tax-exempt municipal bonds suggests that there are tax clienteles in the bond market where the benefits from diversification are smaller than in the stock market (see, e.g., pages 340-345 in Sundaresan (2002)).

approximately 300 per year and the market capitalization two trillion SEK.⁵ The middle panel provides statistics on dividends. Dividends are paid annually after the approval of the shareholder meeting. Approximately 45% of the listed firms pay dividends, but the market value of the dividend-paying firms is more than 80% of market capitalization. The aggregate dividends are about 60 billion SEK, which implies a dividend yield around 2.5%. The data are generally skewed: The market value of the ten largest firms is more than 50% of stock market capitalization; ten firms pay more than 50% of aggregate dividends; and the market share of the 50 largest investors is almost 50% of stock market capitalization. The skewness is illustrated by the sharp reduction in dividends between 2001 and 2002, when the largest firm (18% of market capitalization) omitted its dividend (four billion SEK or 9% of aggregate dividends).

The bottom panel reports statistics on share repurchases, which are legal since March 2000. The shareholder meeting can authorize management to repurchase up to 10% of the outstanding stock. Approximately 10% of the Swedish firms repurchase shares through open market purchases. The market value of the repurchasing firms is about 25% of stock market capitalization. The repurchase yield is lower than the dividend yield. The sum of the dividend yield and the repurchase yield is in the order of 3% and similar to that of US firms (Allen and Michaely (2003)).

Ownership of Swedish listed stocks is organized as book entries by the Nordic Central Securities Depository (NCSD).⁶ Each investor or custodian bank must have an account in the securities depository. According to law, a complete ownership record of all domestic shareholders must be established on the last bank day of June and December each year. The law requires Swedish banks to reveal the identities of the owners of all shares held in custody, but foreign banks do not have to report the nominee identity. The identities of the owners of 500 shares or less are not available to us on electronic media. For individuals, the electronic reporting limit is the higher of 500 shares or 0.1% of the shares. The median market value of the reporting limit is approximately 14,000 SEK (500 shares) and 300,000 SEK (0.1% of the shares), respectively.

⁵An approximate exchange rate is 10 SEK/USD, although the dollar exchange rate has varied substantially during the time period we study.

⁶Regulations require that exchange-listed firms use the securities depository for registration of stock ownership. Some non-listed firms and bond issuers also use the securities depository for record keeping. Bond ownership data are confidential as are data on stock ownership outside the securities depository.

We obtain eight cross-sections of stock ownership for June and December each year in 2001-2004, but will in the empirical work use annual cross-sections (the December record). Each record displays the name of the shareholder, an organization identification number, the number of shares held, and a security identification code. The formation of individual stock portfolios can be based on the organization number for organizations and the name for individuals and proprietorships for whom the identification number has been omitted. The foreign stock portfolios are eliminated, because we do not know the identity of the beneficial owner of shares in custody. The domestic stock portfolios do not include ownership below the reporting limit or the ownership of any other assets such as foreign stocks, fixed income securities, mutual funds, real estate, human capital, and business income that also influence investors' portfolio decisions.

2.2 Taxation of Dividends and Capital Gains

Stock ownership generates dividends and capital gains. Dividends are taxed when they are paid and capital gains when the investor sells the stock to another investor in the secondary market or back to the firm in a share repurchase. This section explains how Swedish investors are taxed on dividends and capital gains. The tax rules have remained largely unchanged since 1991.

Individuals. Ordinary income and investment income are taxed as separate income classes. Labor income is taxed as ordinary income and subject to a progressive tax schedule. The average tax rate in the highest income bracket is 56.6%.⁷ Dividends and capital gains are taxed as investment income at the flat 30% rate. Capital loss on stocks is deductible against other income, but loss limitations apply.⁸ Estates are taxed as individuals and all tax obligations of the deceased individual are passed on to the estate.

⁷The marginal tax rate is the sum of the local tax rate, which averages 31.6%, and the state tax rate which is 25% for income above 465,200 SEK (2005).

⁸Capital loss on stock is fully deductible against capital gains on other stocks, but only 70% against other investment income. Negative investment income can also offset tax liability on ordinary income. The tax reduction is 30% times the deficit up to 100,000 SEK, and 21% times the deficit above 100,000 SEK. This means that capital loss saves taxes at rates 30% (gains on stock), 21% (investment income, ordinary income up to the limit), and 14.7% (ordinary income above the limit).

Businesses. Investment income is lumped together with operating income and taxed at the 28% rate. Capital loss is fully deductible, it can be carried forward indefinitely, but cannot be carried back. Intercorporate dividends and capital gains are tax free if the ownership fraction of the voting rights exceeds 25% before 2003 and 10% from 2004.⁹ The local tax officer can grant tax-exempt status for smaller ownership fractions. Business taxation applies to corporations, associations, and foundations, but a variety of other business organizations are not taxed this way:

- Life insurance: Income on the stock portfolio is not taxed.
- Investment funds: Dividends pass through and are taxed by the recipients, while capital gains accrue tax free within the fund. Fund owners pay capital gains tax when they sell shares in the fund.¹⁰
- Partnerships: Income from a stock portfolio passes through, but is taxed as *ordinary income* by the partners. The transformation of investment income into ordinary income discourages individuals from owning stock through a partnership as the marginal tax rate on ordinary income (56.6%) is much higher than that on investment income (30%). For a corporate partner, the transformation makes no difference as the tax rate is 28% in either case.
- Sole proprietorships: Income from a stock portfolio passes through and is taxed by the proprietor as investment income (30% rate). Stock clubs are taxed this way.

Government Entities, Charities, and Non-Profits. Government entities are exempt from taxation. Charitable organizations are exempt from taxation of investment income. Foundations which invest for pension purposes are tax neutral between dividends and capital gains, but must pay tax on the net asset value of the portfolio. Other non-profit organizations are taxed as businesses (above).

⁹Morck (2005) documents similar tax rules in most developed countries except the US where intercorporate dividends are taxed for the explicit reason to discourage the formation of business groups.

¹⁰These tax rules mean that short-term trading profits by the fund are transformed into long-term trading profits by the investor. This tax benefit comes at the expense of tax liability on imputed income defined as 1.5% of the market value of the fund shares in the beginning of the year. The tax on imputed income is paid by the fund owners.

2.3 Tax Preferences

Let τ_d and τ_g be the marginal tax rates on dividends and capital gains, respectively. We compute the relative tax preference for dividends over capital gains for all investors and identify four tax clienteles, sorted from high to low:

$$\theta = \frac{1 - \tau_d}{1 - \tau_g} = \begin{cases} 1.000 & \text{A. Tax-neutral organizations} \\ 0.865 & \text{B. Businesses} \\ 0.854 & \text{C. Individuals, estates, and proprietorships} \\ 0.700 & \text{D. Investment funds (individual owners)} \end{cases} \quad (1)$$

Tax-neutral investors have the strongest preference for dividends, businesses and individuals fall somewhere in between, and investment funds prefer capital gains. The numerical value for individuals and businesses depend on the value of deferral of capital gains tax. Bailey (1969) estimates the value of deferral of capital gains to 50% of the statutory rate;¹¹ Chay, Choi, and Pontiff (2006) find it to be 55%. Green and Hollifield (2003) model the advantage of deferral and find numerically that the effective tax rate on capital gains amounts to approximately 60% of the statutory rate. We apply the numerical result of Green and Hollifield (2003), so that $\tau_g = 18\%$ for individuals and $\tau_g = 16.8\%$ for businesses. Their analysis is based on the assumption that the investor is indifferent between infinite deferral and selling the stock. This assumption is not plausible for banks and brokers which hold inventory stock for trading purposes. Instead, we assume that banks and brokers are tax neutral with $\tau_d = \tau_g = 28\%$.¹²

The pass-through tax treatment of stock income from partnerships and investment funds means that the tax preferences depend on the identities of the partners and the fund owners, respectively. In equation (1), we have included investment funds and excluded partnerships. The asymmetric

¹¹Bailey (1969) also finds that the value of the option to reset the cost basis to the market value at death is 50%. Multiplying the two numbers suggests that the effective tax rate on capital gains is 25% of the statutory rate. We do not follow this approach, because the Swedish tax code does not allow the estate to reset the cost basis to market values at death (see above).

¹²This assumption is based on conversations with traders who say that they only take into account the risk exposure of the inventory and not of capital gains taxes when they trade. Swedish market makers pay tax on dividends and *realized* capital gains. This is different from the US where market makers are taxed on the change in the value of the inventory measured at market values and, as a consequence, are tax neutral between dividends and capital gains.

treatment of the two organizational forms is based on the belief that investment funds are primarily owned by individuals, while partnerships may have individual as well as institutional partners.¹³ Without information on the ownership structure, we think that the inclusion of the partnerships only adds noise.

The calculations in (1) assume that investors have taxable income. If investors can offset dividends and capital gains against capital losses, the relative tax preferences change somewhat. Loss deductions are irrelevant for tax-neutral organizations (A) and investment funds (D). Businesses (B) become tax neutral, while individuals (C) still prefer dividends as a result of loss limitations (see footnote 8). We assume that investors make long-term investments and ignore the possibility that businesses and individuals may want to re-balance their portfolios when they have capital losses.

2.4 Identification of Investor Tax Preferences

Statistics Sweden classifies organizations by a two-digit code for organizational form, which we use to sort investors into tax clienteles. The organization code was originally created to facilitate the exchange of information in the public sector. The tax administration uses the code to distribute the appropriate tax form to each organization. Table 2 shows the organization type, the tax form number, and our inference on the organization's tax status. There are 21 different organizations including individuals in the table. The tax status is unambiguous for the 12 organizations in the top of the table.¹⁴ Additional information is required to classify the tax status of the five organizations in the middle of the table. The last four organizations in the bottom of the table are not studied.

For organizations in the middle of the table, the name uniquely identifies life insurance companies (A), non-life insurance companies (B), pension funds (A), and closed-end funds (D). Stock brokers (A) are identified by the register of the Swedish Association of Stock Brokers, and controlling shares (A) by the 10% and 25% ownership cutoffs. Non-profit organizations must file a tax return each year. The local tax officer decides whether the organization is charitable and qualifies for tax-exempt investment income (A) or the organization is subject business taxation (B). We

¹³For a partnership, the tax preferences are 0.657 (individuals), 0.865, (businesses), and 1.000 (tax neutral) and, for an investment fund, 0.700 (individuals), 0.720 (businesses) and 1.000 (tax neutral).

¹⁴The tax status of banks is determined by the fact that banks must only hold stock for market making purposes.

classify non-profit organizations with charitable-related names as tax exempt (A) and non-profit organizations with names related to a specific group of people as businesses (B). Foundations are harder to classify than associations, because they are typically named after the donor. A few scientific foundations (A) are well-known to the authors. Foundations with a relationship to a business are classified as taxed (B). The name method classifies 88% of the associations and 29% of the foundations. Non-classified non-profit organizations are deleted.

3 Empirical Results

3.1 Aggregate Investor Portfolios

The starting point of our analysis is the Capital Asset Pricing Model extended with taxes as in Brennan (1970), Litzenberger and Ramaswamy (1979), and Allen, Bernardo, and Welch (2000). In these models, if investors are sufficiently risk averse, the tax effects are negligible and investors hold approximately equal shares of all stocks in the market portfolio. This is our null hypothesis, which we evaluate against the alternative that tax-neutral investors (A) tilt their portfolios towards dividend-paying stocks, that investment funds (D) tilt their portfolios away from dividend-paying stocks, and that businesses (B) and individuals (C) fall somewhere between the two extremes.

To test these hypotheses, we construct the aggregate stock portfolios of all investors that belong to tax clientele $k = A, B, C, D$. Table 3 provides summary statistics. There are 42,134 portfolios with a combined market share of 54.2%. Tax-neutral investors hold 27.9% of the market, investment funds 15%, businesses 6.9%, and individuals 4.5%. Missing are the foreign investors (33.2%), holdings below the reporting limits (10.8%), unclassified associations and foundations (1.5%), domestic investors with unknown identity (0.2%), and partnerships (0.0%). The insignificant market share of partnerships is consistent with tax incentives which discourages individuals from holding stock through a partnership. The small market share of individuals is noteworthy. Even if we assume that all stocks below the electronic reporting are held by individuals, they still own only 15.3% of the shares. As seen in Table 3, the dividend yield on tax-neutral portfolios is higher than the dividend yield on any of the other portfolios, but the ordering does not follow the tax clientele

hypothesis as the dividend yield on individuals is less than that of investment funds.

For each tax clientele k , we compute the percentage ownership fraction F_{jt}^k in firm j in year t , and estimate a pooled cross-section, time-series, linear regression model of the ownership fraction on a dividend dummy variable D_{jt} , which equals one if the firm pays dividends and zero otherwise, and a set of firm-specific control variables X_{jt} :

$$F_{jt}^k = \beta_{0t}^k + \delta^k D_{jt} + \beta^{k'} X_{jt} + \varepsilon_{jt}^k, \quad k = A, B, C, D. \quad (2)$$

The δ^k parameter captures, conditional on the firm characteristics X_{jt} , the over- or under-weighting in dividend-paying stocks of clientele k . Under the null hypothesis that the aggregate investors hold equal market shares across firms, the coefficients of the dividend dummy are all zero. The alternative hypothesis predicts that the coefficients can be sorted according to tax preferences:

$$\delta^A \geq \delta^B \geq \delta^C \geq \delta^D. \quad (3)$$

The regression is equally-weighted which is correct under the null hypothesis that the ownership fractions are equal across firms. The regression does not include a dummy variable for share repurchases, because the tax consequences are the same for share repurchase and zero payout. The general study of payout policy may offer different implications for dividend-paying and repurchasing firms, but analyzing those differences is outside the scope of our paper.

The regression results are reported in Table 4. Each panel reports three model specifications for various combinations of variables which control for investor risk preferences: The betas from a market regression model or three-factor regression model, and idiosyncratic risk measured by the residual standard deviation from the regression models. Within each panel, the coefficients of the dividend dummy variable are similar across model specifications. Across the panels, all regression coefficients in Panels A and D have the opposite sign of those in Panels B and C.¹⁵ Standard errors are reported below the coefficients and the coefficients are generally statistically

¹⁵If we add also the residual category of missing portfolio data, the ownership fractions add up to 100%. This also means that all the coefficients in each row would sum to zero by construction.

different from zero at conventional levels.¹⁶ The coefficient of the dividend dummy is positive for tax-neutral investors (A) and investment funds (D). These portfolios are tilted towards dividend-paying stocks by approximately eight and four percentage points, respectively. For businesses (B) and individuals (C) the coefficients are negative and suggest that these investors tilt their portfolios away from dividend-paying stocks by about four percentage points. Together, this is mixed evidence for the dividend tax clientele hypothesis. First, consistent with the tax clientele hypothesis, tax-neutral investors show a stronger preference for dividend paying stocks than any of the other tax clienteles. The differences between tax neutral investors (A) and any of the other tax clienteles are statistically significant at usual significance levels. Second, inconsistent with the tax clientele hypothesis, the coefficient for investment funds (D) is larger than that of both businesses (B) and individuals (C). These differences are also statistically significant.

3.2 Individual Investors' Portfolios

3.2.1 Descriptive Statistics

The aggregate statistics in the previous section hide significant investor heterogeneity. Table 5 reports averages of portfolio characteristics for major investor types. In addition to the organizations in Table 2 above, we have classified corporations as widely-held if the firm itself or the parent of the business group to which the firm belongs is registered in the Nordic Central Securities Depository, or as closely-held if the firm or the parent is outside the securities depository. The intercorporate ownership structure is taken from the database Market Manager.

The variation in average portfolio size across investor types is noticeable. Life insurance companies hold the largest portfolios with almost 50 stocks. Closed-end funds are also very large, but they hold only 10 stocks. Mutual funds, non-life insurance companies, the public sector, and banks hold medium size portfolios with approximately 20 stocks. Pension funds, charities, and non-profits hold smaller portfolios with less than 10 stocks. The smallest portfolios are held by closely-held firms and individuals with only one to three stocks. Note that we only consider the investors' direct

¹⁶The standard errors reported throughout the paper are based on a pair wise bootstrap (500 replications) accounting for conditional heteroskedasticity and serial correlation. Asymptotic standard errors from a GMM estimation, also accounting for conditional heteroskedasticity and serial correlation, are very similar to the bootstrap standard errors, and are therefore not reported in the tables.

investments in domestic stocks and do not have information on the number of foreign stocks they hold. This is particularly relevant for mutual funds. The small number of stocks in individuals' portfolios is influenced by the higher reporting limit, but a small number of directly owned stocks in individuals' portfolios is also a striking feature of the Survey of Consumer Finances (Polkovnichenko (2005)).

The variation in the risk characteristics across investor types is also noticeable. Two investor types appear. First, the portfolios of tax-neutral investors, investment funds, and larger business portfolios (non-life insurance, widely-held corporations, associations, and foundations) are tilted towards stocks with high dividend yield and high book-to-market ratios (small negative HML coefficients). Second, the portfolios of closely-held corporations and individuals show the opposite traits. They are tilted towards stocks with low dividend yield and low book-to-market ratios (large negative HML coefficients).

For each tax clientele, we report the frequency distribution of the number of stocks in Figure 1 and the HML coefficients in Figure 2. The dominance of few stocks in business and individual portfolios is apparent, as is the tendency for businesses and individuals to hold stocks with low HML coefficients.

3.2.2 Regression Results

The individual stock portfolio data described above are very different from the predictions of the Capital Asset Pricing Model. Regressing individual ownership fractions on a set of explanatory variables is also statistically difficult. For example, the many single-stock portfolios would appear with the portfolio weight of 100% in one stock and 0% in all other stocks. Instead, we follow the approach of Pettit (1977), Scholz (1992), and Graham and Kumar (2005) and define the portfolio dividend yield as the dependent variable. The idea is that preferences, beliefs, and budget constraints determine the optimal portfolios, which are associated with a dividend yield. Under the null hypothesis that tax effects are negligible, the dividend yield should be equal across investors with different tax preferences. The tax clientele hypothesis, on the other hand, implies that the average dividend yield is higher for tax-neutral portfolios than for investment funds, and that the

dividend yields on business and individual portfolios fall somewhere between the two extremes.

For each investor i in year t , we compute the dividend yield Y_{it} and estimate a pooled cross-section, time-series, linear regression model of the dividend yield on dummy variables D_{it}^k for each tax clientele and a set of control variables X_{it} :

$$Y_{it} = \beta_{0t} + \gamma^B D_{it}^B + \gamma^C D_{it}^C + \gamma^D D_{it}^D + \beta' X_{it} + \varepsilon_{it}. \quad (4)$$

The tax clientele hypothesis implies that:

$$0 \geq \gamma^B \geq \gamma^C \geq \gamma^D. \quad (5)$$

We also estimate a regression where we replace the tax clientele dummies with the tax preference parameter θ_{it} for each investor i in year t :

$$Y_{it} = \beta_{0t} + \gamma \theta_{it} + \beta' X_{it} + \varepsilon_{it}. \quad (6)$$

For this specification, the tax clientele hypothesis predicts that $\gamma \geq 0$.

The main regression results are reported in Table 6 using all 168,536 investor-year observations. Three specifications refer to model (4) and two to model (6). The tax clientele dummies enter with negative signs and the tax preference parameter with a positive sign. All coefficients are statistically different from zero. In specification (1a), the coefficients of businesses (B) and individuals (C) are more negative than the coefficient of investment funds (D). This result mimics those on aggregate portfolio data above. In specifications (1b) and (1c), the coefficients of the tax clientele dummies are nicely sorted according to tax preferences. The magnitudes are economically meaningful. The yield spread between A and D is in the order of 50 basis points. Consistent with Pettit (1977), dividend yield decreases with market beta and, as in Graham and Kumar (2005), dividend yield increases with HML beta and decreases with idiosyncratic risk.

The bottom of Table 6 shows that 42.4% of the portfolios are clustered at a zero dividend yield. This means the coefficients in a linear model may predict negative dividend yields, which is

infeasible. We examine the sensitivity to the clustering at zero by trimming the sample (Table 7) and by estimating a Tobit model (Table 8). Since zero-yield portfolios are most common among investors with only a few stocks, we expect that the problem is the most critical for the estimation of the coefficients of businesses (B) and individuals (C).

The left panel in Table 7 deletes portfolios with less than five stocks, the middle panel portfolios with a market value below 250,000 SEK, and the right panel portfolios of businesses (B) and individuals (C). The number of observations and the percentages of zeros decrease dramatically. In all three panels the signs of the coefficients are the same as in the full sample. The magnitude of the coefficients for investment funds (D) is about the same, while the coefficients for businesses (B) and individuals (C) are smaller. The coefficient of the tax parameter θ is also smaller and approximately cut in half.

The estimation of the Tobit model in Table 8 conveys similar results to those using trimmed samples. The top panel reports the estimated coefficients with standard errors. The bottom panel evaluates the differences in expected yield spreads due to differences in relative tax preferences at the averages of the control variables for tax-neutral investors.¹⁷ The resulting yield spreads are similar to those reported in Table 7. One tax coefficient is positive, but not statistically different from zero. In sum, the portfolios held by tax-neutral investors show a robust significant difference in dividend yields relative investment funds, whereas the differences relative portfolios held by businesses and individuals are sensitive to the empirical specification.

4 Corporate Stock Portfolios

We have seen above in Table 5 that 30,219 portfolios are owned by closely-held corporations. The average dividend yield on those portfolios is low, average portfolio size is small, and the portfolios are tilted toward growth stocks as suggested by the low average HML coefficient. Why are corporate portfolios abundant and why are those portfolios tilted toward growth stocks? We propose a tax-based explanation.

¹⁷Computing differences in expected yield spreads at the grand average or at averages of other investor clienteles give qualitatively and quantitatively similar results.

Special tax rules pertain to income from a closely-held corporation, where the owner (or his relatives) is also employed. The rules specify a normal dividend as the book value times the risk free rate plus 7%. The normal dividend is taxed as investment income (30% rate). Excess dividend is taxed as labor income and subject to a marginal tax rate of 67%.¹⁸ The rules also specify a threshold for capital gains, which is approximately four million SEK. Capital gains below the threshold are treated as half investment income (30% rate) and half labor income (67% rate). Capital gains above the threshold are taxed as investment income (30% rate).

Indirect stock ownership through a corporation is subject to triple taxation and the special rules raise the personal tax rate: The listed corporation pays corporate tax on operating income (28%), the closely-held corporation pays corporate tax on stock income (28%), and the owners of the closely-held corporation pay personal income tax (67%). The marginal tax rate on a dividend that passes through to its final owner is 83%. However, the marginal tax rate on capital gains is notably less if the stocks do not pay dividends and the owner can postpone the realization of the capital gain into the distant future at the lower personal rate (30%).

The high marginal tax rate (67%) makes it expensive to pay out corporate income to the owners. Excess liquidity must then be invested. A firm which has reached its optimal size must rely on financial investments. A portfolio of zero-yield stocks does not trigger any taxes before the owner decides to sell the stock. A portfolio of low-yield, growth stocks may then serve as a supplemental retirement account. It has the advantage that it can be liquidated at any time and used for other purposes than retirement. This benefit must be weighted against the advantage of private pension and deferred compensation plans, which are protected by the limited liability of the corporation.¹⁹

¹⁸The marginal tax rate on the excess dividend is

$$\tau_d = 1 - \left(\frac{1}{1.3246} \right) (1 - 0.566),$$

where 32.46% is the social security tax rate and 56.6% is the sum of the average local tax rate and the maximum state tax rate.

¹⁹Social security is the basis for retirement in Sweden. Payments to private pension plans and deferred compensation plans are made after social security taxes, but before ordinary income tax. The maximum before-tax amount is 39,300 SEK per year for private pension plans and 394,000 SEK for deferred compensation plans. Accordingly, the stock portfolio has the additional advantages that there is no upper limit and social security taxes must not be paid.

5 Conclusions

We show that tax-neutral investors and investment funds tilt their portfolios towards dividend-paying stocks and that business and individuals tilt their portfolios away from dividend-paying stocks. This is mixed evidence for the tax clientele hypothesis. We also show that the dividend yield on portfolios held by tax-neutral investors exceeds the yield on asymmetrically taxed investment funds by approximately 50 basis points. This result is consistent with the predictions of the tax clientele hypothesis. Finally, we show that the dividend yield on portfolios held by tax-neutral investors exceeds those of taxed business and individual along the predictions of the tax clientele hypothesis. The magnitude is not clear, because we cannot tell whether businesses and individuals choose high growth stocks with low dividend yield, because they like growth stocks or because they want to avoid taxes. The abundance of portfolios by closely-held corporations investing in low-yield, growth stocks suggests that many of these investors want to avoid taxes. In this case, the tax-induced yield spread between tax-neutral and taxed investors is more than 100 basis points. We conclude that there are tax clienteles in the market.

One avenue for future research is to finish the “tax clientele CAPM” which was conjectured by Litzenberger and Ramaswamy (1980) but never completed. The line-up of the tax coefficients in some regression specifications look very much like the equilibrium which they conjectured. A model could be calibrated against the data and used for analyzing the effects of changing the tax rates.

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Table 1: Firms and Payout

	2001	2002	2003	2004
Number of firms	343	331	317	306
Market value of firms	2,516	1,635	2,111	2,341
Number of firms paying dividends (in % of total)	158 (46.1)	141 (42.6)	143 (45.1)	142 (46.4)
Market value of firms paying dividends (in % of total)	2,335 (92.8)	1,424 (87.1)	1,738 (82.3)	1,859 (79.4)
Dividends	65.9	50.5	56.7	59.5
Dividend yield	2.27	2.43	3.32	2.86
Number of firms repurchasing stock (in % of total)	35 (10.2)	35 (10.6)	34 (10.7)	24 (7.8)
Market value of firms repurchasing stock (in % of total)	644 (25.6)	375 (22.9)	598 (28.3)	642 (27.4)
Value of repurchased stock	19.2	6.9	8.6	14.6
Repurchase yield	0.79	0.37	0.51	0.75

The table presents summary statistics for the firms in our sample over 2001–2004. All values are reported in billion SEK. Dividend and repurchase yields are reported in %.

Table 2: Organization and Tax Status

Organization	Tax form	Tax status	Classification method
Bank corporations	2	A	
Mutual savings banks	2	A	
Public sector	3	A	
Religious associations	3	A	
For-profit associations	2	B	
Condominium associations	2	B	
Common interest property	2	B	
Family foundations	3	B	
Individuals, sole proprietorships	1	C	
Estates	1	C	
Multi-person proprietorships	None	C	
Investment funds	2	D	
Insurance corporations	2	A,B	Life (A), casualty (B)
Mutual insurance companies	2	A,B	Life (A), casualty (B)
Other corporations	2	A,B,D	Control/trader (A), fund (D), other (B)
Other non-profit associations	3	A,B	Pension (A), name-based (A or B)
Other foundations & funds	3	A,B	Pension (A), name-based (A or B)
Partnerships	4	n/a	
Foreign institutions	2	n/a	
Other organizations	3	n/a	
Under investigation	2/3	n/a	

Tax form: Individuals (1), businesses (2), charities and non-profits (3), and partnerships (4). Tax status based on equation (1): Tax neutral (A), businesses (B), individuals (C), investment funds (D). Name-based classification: Tax neutral (A) if the organization name contains words associated with children, animal protection, nature, religion, scientific, education, defense, museum, sports, arts, music, culture, political party, and health care. Business taxation (B) if the organization name contains words associated with business activity, labor union, stock club, employee profit plan, and social club, or the association is named after a person or family.

Table 3: Summary Statistics of Aggregate Investors

	Dividend yield	Market value	Market share	Number of investors
A. Tax-neutral investors	3.00	599.4	27.9	2,644
B. Businesses	2.93	148.6	6.9	31,723
C. Individuals	2.48	96.6	4.5	7,400
D. Investment funds	2.69	322.5	15.0	367
A–D			54.2	42,134
X. Missing data	2.50	984.5	45.8	n/a

The table shows statistics, averaged over years, for the aggregate tax clienteles in our sample. Market values are reported in billion SEK. Dividend yields and market shares are reported in %.

Table 4: Regressions of Ownership Fractions on Firm Characteristics

	A. Tax-neutral investors			B. Businesses			C. Individuals			D. Investment funds		
2001 dummy	15.466 (1.679)	16.230 (3.242)	17.237 (3.674)	17.596 (1.002)	16.756 (1.862)	17.329 (1.924)	27.947 (1.807)	24.702 (3.496)	25.271 (3.643)	9.102 (1.019)	13.046 (1.575)	12.421 (1.776)
2002 dummy	16.878 (2.040)	17.626 (2.994)	18.526 (3.265)	19.175 (1.256)	18.350 (1.975)	18.758 (2.012)	27.319 (2.353)	24.145 (3.224)	24.491 (3.437)	7.666 (1.105)	11.509 (1.509)	11.027 (1.624)
2003 dummy	13.413 (1.615)	13.808 (3.072)	14.390 (3.391)	16.012 (0.978)	15.674 (1.835)	15.974 (1.879)	34.079 (2.351)	32.157 (3.604)	22.416 (3.759)	8.003 (1.021)	11.134 (1.420)	10.732 (1.570)
2004 dummy	16.900 (2.003)	17.292 (2.997)	18.009 (3.163)	19.999 (1.278)	19.650 (2.046)	20.103 (2.078)	25.239 (2.096)	23.365 (3.322)	23.849 (3.315)	8.215 (1.213)	11.171 (1.580)	10.643 (1.646)
Dividend dummy	9.699 (1.757)	8.976 (2.096)	8.466 (2.177)	-5.553 (0.953)	-4.670 (1.222)	-4.205 (1.337)	-7.997 (1.987)	-5.145 (2.307)	-4.104 (2.483)	7.674 (1.005)	4.923 (1.092)	4.437 (1.111)
Beta (Market)		2.319 (1.255)	2.605 (1.325)	-3.240 (0.818)	-3.240 (0.818)	-3.480 (0.794)	-8.111 (1.514)	-8.429 (1.672)		4.207 (0.646)		4.264 (0.718)
Beta (HML)			-3.185 (1.924)	2.049 (1.089)			6.330 (2.079)					-2.753 (0.909)
Beta (SMB)			-3.480 (1.785)	0.880 (1.042)			3.948 (2.133)					-1.800 (0.852)
Idiosyncratic risk		-4.084 (2.905)	-5.132 (3.644)	5.441 (1.873)			14.952 (3.189)				-10.394 (1.189)	-9.806 (1.375)
Adjusted R ²	5.4	5.9	6.2	4.8	8.2	9.0	4.6	11.6	12.6	8.8	18.0	18.6
N	1,266	1,266	1,266	1,266	1,266	1,266	1,266	1,266	1,266	1,266	1,266	1,266

The table shows the results of pooled least square regressions of percentage ownership fraction on firm characteristics over 2001–2004. The dividend dummy equals one if a firm pays dividends, and zero otherwise. The betas are the factor loadings in a market model regression or in a three factor model regression (market; high-minus-low book-to-market ratio, HML, or value-minus-growth; small-minus-big market capitalization, SMB). Idiosyncratic risk is the (annualized) standard deviation of the residuals from the same regressions. Standard errors based on a pairwise bootstrap (500 replications) accounting for conditional heteroskedasticity and serial correlation are reported in parenthesis. The adjusted R-squares in the regressions are reported in %. N is the total number of observations available.

Table 5: Summary Statistics of Individual Investors

	Average									
	Dividend yield	Weight in dividends	Beta (market)	Beta (HML)	Beta (SMB)	Idiosyncratic risk	Number of stocks	Value	Number of investors	Market share
<u>A. Tax-neutral</u>										
Life insurance	2.74	86.3	1.13	-0.10	0.16	11.9	47.4	8,433.7	19	8.1
Control	2.31	51.7	0.80	-0.22	0.26	52.9	1.2	1,299.1	91	6.2
Banks & brokers	3.72	90.9	1.11	0.30	-0.10	16.9	16.4	312.8	114	1.8
Public sector	2.79	86.5	1.16	-0.06	0.13	14.5	18.8	1,293.5	155	10.5
Pension funds	2.07	68.9	1.27	-0.44	0.23	23.2	7.5	53.1	769	2.1
Church & charity	2.83	80.3	1.21	-0.15	0.15	18.4	8.0	32.1	1,498	2.5
<u>B. Businesses</u>										
Non-life insurance	2.91	83.9	1.19	-0.07	0.10	16.8	14.5	212.9	120	1.3
Widely held firms	2.08	59.9	1.08	-0.39	0.30	34.9	2.3	201.9	140	1.5
Associations and foundations	2.84	81.2	1.20	-0.13	0.14	18.9	7.0	29.8	1,245	1.9
Closely held firms	1.17	44.3	1.28	-0.75	0.31	34.9	3.6	1.9	30,219	3.0
<u>C. Individuals</u>										
Individuals	1.36	29.2	0.81	-0.41	0.37	68.0	1.3	15.7	6,109	5.0
Estates, stock clubs	1.17	40.4	1.27	-0.75	0.31	36.4	2.6	0.5	1,291	0.0
<u>D. Investment funds</u>										
Closed-end funds	2.36	75.6	1.12	-0.01	0.23	19.4	9.9	5,881.8	17	5.1
Mutual funds	2.23	79.3	1.20	-0.21	0.21	15.1	23.4	639.6	350	11.7

The table presents the characteristics of portfolios held by investors in different tax clienteles. The averages are equally weighted over all investors and all years. Portfolio values are expressed in million SEK. The betas are the factor loadings in a three factor regression model (market; high-minus-low book-to-market ratio, HML, or value-minus-growth; small-minus-big market capitalization, SMB) and idiosyncratic risk is the (annualized) standard deviation of the residuals from the same regression reported in %. Dividend yields, portfolio weights in dividend-paying stock, and market shares are reported in %.

Table 6: Dividend Yields and Tax Preferences

	1a	2a	3a	4a	5a
2001 dummy	2.718 (0.031)	4.666 (0.028)	4.387 (0.036)	1.915 (0.125)	2.154 (0.128)
2002 dummy	2.214 (0.029)	4.408 (0.026)	4.110 (0.031)	1.656 (0.126)	1.877 (0.126)
2003 dummy	2.938 (0.031)	4.750 (0.026)	4.457 (0.032)	1.998 (0.126)	2.224 (0.126)
2004 dummy	2.631 (0.031)	4.494 (0.025)	4.203 (0.032)	1.742 (0.125)	1.970 (0.125)
Tax preference θ				2.719 (0.139)	2.212 (0.127)
B. Businesses	-1.372 (0.029)	-0.405 (0.023)	-0.322 (0.020)		
C. Individuals	-1.300 (0.035)	-0.469 (0.035)	-0.370 (0.033)		
D. Investment funds	-0.383 (0.048)	-0.608 (0.034)	-0.533 (0.034)		
Beta (Market)		-1.035 (0.010)	-0.803 (0.016)	-1.032 (0.009)	-0.801 (0.016)
Beta (HML)			1.479 (0.008)		1.478 (0.008)
Beta (SMB)			0.236 (0.037)		0.234 (0.036)
Idiosyncratic risk		-0.024 (0.000)	-0.020 (0.000)	-0.024 (0.000)	-0.021 (0.000)
Adjusted R ²	3.9	36.5	39.5	36.5	39.5
N	168,536	168,536	168,536	168,536	168,536
N ₀	42.4	42.4	42.4	42.4	42.4

The table shows the results of pooled least square regressions of dividend yield on portfolio characteristics over 2001–2004. Theta is defined as in expression (1). The betas are the factor loadings in a market model regression or in a three factor model regression (market; high-minus-low book-to-market ratio, HML, or value-minus-growth; small-minus-big market capitalization, SMB). Idiosyncratic risk is the (annualized) standard deviation of the residuals from the same regressions. Standard errors based on a pairwise bootstrap (500 replications) accounting for conditional heteroskedasticity and serial correlation are reported in parenthesis. The adjusted R-squares in the regressions are reported in %. N is the total number of observations available; N₀ is the number of observations with zero dividend yield expressed in % of total number of observations.

Table 7: Dividend Yields and Tax Preferences in Trimmed Samples

	Number of stocks ≥ 5			Portfolio value \geq SEK 250,000			Clienteles A and D only		
	1b	3b	5b	1c	3c	5c	1d	3d	5d
2001 dummy	2.435 (0.026)	4.447 (0.060)	3.459 (0.100)	2.672 (0.030)	4.479 (0.064)	3.330 (0.130)	2.358 (0.051)	4.968 (0.272)	3.406 (0.358)
2002 dummy	2.013 (0.024)	4.222 (0.058)	3.233 (0.099)	2.443 (0.029)	4.179 (0.055)	3.031 (0.129)	1.998 (0.031)	4.718 (0.238)	3.157 (0.325)
2003 dummy	3.477 (0.026)	4.631 (0.055)	3.649 (0.098)	3.449 (0.031)	4.754 (0.053)	3.600 (0.129)	3.390 (0.040)	5.371 (0.230)	3.809 (0.314)
2004 dummy	2.983 (0.025)	4.339 (0.058)	3.356 (0.097)	2.840 (0.030)	4.360 (0.057)	3.207 (0.126)	2.744 (0.037)	4.933 (0.241)	3.371 (0.321)
Tax preference θ			1.018 (0.095)			1.184 (0.125)			1.562 (0.148)
B. Businesses	-0.765 (0.027)	-0.068 (0.018)		-0.935 (0.028)	-0.159 (0.023)				
C. Individuals	-0.725 (0.077)	-0.132 (0.056)		-0.856 (0.044)	-0.020 (0.048)				
D. Investment funds	-0.369 (0.039)	-0.420 (0.028)		-0.592 (0.049)	-0.479 (0.036)		-0.376 (0.048)	-0.469 (0.040)	
Beta (Market)		-0.842 (0.039)	-0.836 (0.039)		-0.881 (0.042)	-0.916 (0.037)		-1.440 (0.203)	-1.440 (0.215)
Beta (HML)		1.898 (0.024)	1.888 (0.025)		1.623 (0.018)	1.654 (0.019)		1.802 (0.052)	1.802 (0.054)
Beta (SMB)		0.017 (0.062)	0.023 (0.061)		0.075 (0.084)	0.104 (0.085)		-0.221 (0.336)	-0.221 (0.354)
Idiosyncratic risk		-0.029 (0.001)	-0.029 (0.001)		-0.024 (0.001)	-0.023 (0.001)		-0.011 (0.004)	-0.011 (0.005)
Adjusted R ²	15.5	58.4	58.4	4.0	35.5	35.5	6.0	45.5	45.5
N	37,607	37,607	37,607	74,576	74,576	74,576	12,045	12,045	12,045
N ₀	4.7	4.7	4.7	19.0	19.0	19.0	10.8	10.8	10.8

The table shows the results of pooled least square regressions of dividend yield on portfolio characteristics over 2001–2004. Specifications 1b, 3b, and 5b only include portfolios with five holding or more; specification 1c, 3c, and 5c only include portfolios with a market value of SEK 250,000 or more; specification 1d, 3d, and 5d only include tax clienteles A and D. Theta is defined as in expression (1). The betas are the factor loadings in a market model regression or in a three factor model regression (market; high-minus-low book-to-market ratio, HML, or value-minus-growth; small-minus-big market capitalization, SMB). Idiosyncratic risk is the (annualized) standard deviation of the residuals from the same regressions. Standard errors based on a pairwise bootstrap (500 replications) accounting for conditional heteroskedasticity and serial correlation are reported parenthesis. The adjusted R-squares in the regressions are reported in %. N is the total number of observations available; N₀ is the number of observations with zero dividend yield expressed in % of total number of observations.

Table 8: Dividend Yield and Tax Clienteles in a Tobit Model

	1e	2e	3e	4e	5e
2001 dummy	3.029 (0.029)	6.914 (0.065)	6.142 (0.084)	5.398 (0.165)	5.454 (0.144)
2002 dummy	1.707 (0.029)	5.822 (0.044)	5.058 (0.067)	4.307 (0.173)	4.372 (0.141)
2003 dummy	2.585 (0.028)	5.970 (0.038)	5.227 (0.063)	4.455 (0.176)	4.542 (0.139)
2004 dummy	2.295 (0.030)	5.727 (0.041)	5.010 (0.069)	4.213 (0.177)	4.324 (0.139)
Tax preference θ				1.568 (0.195)	0.751 (0.147)
B. Businesses	-2.156 (0.030)	-0.142 (0.031)	-0.025 (0.024)		
C. Individuals	-2.895 (0.051)	-0.090 (0.063)	0.063 (0.060)		
D. Investment funds	-0.237 (0.044)	-0.795 (0.044)	-0.596 (0.044)		
Beta (Market)		-1.320 (0.032)	-0.850 (0.046)	-1.330 (0.029)	-0.867 (0.053)
Beta (HML)			2.205 (0.027)		2.216 (0.025)
Beta (SMB)			0.098 (0.090)		0.111 (0.108)
Idiosyncratic risk		-0.087 (0.001)	-0.078 (0.001)	-0.086 (0.001)	-0.077 (0.001)
Pseudo R ²	2.9	41.4	43.5	41.3	43.4
N	168,536	168,536	168,536	168,536	168,536
N ₀	42.4	42.4	42.4	42.4	42.4
$E(Y_{it} B, \bar{X}_{it}) - E(Y_{it} A, \bar{X}_{it})$	-1.389 (0.025)	-0.111 (0.020)	-0.020 (0.019)	-0.167 (0.017)	-0.082 (0.016)
$E(Y_{it} C, \bar{X}_{it}) - E(Y_{it} A, \bar{X}_{it})$	-1.738 (0.026)	-0.071 (0.025)	0.051 (0.049)	-0.180 (0.019)	-0.088 (0.017)
$E(Y_{it} D, \bar{X}_{it}) - E(Y_{it} A, \bar{X}_{it})$	-0.178 (0.067)	-0.588 (0.046)	-0.456 (0.033)	-0.362 (0.037)	-0.180 (0.035)

The table shows the results of a pooled Tobit model where the dividend yield is regressed on portfolio characteristics over 2001–2004. Theta is defined as in expression (1). The betas are the slope coefficients in a market model regression and a three factor model regression (market; value-minus-growth, HML; small-minus-big, SMB), respectively. Idiosyncratic risk is the (annualized) standard deviation of the residuals from the same regressions. Idiosyncratic risk is the (annualized) standard deviation of the residuals from the same regressions. Standard errors based on a pairwise bootstrap (500 replications) accounting for conditional heteroskedasticity and serial correlation are reported in parenthesis. The pseudo R-squares (reported in %) are the squared correlations between predicted and observed dividend yields. N is the total number of observations available; N₀ is the number of observations with zero dividend yield expressed in % of total number of observations. The lower part of the table shows how the expected dividend yield on portfolios held by tax-exempt investors (clienteles A) differs from the yields on other portfolios. The expected yields are calculated conditional on the typical characteristics of portfolios held by tax-exempt investors. Standard errors, calculated from the bootstrapped variance-covariance matrix in the Tobit estimation, are reported in parenthesis.

Figure 1: Number of Stocks in Investors' Portfolios

The figure shows percent frequency histograms of the number of stocks in portfolios held by tax clienteles A–D.

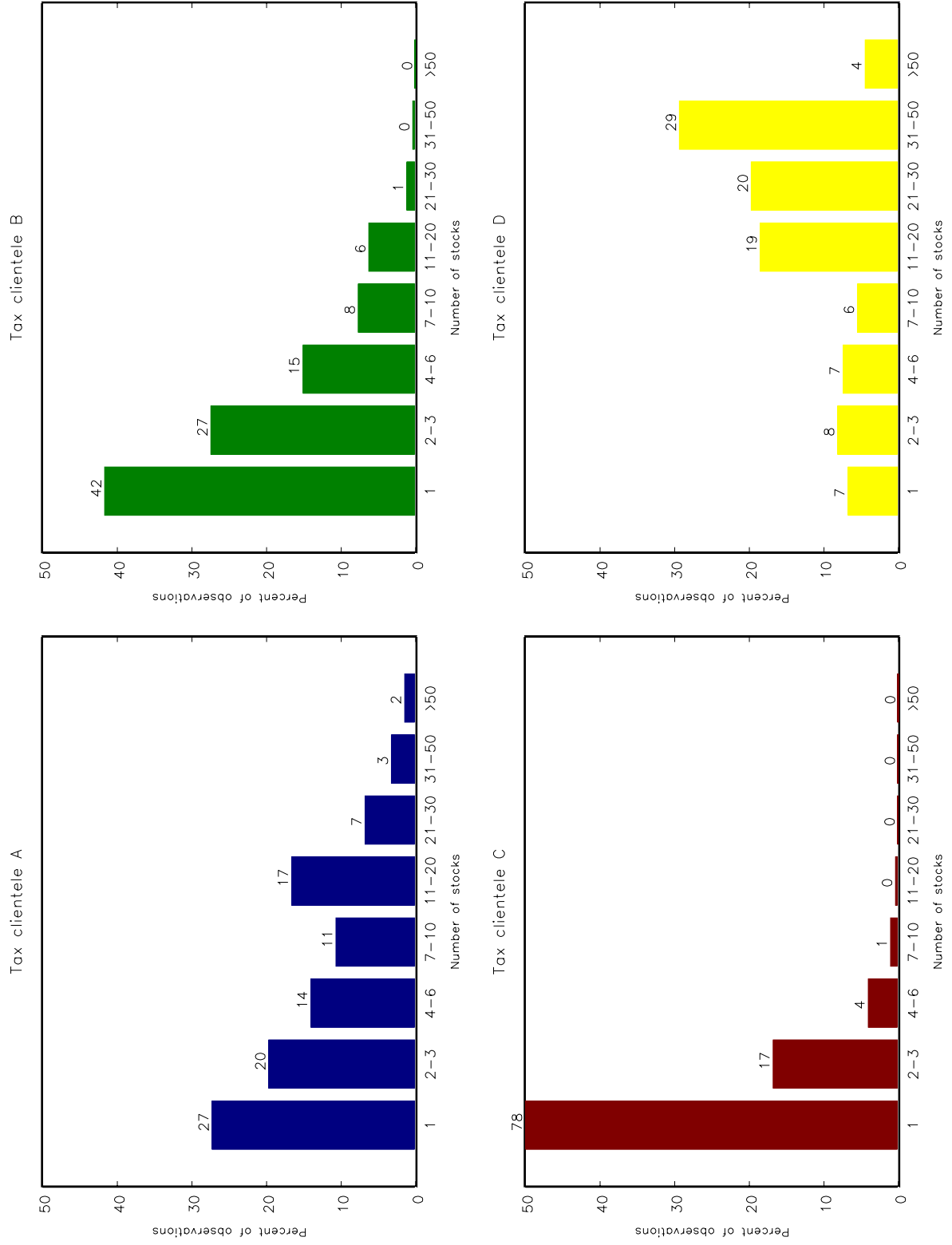


Figure 2: Beta (HML) Loadings in Investors' Portfolios

The figure shows percent frequency histograms of the beta (HML) loadings of portfolios held by tax clienteles A-D.

