Inelastic U.S. Equity Markets: New Evidence From A Reform of Fiduciary Duties

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August 26, 2024

Abstract

We study the equity market implications of a reform in the laws that govern trust investments, implemented in a staggered fashion across U.S. states from 1986 to 2006. The introduction of the *prudent investor rule* systematically alters the relative attractiveness of stocks within the cross-section of U.S. equities for trusts. As trusts account for a substantial fraction of institutional equity holdings in our sample period, and since the reform does not pertain to other investors, our empirical setting provides a rare opportunity to study the impact of a regulatory change on institutional investor holdings and relative prices in the U.S. equity market. We show that, before the reform, trusts tilt their portfolios towards prudent stocks ("regulatory tilts"). After the law change, trusts undo these tilts which introduces large and predictable changes in demand. Consistent with models of inelastic equity markets, we find long-lived outperformance of stocks bought by trusts after the law change relative to stocks sold by those funds. In this new and unique setting, we derive estimates of the price elasticity of demand of U.S. equities which are low and support the inelastic markets hypothesis.

Keywords: Inelastic Equity Markets; Demand Effects; Institutional Investors; Trusts; Prudent Man Laws

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1 Introduction

Institutional investors are central players in today's financial markets and understanding their impact on asset prices has become the focus of a large academic literature. An important strand in this literature, recently summarized by Gabaix and Koijen (2021) under the label *inelastic markets hypothesis*, posits that changes in institutional investor demand can change asset prices. The inelastic markets view stands in contrast to the more traditional efficient markets view that asset prices reflect fundamental value and are independent of investor demand.

In this paper, we provide novel evidence in line with inelastic markets. We address two central questions. The first question is what causes markets to be inelastic. We argue and provide empirical evidence for the view that financial regulation can make institutional investor demand inelastic. The second question is whether shifts in demand by institutional investors change asset prices. Our contribution is to provide, to our knowledge for the first time, evidence from a natural experiment based on staggered state-level law changes that affect institutional investor demand for the entire cross-section of U.S. stocks. Our empirical setting thus provides a rare opportunity to study the impact of a regulatory change on institutional investor holdings and relative prices in the U.S. equity market, i.e., one of the largest, most liquid, financial markets in the world.

The reform we study is the Uniform Prudent Investor Act (UPIA), which was implemented across states in the U.S. from 1986 to 2006. The core feature of the UPIA we exploit is that it reorients the standard of "prudence" by replacing so-called *prudent man laws*, which governed trust investments under the old regime, with the *prudent investor rule*. The duty of prudence is one of the key fiduciary duties in trust management. It aims to ensure that a trustee invests the funds held in trust for the beneficiaries in a prudent manner. Before the law change, under the prudent man rule, prudence was assessed by courts asset-by-asset, meaning that a trust fund manager needed to make sure that each asset individually could be considered a prudent investment.[1] After the law change, under the prudent investor rule, prudence is determined on

[1] The prudence of an asset is determined by courts. The prior related literature suggests prudence is a function of variables like the CAPM beta, dividend yield, firm age, profitability, being part of a large index, and volatility.

a portfolio level, meaning that a trust may now invest into assets which courts may consider imprudent in isolation, as long as the trust portfolio as a whole can be considered prudent.

Using the UPIA reform as a laboratory to study the effect of institutional investors on asset prices has a number of attractive features. First, the prudent investor rule's adoption of a portfolio perspective was motivated by advances in portfolio theory in the finance literature since Markowitz (1952), not by a desire to affect fundamentals of any firms held by trusts. Second, trust investments are economically substantial and changes in asset holdings across many trusts can plausibly matter for asset prices. Third, while the reform only affects trusts, other financial institutions are not directly affected because they are governed by different legal rules. We can thus use them to construct counterfactuals. Fourth, as we show in a theoretical model, the law change is associated with clear predictions about the change in holdings we should see: trusts' demand for prudent assets should go down, while demand for other assets should go up. If markets are inelastic, the model also predicts that prices for these assets should move in parallel.

In the first part of the paper we examine the holdings of trusts around the introduction of the UPIA. Before the introduction of the UPIA, we show trusts allocate more money to prudent stocks, and less money to other stocks. A main finding in the first part of the paper is that this difference reduces substantially after the introduction of the UPIA. These results are consistent with the view that the old prudent man laws, and the associated stock-by-stock approach to determining a portfolio's prudence, effectively put a binding constraint on the stocks trusts were willing to hold. Regulation therefore induced what we label "regulatory tilts" in the holdings of an important class of institutional investors. We show both theoretically and empirically that adopting a new regulatory approach towards measuring prudence in trusts via the UPIA leads to predictable and systematic shifts in the relative demand across stocks.

In the second part of the paper we ask whether the demand shifts induced by the regulatory change in prudence laws are associated with changes in relative prices. We find that in the 12 months after the reform, a value-weighted zero-investment portfolio that goes long stocks that trusts are predicted to buy (i.e., less prudent stocks) and short stocks trusts are predicted to sell (i.e., prudent stocks) earns a monthly five-factor alpha of 0.45%, or 5.3% per year. These findings are consistent with the view that the change in trust law we examine induces economically large and long-lived shifts in relative prices of assets bought and sold by trusts.

Finally, we derive estimates of the elasticity of demand for U.S. stocks based on our state-level regulatory change setting. Depending on the specification, we find average price elasticities of U.S. stocks in the range between 0.11 and 0.36. Our estimates based on staggered state-level regulatory changes – which to our knowledge is among the first such estimates for the entire cross-section of U.S. stocks in the literature – complement estimates from other approaches described in Gabaix and Koijen (2021) and yields comparable results, which are very far from the null of an elastic market. In sum, our results support the inelastic markets hypothesis.

2 Relation to Prior Literature

Our paper contributes new evidence on the impact of financial regulation to the literature on inelastic markets. To the best of our knowledge, our setting is unique in that it allows us to study the impact of changing financial regulations on asset prices using a staggered state-level law change setting. That approach complements seminal recent work on demand-based asset pricing, which uses instrumental variables to identify demand effects in asset-demand systems (Koijen and Yogo (2019), Koijen, Richmond, and Yogo (2023)).

Gabaix and Koijen (2021) present an overview of estimates of the price elasticity of demand from various approaches in the literature. On the stock level, they report estimates between 0.06 and 3.3, at the factor level between 0.18 and 0.21, and at the market level between 0.15 and 0.66, which are all much lower than elasticities in standard asset pricing models (which are 5,000 or higher). They also report a variety of methods and settings researchers have employed to derive these estimates, which is a notoriously difficult empirical challenge. We contribute by providing a new and unique setting and a new estimate of the elasticity of U.S. stocks.

Our results also speak to the large debate on the slope of demand curves for stocks. A prominent older literature analyzes index additions as demand shifters (e.g, Shleifer (1986), Harris and Gurel (1986), Wurgler and Zhuravskaya (2002), Chang, Hong, and Liskovich (2014)) and finds that demand curves for stocks slope down. While this work was seminal and has shaped the subsequent debate, there is a continuing debate on index additions as sources of identifying information (e.g, Patel and Welch (2017), Appel, Gormley, and Keim (2024), Glossner (2024), Wei and Young (2024)). Other work has analyzed corporate events that may affect investor demand (e.g., Abarbanell, Bushee, and Smith Raedy (2003), Ofek and Richardson (2000), Ellul, Jotikasthira, and Lundblad (2011)). While the findings in these studies are generally in line with inelastic markets, one concern about single-firm event-based studies is that an omitted variable drives both the event and the price change. Abstracting from identification concerns, since single-firm studies focus by construction on only a small subset of firms, it remains an open question how effects generalize. For example, if one is interested in the demand curves for the largest and most liquid stocks, what one can infer from studying firms at the cutoff of, say, the Russell 1,000 is limited.

An alternative to studying changes that affect single firms is to analyze events that affect many firms simultaneously. One set of studies uses fire sales to identify demand shifts (e.g., Coval and Stafford (2007), Edmans, Goldstein, and Jiang (2012)) for stocks sold by mutual funds.[2] Other studies exploit index reconstitutions. Kaul, Mehrotra, and Morck (2000) analyze index changes for Canadian stocks in 1996, and Greenwood (2005) analyzes changes in the composition of the Nikkei Index in April 2000. Ben-David, Li, Rossi, and Song (2022) take a different approach, as they source exogenous changes in investor demand based on 2002 shock to Morningstar fund-rating practices. An attractive feature of these studies is that the way an index composition is changed, or the rules governing fund ratings, are plausibly orthogonal to firm fundamentals, while affecting many large firms, and demand for them, simultaneously. A caveat is that these events are rare, one-off events, so it is hard to rule out that other concurrent factors are driving the result.

The existing literature can thus essentially be grouped in two sets of studies: studies that

[2] Wardlaw (2020) and Berger (2023) question the validity of fire sales shocks as instruments for exogenous demand shifts.

involve single-firm events (e.g., an index addition), which are observed (for different firms) across time; and studies that involve many firms (e.g, via an index reconstitution) at a single point in time (or few points in time, as is the case for fire sales). Our paper contributes by providing evidence that comes from observing many firms across many points in time. Relative to single-firm event-based studies, our setting can attenuate some pertinent identification issues and speak to the full cross-section of stocks. Complementing index reconstitution studies from other countries such as Japan and Canada, our paper provides across-time evidence on the impact of institutional demand on stock prices for the U.S. equity market.

One other paper that provides evidence on many firms and many points in time in an entirely different setting is Hartzmark and Solomon (2023) who analyze stock returns around dividend payment dates. Despite the difference in settings, the elasticites they compute are similar in magnitude to ours.

Our work also adds to the rich literature on the role of delegated asset management in financial markets (e.g., French (2008), Stein (2009), Stambaugh (2014), Zingales (2015)). This literature has developed around the role of institutions for market efficiency, and on the consequences of delegation for investors' wealth accumulation. We contribute to this literature by highlighting that regulation designed to curb agency issues in the delegation process, may have unintended side-effects on prices in inelastic markets.

Our work builds on a small set of prior papers that analyzes prudent man laws and the prudent investor rule. In the empirical legal literature, Schanzenbach and Sitkoff (2007) find that personal trusts allocate a greater fraction of the fund's wealth towards equities following the introduction of UPIA. Schanzenbach and Sitkoff (2017) use the same data and find that, after the UPIA, fund assets correlate more strongly with the S&P500. Our paper is different, because our data allows us to look inside trusts' equity portfolios, focus on individual stock returns, and thus study the impact the UPIA has had on relative prices. In finance, Del Guercio (1996) shows that bank trusts significantly tilt the composition of their portfolios toward stocks that are viewed by the courts as prudent, while mutual fund managers do not. Since her data is pre-UPIA, she cannot examine the effect of the law change on portfolios and prices. Hankins, Flannery, and Nimalendran (2008) study the introduction of UPIA to understand institutional preferences for dividend-paying stocks. Since they do not consider prices, their results do not speak to the inelastic market hypothesis.

3 Institutional Background

In this section we provide some institutional background on trusts and trust law.[3]

3.1 Trusts

In its most basic form relevant for our paper, a trust is an investment vehicle which a "settlor" sets up with the intention of supporting one or more fund beneficiaries. The settlor selects "the trustee", who is responsible for distribution, management, custody and administration of the wealth in the trust. Historically, going back at least to 14th century England, trusts were a legal vehicle to conveniently pass on wealth (then usually in the form of real estate) from one generation to the next. This has changed. As observed by Langbein (2004):

> Today's trust has ceased to be a conveyancing device for land and has become, instead, a management device for holding a portfolio of financial assets. [...] Such a portfolio requires skilled and active management. Investment decisions need to be made and monitored, the portfolio rebalanced and proxies voted.

Responsible for the "skilled and active management" Langbein describes are the trustees, which, for modern trusts are usually fee-paid professional service providers in bank trust departments, trust companies, and other institutions that offer trust services. From a finance perspective, then, a trust is simply a form of delegated financial management in which the trustee manages a portfolio of assets on behalf of her clients.

[3]Because the law is particularly relevant for the governance of trusts, and because the associated body of legal rules is both complex and voluminous, our brief account in this section draws heavily on prior work of legal scholars. In particular Sitkoff (2003), Schanzenbach and Sitkoff (2007) and Sitkoff (2019) have been very helpful and we refer interested readers to these papers for additional legal background on trusts.

There are many legal variants of the basic trust structure. The prototypical case is an irrevocable personal trust in which the settlor is an individual who transfers assets to the trust for the benefit of the ultimate owners, such as, for example, spouses or children. In an irrevocable trust, the settlor gives up all ownership rights on those assets and there is no option to reverse that decision once the fund is set up. The fund is then managed by the trustee. Irrevocable trusts are a tax advantaged way to transfer wealth from one generation to another. By contrast, in a revocable trust the settlor retains the option of getting the assets out of the fund again.

Trusts are often set up by wealthy individuals or families for purposes of estate planning, shielding assets from creditors, tax optimization, probate avoidance, charity, or philanthropy. While they share the basic structure above, the specific legal form of a trust is dictated by the purpose. State laws across the U.S. are of key importance for the specific legal arrangements that are available to a potential settlor.

Unless otherwise mentioned, most of our discussion in the following is from the perspective of a personal irrevocable fund. In our empirical work below, in line with the objectives of our study, we will focus on those trusts in which form 13F filing institutional investors act as professional trustees have discretion to make investment decisions. Trusts in which the settlor retains most of the decision rights are thus not part of our study.

3.2 Agency Problems in Trusts

Being a form of delegated asset management, agency concerns are central to trusts. While the trustee is installed by the settlor to manage the assets of the trust for the benefit of the beneficiaries, the trustee has substantial discretion in how to manage these assets. Since trustee actions are not perfectly observable, and since writing complete contracts is usually not feasible, the potential for agency problems in trusts is thus substantial. Exacerbating agency problems for trusts is the fact that, contrary to corporate executives, trustees enjoy legal protection against removal in normal circumstances. In addition since, contrary to boards or institutional investors in the corporate context, settlors and beneficiaries are often not experts (e.g., spouses or underage children), their ability to monitor trustees may often be particularly limited.

The central governance tool to ensure trust funds are not mismanaged or misappropriated is thus trust law. As Sitkoff ((2019), p.2) explains: "Trust law's answer to this problem of agency costs is to subject a trustee to fiduciary duties in the trustee's exercise or nonexercise of the trustee's powers. Fiduciary principles are thus the primary beneficiary safeguard in modern trust practice."

3.3 Trust Fiduciary Law: The Duty of Prudence

Trust law subjects a trustee to fiduciary duties, which are duties to, and enforceable by, beneficiaries. A central fiduciary duty is the *duty of care*, which holds that a trustee "has a duty to administer the trust as a prudent person would, in light of the purposes, terms, and other circumstances of the trust, exercising reasonable care, skill, and caution" (Sitkoff ((2019), p.7)). The duty of prudence, and the definition of what constitutes prudent trustee behavior, has particular implications for the investment decisions a trustee can make.

For a long time, the generally accepted standard of prudence for trust investments in the U.S. was the so-called *prudent man rule*. This rule descended from the 1830 court decision in the seminal case of *Harvard College v. Amory*, and inspired the Restatement of the Law (Second) (1959), one of the most influential texts in trust law before the regulatory change we exploit in this paper. The Restatement encouraged courts to assess the prudence of a trustee's investment decisions based on the individual characteristics of a given asset. In effect, the prudence of an investment portfolio of a given trust was determined asset-by-asset without any portfolio considerations. Because being in breach of the duty of prudence would result in personal liability for the trustee, the asset-by-asset determination of prudence gave trust fund managers a strong incentive to invest mainly in assets which courts would likely consider prudent.

3.4 The Uniform Prudent Investor Act

The regulatory change we exploit in this paper is the Uniform Prudent Investor Act (UPIA) which was drafted by the National Conference of Commissioners on Uniform State Laws and subsequently put into state law in a staggered fashion across U.S. States. UPIA is a trust law reform which reorients the standard of prudence, explicitly linking it to "modern portfolio theory" in finance.[4] The key new requirement introduced by UPIA was that prudence should be assessed "in the context of the trust portfolio as a whole, and as a part of an overall investment strategy having risk and return objectives reasonably suited to the trust". This new *prudent investor rule*, which superseded the old prudent-man rule, thus explicitly takes a portfolio perspective and allows trustees to invest into assets that previously would have been deemed not prudent. UPIA also explicitly requires trust fund managers to diversify their portfolio. By 2006, the UPIA, and with it, the prudent investor rule, was adopted by all U.S. States.

The transition from the prudent man rule to the prudent investor rule constitutes an attractive opportunity to study the impact of institutional investors on stock prices for two reasons. First, the rule change has a direct impact on the portfolio of stocks held by trust funds. Under the prudent man rule, each individual stock needed to satisfy the standard of prudence, while under the prudent investor rule, only the final portfolio as a whole needs to satisfy those standards. Compared with the prudent man rule, the prudent investor rule thus leaves more scope for investing in stocks which were not considered prudent under the old regime. Specifically, after the law change, we would expect trust fund managers to increase their investments in stocks that were previously deemed not sufficiently prudent because, (i) the prudent investor rule encourages, and such stocks improve, portfolio diversification, because (ii) under the prudent investor rule, investing too much into prudent assets might itself be considered imprudent, and because (iii) professional trust fund managers are usually compensated as a percentage of assets under management, which gives an incentive to increase risk much in the spirit of the classical Jensen and Meckling (1976) principal agent framework.

[4]The first paragraph of the preface of the UPIA makes this motivation explicit. We provide the preface in the Appendix.

A second advantage is that the law change reflects advances in academic finance, explicitly citing "modern portfolio theory" as a core motivation for UPIA. The law change was in no obvious way designed to benefit the firms held by trusts directly, which helps attributing causality in case we find that stock returns change when the law changes.

We close this section with two additional observations. First, there are cases in which a trustee delegates a function of trusteeship. In this case, fiduciary standards still apply because the trustee must exhibit prudence in "selecting, instructing, and periodically monitoring the agent" (Sitkoff ((2019), p.15)). In addition, the agent owes then a duty of care to the trustee. This minimizes the possibility that a trustee can circumvent prudent investment laws simply by hiring an agent who would then invest in assets which would be considered "imprudent" if held by the trustee herself. More generally, as Schanzenbach and Sitkoff (2007) argue and document with examples, there were practical limits on the ability to contract around the prudent man rule – for example, by explicitly authorizing a trustee to invest in "imprudent" securities – because courts would often nevertheless evaluate the trustee's behavior relative to the prudent man standard in case of an ex post legal dispute. In short, while the duty of prudence is formally a default law, prior research shows that it has substantial teeth and is broadly relevant for trusts.

Second, we note that UPIA does not affect other institutional investors such as mutual funds, hedge funds, and insurance companies. Pension funds are subject to the Employee Retirement Income Security Act (ERISA, 1974), which does impose prudence duties on pension fund managers, related to the duties relevant for trusts. The core difference is that ERISA is a federal law (which predates UPIA by two decades) while UPIA is implemented as state law. By design of our state-level difference-in-difference tests, federal laws cannot affect our results.

4 Theoretical Framework

We derive our main predictions in a simple model that captures the relation between trust managers' portfolio choice and the prudent-man legal standard, as well as the dynamics of asset prices around the passage of the UPIA law in a stylized way. The model builds on, and closely follows, earlier work on inelastic prices and delegated portfolio management by Pavlova and Sikorskaya (2023). The key insight from the model is that prudent man laws induce "regulatory tilts" in the portfolios of trusts, and that changes in the law yield testable predictions for holdings and prices. The model also informs our estimation of demand elasticities later in the paper.

There are two periods, $t = 0$ and $t = 1$. There is a riskless asset, with a rate of return r normalized to zero, and N risky assets (stocks) paying cash flows of D_i for stock i at time t=1. Let $D_i = \bar{D}_i + \epsilon_i$, where $\bar{D}_i$ is the expected cash flow from asset i and $\epsilon_i \sim N(0, \sigma_\epsilon^2)$ is an idiosyncratic shock that is uncorrelated across assets.[5] Risky assets are in fixed supply. We define a vector for period-zero prices $S = (S_1, ..., S_N)$ and a vector for period-one returns $R = D - S$, with covariance matrix $\Sigma = \sigma^2 I_{N\times N}$.

There are two broad types of investors, namely direct investors and asset managers. Asset managers are further partitioned into two subgroups, namely fund managers and trust managers. All investors have constant absolute risk aversion (CARA) preferences with a coefficient of risk aversion γ. Direct investors choose their demand for risky assets θ_D so as to maximize their expected utility from final wealth $E(u(W_D)) = -exp\{-\gamma W_D\}$, with $W_D = W_0 + \theta_D'(D - S)$. As is standard in CARA-normal models, this gives rise to the following demand for risky assets:

$$\theta_D^* = \frac{1}{\gamma}\Sigma^{-1}(\bar{D} - S). \tag{1}$$

Other investors delegate their investment to fund managers. Fund managers are compensated based on a combination of fixed salary $\phi_F \geq 0$, performance-based pay on the return of the fund they manage, R_F, as well as for performance relative to an exogenous benchmark B_F such that the final wealth of a fund managers is: $W_F = \phi_F + a_F R_F + b_F(R_F - B_F)$, where $a_F \geq 0, b_F > 0$. This captures the realistic feature that benchmarking to an index like, for example, the S&P500 and compensation contracts that depend on performance relative to an index are very common.[6] Denote the weights of asset i in the benchmark index by $\omega_{F,i} \geq 0$ and

[5] Common shocks to stock returns can be included in the model, but we abstract from them for brevity.

[6] For example, Ma, Tang, and Gomez (2019) document that a large majority of mutual fund managers has a compensation contract that features benchmarking. Performance-evaluation relative to benchmarks are also very common for most other types of institutional investors (e.g., Bank for International Settlements (2003)).

denote the corresponding vector of weights by ω_F. Fund managers then choose the vector of their demand for the N assets θ_F so as to maximize their expected utility of managerial compensation, $E(u(W_F)) = -exp\{-\gamma W_F\}$, which yields:

$$\theta_F^* = \frac{1}{\gamma(a+b)}\Sigma^{-1}(\bar{D} - S) + \frac{b}{a+b}\omega_F. \tag{2}$$

There are two key insights from equation (2). First, the existence of benchmarks creates incentives for fund managers to tilt their portfolio holdings toward the benchmark. Second, demand becomes partly inelastic because the second term does not depend on assets' risk and return characteristics.

The new feature we introduce into the model are trust managers. We start from the assumption that the general structure of compensation for trust managers is the same as for other fund managers, i.e., $W_T = \phi_T + a_F R_T + b_F(R_T - B_T)$. While we are not aware of a comprehensive study on trust fund manager compensation contracts, we believe this is plausible and can be justified on several grounds. Most importantly, it can be shown that benchmarking emerges endogenously as part of an optimal contract in a setting of delegated portfolio management which, as in the case of trusts, involves a principal-agent relationship (Kashyap, Kovrijnykh, Li, and Pavlova (2023)). In practice, beneficiaries will almost surely evaluate trust managers and determine whether they want to terminate a trust arrangement (in the case of a revocable trust), and/or potentially sue a trust manager (in the case of an irrevocable trust), based on their performance relative to some benchmark. Finally, in cases in which the trustee hires an outside asset manager to invest on behalf of the trust, contracts will likely be benchmarked, as is common across the asset management industry.

Like fund managers, trust managers make their investment choice θ_T to maximize their expected utility $E(u(W_T)) = -exp\{-\gamma W_T\}$. The key difference is that trust managers are likely to face, on average, a more conservative benchmark than other fund managers, because trust law induces a regulatory incentive to manage portfolios in a prudent manner. To model this in a simple and tractable way, we assume that the composition of the benchmark for trust managers is governed by $\omega_T = \omega_F - c\hat{\psi}$, where $\hat{\psi} = (\hat{\psi}_1 \ \hat{\psi}_2 \ ...\hat{\psi}_N)'$ is a column vector tracking the extent to which a given stock is considered prudent according to trust law. For $\hat{\psi}_i < 0$ stock i is "prudent," for $\hat{\psi}_i > 0$ it is "imprudent". The parameter $c \geq 0$ governs the strength of the law-induced incentive to favor prudent stocks and shun imprudent stocks. The optimal portfolio selected by trust managers is given by:[7]

$$\theta_T^* = \frac{1}{\gamma(a+b)}\Sigma^{-1}(\bar{D} - S) + \frac{b}{a+b}\omega_T = \theta_F^* - \frac{bc}{a+b}\hat{\psi}. \tag{3}$$

Equation (3) shows that, in the absence of trust law and a duty of prudence, $c = 0$ and trust managers would in our model choose the same portfolio as the average other fund, because they would face the same benchmark. With trust law and prudence-related rules, $c > 0$ and equation (3) shows that trust funds optimally tilt their portfolios toward stocks deemed prudent, and away from stock deemed imprudent. This portion of trust demand is inelastic. We label this property of trust law on portfolio holdings "regulatory tilt".

We now turn to the pricing implications. There is a mass λ_D of direct investors, a mass λ_F of fund managers, and a mass λ_T of trust managers. In order for the market to clear, the sum of the demand of these three sets of investors has to equal the supply $\bar{\theta}$ of the risky assets:

$$\begin{aligned}&\lambda_D\theta_D + \lambda_F\theta_F + \lambda_T\theta_T \\ &= \frac{1}{\gamma}[\lambda_D + \frac{1}{a+b}(\lambda_F + \lambda_T)](\bar{D} - S) + \frac{b}{(a+b)}(\lambda_F + \lambda_T)\omega_F - \frac{bc\lambda_T}{(a+b)}\hat{\psi} = \bar{\theta}.\end{aligned}$$

Solving for equilibrium prices S yields:

$$S = \bar{D} - \gamma A\Sigma[\bar{\theta} - \frac{b}{a+b}(\lambda_F + \lambda_T)\omega_F + \frac{bc}{a+b}\lambda_T\hat{\psi}]. \tag{4}$$

where $A = \frac{1}{\lambda_D + \frac{\lambda_F + \lambda_T}{a+b}}$. Equilibrium prices have many intuitive properties: they decline when

[7] The level of base pay is allowed to differ in our model across manager types. In line with the previous literature, we take the contract parameters a and b as exogenous and we further assume that a and b are the same across all types of asset managers (e.g., Pavlova and Sikorskaya (2023)). Endogenizing these parameters would be interesting, but well beyond the scope of our paper and is left for future research. See Kashyap, Kovrijnykh, Li, and Pavlova (2023) for a paper that endogenizes benchmarking in delegated asset management.

risk aversion increases, when risk increases, and when the supply of the risky assets increases. Moreover, as in prior literature, the prices of stocks included in a benchmark will rise relative to stocks that are not in the benchmark. Finally, and related, the tilt of trusts' benchmark toward prudent stocks causes these stocks to have, ceteris paribus, higher prices in equilibrium compared to less prudent stocks.

We can now analyze the impact of a change in trust law. In our model, the old prudent man laws imply a regulatory tilt, governed by parameter c which leads trusts to overweight prudent assets and underweight imprudent assets. The introduction of UPIA does two things: first, by moving away from an asset-by-asset approach to measuring the prudence of trust investments, the new law makes the prudence characteristics of each individual asset less important and, second, the new law emphasizes proper diversification which leads trust benchmarks to more closely resemble the benchmarks of other well diversified institutional investors. In our model, both effects can be conveniently modelled as a reduction c.

Denote the new level of c after the law change as c_1 and assume $0 < c_1 < c$. From equation (4) we can then derive price changes around the introduction of UPIA:

$$\Delta S = -\gamma A \Sigma \frac{b \Delta c}{a+b} \lambda_T \hat{\psi}, \tag{5}$$

where $\Delta S \equiv S_1 - S$ is the price change due to UPIA and $\Delta c \equiv c_1 - c$ is the change in c which, by assumption, is negative. Thus, prices decline for prudent stocks ($\Delta S_i < 0$) and increase for imprudent stocks ($\Delta S_i > 0$) after UPIA is introduced.

Demands by investors change as follows. Denoting post-UPIA quantities again by a subscript 1 we have:

$$\Delta \theta_D^* \equiv \theta_{D1}^* - \theta_D^* = \frac{1}{\gamma} \Sigma^{-1} (-\Delta S), \tag{6}$$

$$\Delta \theta_F^* \equiv \theta_{F1}^* - \theta_F^* = \frac{1}{a+b} \Delta \theta_D^*, \tag{7}$$

where the last equality follows from $\theta_F^* = \frac{1}{a+b}\theta_D^* + \frac{b}{a+b}\omega_F$ and the fact that UPIA does not change the benchmarks of non-trust fund managers. Since $\Delta S_i < 0$ for prudent stocks, the above equation shows that, in equilibrium, non-trust investors will hold more prudent stocks after the introduction of UPIA, and vice versa for imprudent stocks. Finally, we have:

$$\begin{aligned}\Delta\theta_T^* \equiv \theta_{T1}^* - \theta_T^* &= \frac{1}{\gamma(a+b)}\Sigma^{-1}(-\Delta S) - \frac{b\Delta c}{a+b}\hat{\psi} \\ &= \frac{\lambda_D(a+b)+\lambda_F}{\lambda_D(a+b)+\lambda_F+\lambda_T}\frac{b(-\Delta c)}{a+b}\hat{\psi}\end{aligned} \tag{8}$$

For imprudent stocks, with $\hat{\psi}_i > 0$, the holdings of trusts therefore increase after the law change, and vice versa for prudent stocks.

We summarize the model in the following three predictions, which we will bring to the data in the following sections:

Prediction 1: *Before the UPIA law change, relative to other institutional investors, trusts tilt their portfolios towards prudent stocks ("regulatory tilts").*

Prediction 2: *After the UPIA law change, the holdings of prudent stocks by trusts decrease, while the holdings of imprudent stocks increase.*

Prediction 3: *After the UPIA law change, the prices of prudent stocks decrease, while the prices of imprudent stocks increase.*

5 Data

5.1 UPIA adoption by US States

The Uniform Prudent Investor Act (UPIA) was incorporated into state law by U.S. states at different points in time. To obtain implementation dates, we start with a list of States that have adopted the UPIA and, for each State, the associated state laws, all from the FDIC.[8] We then manually collect the effective date for each law, with main sources being state government websites and WestLaw. From 1986 to 2006, fifty-one states have adopted the Uniform Prudent Investor act.[9] Table 1 shows the resulting implementation dates.

5.2 Institutional Investor Data

We use institutional equity holdings obtained from the Thomson Reuters Institutional Holdings 13F Database. The database covers equity holdings of all institutional investors who exercise "investment discretion" over assets under management of at least $100 million. Such investors must report their holdings to the SEC on form 13F on a quarterly basis.

To identify trusts, we obtain institutional investor classification data used in DeVault, Sias, and Starks (2019), a finely-grained proprietary data set of Thomson Reuters institutional classifications to identify 57 different organizational types.[10] Based on this classification, we define an institution as a trust if it belongs to one of the following organizational types: Bank and Trust, Banking Institution, Commercial Bank, Private Bank, Savings Bank, Trust Bank, and Trust Company. Throughout the paper we refer to these entities as "trusts." This classification reflects the fact that bank trust departments have historically been key institutions to manage trust assets and to act in a fiduciary capacity for trust assets. Using banks to identify trust assets is also in line with the approach in Del Guercio (1996). A main advantage of the DeVault, Sias, and Starks (2019) classification in our setting is that there exist trust companies which are not banks. While we capture them with our detailed classification, we would miss them using the more standard classification of five investor types.[11]

[8]Source: `https://flofr.gov/sitePages/documents/69U100/FDIC-Trust-Examination-Manual-4-2-2018.pdf` (retrieved: June 2020).

[9]The Uniform Prudent Investor Act (UPIA) was drafted in 1994. Early adoptions are possible because some states, for example Illinois, worked off early drafts of the UPIA and the Restatement (Third) of Trusts from 1992 on which the UPIA is based. Other States, like Delaware, were model states on which some of the UPIA was based. Following the FDIC, and similar approaches in Schanzenbach and Sitkoff (2007) and Schanzenbach and Sitkoff (2017), we use the date of the state law that first incorporates the essential features of UPIA as implementation date.

[10]We thank Rick Sias and Laura Starks for making the classification data available to us.

[11]While our classification is more accurate, we obtain qualitatively similar results in our main holdings and

Using 13F data allows us to analyze the impact of the UPIA law change on a security-by-security level. That is, we can answer questions that relate to how trusts allocate their investments across securities *within* the universe of U.S. equities and therefore study the impact of the law change on portfolio composition and security prices. Other data sources, like until 2008 the SDI data from the FDIC, which also provide data on trust assets, do not provide details on which stocks are held, and are therefore not suitable for our context. Moreover, in contrast to our 13F data, the FDIC data do not cover non-depository trust managers, i.e. trusts that are not banks.

While we believe the 13F data, combined with the 57-category DeVault, Sias, and Starks (2019) institutional classification, is the best data available for our purposes, it is not without limitations. First, we observe holdings aggregated at the institution level and not trust-by-trust. Second, among the stocks reported on form 13F, some may not be covered by state-level trust law. For example, banks also manage pension trusts, which are governed by ERISA, a federal law. That said, this should not impact our inferences because, by design, a federal law cannot affect our difference-in-difference estimates at the state level. If anything, stocks not covered by state-level trust law would likely work against us because they induce noise into our estimation. We show in robustness tests that our main results also obtain when we drop pension funds.

Third, and related: given that banks were not allowed to invest in securities outside of their fiduciary capacity before the repeal of the Glass-Steagall act in 1999, our data should closely track the stock holdings in a bank's trust department up to 1999. However, after 1999, equity holdings reported on form 13F may contain non-fiduciary assets (for example, banks trading on their own account). We deal with this issue in two ways. In our baseline tests, we use the assignment of trusts described above also for observations after the year 1999. While institutions could, in principle, hold equities then for other reasons, we argue it is reasonable to assume that institutions with a substantial bank trust department before 1999 will most likely have a substantial bank trust department also for many years after 1999. Even if their business changes, such changes will take time to be implemented. That said, as a robustness check, we identify

return tests when using banks in the standard Bushee (e.g., Bushee (2001)) classification.

institutions that became financial holding companies, and thus potentially hold other assets, and show that our main results are unaffected when we drop them from the sample. While dropping those institutions is almost surely too conservative, it is useful in showing that our findings are not induced by the changes in banking regulation in the late nineties.

We assume that the location of the 13F reporting institution's headquarters is the relevant jurisdiction in matters of a breach of fiduciary duty.[12] We obtain information about institutional investors' historical headquarters location from the SEC Analytic Suite database. If missing, we search for the headquarter location in the Federal Deposit Insurance Corporation (FDIC) BankFind Suite and use that location, if available. If we cannot find headquarter location in either SEC or FDIC data, we record headquarter location as missing. We merge information about headquarter location with the Thomson Reuters 13F Database using the fund name. We are able to obtain headquarter location for 77% of the institutional investors in the Thomson Reuters 13F Database, accounting for 76% of the total dollar value invested by all institutions.

To guard against outliers, we drop institutions with less than three stocks in their portfolio (on average, institutions hold 139 stocks), and we drop state-years with less than two trusts.

Table 2 reports summary statistics separately for trusts and the remaining 13F institutions. In our sample, trusts hold between 14% and 26% of all institutional equity holdings reported in the 13F files. Their holdings are therefore substantial.

5.3 Firm-level Data and the Definition of Prudent Equity Investments

We obtain stock returns and other firm-level characteristics from the CRSP-Compustat merged database. We include all stocks with share code 10 and 11, traded on the NYSE, AMEX and Nasdaq.

What constitutes a prudent equity investment is not unambiguously defined in the legal texts.

[12] This is an approximation. Strictly speaking, the relevant jurisdiction will be where the trust resides, which is usually at the location of the handling institution. Our approach follows Schanzenbach and Sitkoff (2017) who use a similar approximation and also provide relevant legal background.

To a substantial degree it is a matter of interpretation by courts. Based on the prudent man rule and the associated comments in the Restatement of the Law (Second) (1959),[13] and following prior work of Del Guercio (1996), Gompers and Metrick (2001), and Bennett, Sias, and Starks (2003), our analysis focuses on a set of six firm-level characteristics that can plausibly be linked to prudence: a firm's CAPM beta, firm age, dividend yield, profitability, stock return volatility, and S&P Index membership. We provide the respective variable definitions in the appendix.

To account for the fact that each of the six variables above is a noisy proxy of the prudence of a given stock, we combine those variables into one index as follows. First, for each year, we define the investable stock universe as the set of stocks that where held by any 13F institution in our sample in the previous 40 quarters. Second, separately for each quarter, we sort stocks into terciles by dividend yield, profitability (return on equity), CAPM beta, and stock return volatility. For firm age, we sort stocks into three groups: age $>$ 15 years, age between 5 and 15 years and age $<$ 5 years. For S&P 1,500 membership we form two groups: member/non-member. We then assign, separately for each characteristic k, a score equal to -1 to the tercile or groups that is most prudent (old firms, S&P 1,500 member, high dividend yield and profitability, low CAPM beta and stock return volatility), we assign 0 to the middle group, and 1 to the tercile or group that corresponds to the least prudent stocks (young firms, S&P 1,500 non-member, low dividend yield and profitability, high CAPM beta and stock return volatility). For a given stock i at time t, we then define a prudence index as:

$$\psi_{it} = \sum_{k=1}^{6} Score_{it}^{k}, \tag{9}$$

where $Score_{it}^{k}$ is the score for each variable k. We ensure that scores are constructed using information that would be available to investors at date t (see appendix for details on variable construction). ψ thus ranges from -6 to 6, with -6 indicating the most "prudent" stocks and 6 indicating the most "imprudent" stocks.

[13]See the "Prudent Man Rule" section and the associated comments in Appendix C of FDIC Trust Examination Manual (retrieved: July 2019).

The ψ measure is our empirical analogue to the parameter $\hat{\psi}$ in the model in Section 4. Just like for $\hat{\psi}$, lower values of ψ correspond to more prudent stocks. The main difference to the model is that we no longer have a clear cutoff value that delineates prudent from imprudent stocks. This reflects the reality that prudence is determined by courts and that no hard and fast rules exist that would allow trustees to determine prudence. Rather, some stocks, due to their characteristics, are more likely defensible as prudent in court than others. ψ can thus be though of as a measurement device to determine the likelihood that a court would find a stock to be prudent, rather than imprudent, with lower values being associated with more prudent stocks.

Table 3, Panel A presents summary statistics for the main variables used. Panel B breaks institutional portfolios into four groups of prudence (measured by ψ). The table shows that in terms of dollars invested, the most prudent group of stocks ($\psi \leq -3$) represents around 60% of value, while the most imprudent stocks account for only 3%.

6 Results on Holdings

6.1 Regulatory Tilts: Holdings Differences before the Law Change

Del Guercio (1996) was the first to show that prudent man laws induce tilts in trust portfolios. We begin by documenting regulatory tilts towards prudent stocks by trusts also for our sample and period.

Table 4 shows simple univariate differences in the holding characteristics of trust and non-trust institutions. We first compute for each institution in a given state, one year before the introduction of UPIA, a value-weighted average for each characteristic across all stocks. We then take an equal-weighted average across all trusts and non-trusts, respectively, at that state-date. Finally, we take equal- and value-weighted averages across states. The results in Table 4 show significant regulatory tilts: trusts invest in stocks with smaller CAPM beta, more profitable stocks, older stocks, S&P 1,500 stocks, and less volatile stocks compared to other institutions. When we aggregate the six characteristics into the ψ index to reduce noise, we find a large and highly significant difference between trusts and non-trusts. When we calculate a value-weighted average across institutions, the differences decrease slightly in magnitude but become statistically more significant, while the central message remains unchanged.

Figure 1 presents average portfolio weights seperately for trusts and non-trusts. Portfolio weights are calculated for each institution and for each integer value of the prudence index, ψ, in our sample, one year before the state introduced a UPIA statute. These weights represent the proportion of the institution's total portfolio that is invested in stocks corresponding to a given prudence value, ψ. The figure then presents equal-weighted sample averages for each value of ψ. The figure reveals a clear pattern: compared with all other institutions trusts hold a greater fraction of their assets in the most prudent groups of stocks ($\psi \leq -3$) and less in all other prudence categories. The differences are substantial, in particular for the most prudent stocks. The figure also shows that non-trusts overweight less prudent stocks, relative to trusts. As before the figure makes clear that stocks with higher ψ-values and therefore lower prudence make up only a small portion of the total dollar amount invested by institutions.

In sum, the results in this section are consistent with Prediction 1 of the model in Section 4 as well as with DelGuercio's previous findings: prudent man laws induced regulatory tilts.

6.2 Trusts' Portfolio Choices around the Introduction of the UPIA

6.2.1 Institutional Portfolio-Level Evidence

The UPIA reorients the standard of prudence from an asset-by-asset perspective to a portfolio perspective. If the old prudent man laws represented a binding constraint on the ability of trust fund managers to invest in imprudent stocks, the law change relaxes that constraint. According to Prediction 2 of the model in Section 4, we expect trusts to reduce their holdings of prudent stocks and increase their holdings of other stocks after the law change.

As states encoded the UPIA into state law in a staggered fashion, and because UPIA applies to trusts but not other institutions, we estimate:

$$PortfolioShare_{j,p,s,q} = \alpha_j + \alpha_{s,q} + \beta_{1,p} Trust_{j,s,q} + \beta_{2,p} UPIA_{s,q} \times Trust_{j,s,q} + \epsilon_{j,p,s,q} \tag{10}$$

where *Portfolio Share*$_{j,p,s,q}$ is the portfolio weight of a given group of stocks, in the portfolio of institutional investor j, in state s, in quarter q. We run this regression separately for four quartiles of ψ: prudent stocks, with $\psi \leq -3$; less prudent stocks, with $-2 \leq \psi \leq 0$; less imprudent stocks, with $1 \leq \psi \leq 3$; and imprudent stocks with $\psi > 3$. Those quartiles are indexed p.

The above specification allows us to eliminate a substantial amount of potentially confounding variation. α_j are institutional investor fixed effects, which control for stable differences in portfolio choices between trusts and all other institutions, arising, for example, from unobserved managerial traits, incentives, or client preferences. Since trust assignment can change for a given institution in our data, the *Trust*$_{j,s,q}$ variable is not subsumed by the fixed effect. $\alpha_{s,q}$ are state $\times$ date fixed effects, which allow us to compare trusts to non-trusts within the same state at the same point in time. Any variation at the state-date level, such as local economic conditions or the local political environment, does not affect our estimates as long as these factors influence both trusts and non-trusts in the same way. *UPIA*$_{s,q}$ is an indicator variable that takes value 1 if state s has already adopted the prudent-investor rule in quarter q. The coefficient of interest in our analysis is $\beta_{2,p}$, which captures the causal impact of the regulation on trust demand for prudent and imprudent stocks when UPIA is introduced in a state. For each state that passes the new law, we include 40 pre-event quarters and 40 post-event quarters in the analysis. We double-cluster standard errors at the institution and date (year-quarter) level.

As Baker, Larcker, and Wang (2022) emphasize, heterogeneous treatment effects can introduce bias in standard difference-in-differences estimators. In our study, this concern arises because trusts in states that have already passed a UPIA law are used as comparison units for trusts in states adopting the law later. Since outcomes from earlier-treated trusts might reflect treatment effects, they could pose a "bad comparison" problem, potentially biasing staggered

DiD treatment effect estimates, even with random treatment assignment. To address this, we also employ the Sun and Abraham (2021) estimator, designed for settings with heterogeneous treatment effects. This approach uses only never-treated or last-treated trusts as comparison units and calculates the overall treatment effect from a series of cohort-time-specific treatment effects. In our setting, for each cohort an institution can either be a treated unit (trust funds in states enacting UPIA) or a comparison unit (all other institutions).

Consistent with Prediction 2, results in Table 5, Panel A, show that upon the adoption of UPIA, trusts reduce their holdings of low ψ ("prudent") stocks by 4.0 percentage points compared with other institutions headquartered in the same state. At the same time, trusts increase the fraction of their portfolio invested in the stocks we label "less prudent" stocks, which are stocks with values of ψ between -3 and 0, by 3.2 percentage points. This indicates that roughly 80% (= 3.2/4.0) of the trust money disinvested from prudent stocks is reinvested into this category of "less prudent" stocks. By contrast, trusts seem to reinvest much less in the two categories identifying more imprudent stocks ($\psi > 0$): trusts change their holdings of "less imprudent" and "imprudent" stocks by amounts that are economically and statistically much smaller. Overall, then, trusts rebalance away from the most prudent stocks towards stocks that are more speculative, in relative terms, but, in absolute terms, still reasonably prudent.

Because there are institutions that switch in the classification from trust to non-trust and vice versa, the coefficient on the trust indicator is also identified. Consistent with the idea of regulatory tilts, Table 5 shows that institutions increase their holdings of the most prudent stocks, while reducing their holdings of other stocks, once they become classified as trusts, and vice versa.

Panel B presents results for the Sun and Abraham (2021) estimator, which are in line with the findings from Panel A. This indicates that biases from heterogeneous treatment effects are not a large concern in our setting.

Figure 2 presents a dynamic version of this analysis. We estimate:

$$Portfolio\ Share_{j,p,s,t} = \alpha_j + \alpha_{s,t} + \sum_{t=-15}^{15} \beta_{p,t} \mathbb{1}(time = t) \times Trust_{j,s,t} + \epsilon_{j,p,s,t} \tag{11}$$

where $\mathbb{1}(time = t)$ are indicator variables that take value 1 if state s has adopted the prudent-investor rule in each semester t in event time, from $t = -15$ to $t = 15$ (we use semesters, rather than quarters, to reduce noise in our estimates). Event time is defined relative to the adoption of a UPIA statute as described in Table 1. For ease of interpretation, we impose a common starting point equal to 0 at $t = -15$.

Consistent with results from Table 5, we find a clear pattern: as shown in the left panel, upon the passing of a UPIA statute, trusts rebalance their portfolio away from the most prudent stocks ($\psi \leq -3$) and towards stocks that are less prudent in relative terms ($-2 \leq \psi \leq 0$). The right panel shows that we do not observe a comparable pattern for the remaining two groups of "less imprudent" and "imprudent" stocks. Pre-trends are not visible in either panel. The analogous graph based on the Sun and Abraham (2021) estimator looks very similar, so we omit it for brevity.

Finding that rebalancing occurs mainly from the lowest to the second lowest ψ quartile is useful for identification in our later tests, because intuitively demand changes can only impact returns, if demand actually changes. Hence, we would predict much stronger effects for the lowest two ψ quartiles than for the two higher ψ quartiles. We come back to this issue below.

6.2.2 Stock-Level Evidence

Next, we provide stock-level evidence. Because UPIA represents a law change on the state-level, our analysis focuses on the weight of stock i in state-level portfolios. Specifically, we estimate:

$$\Delta w_{i,p,s,q} = \alpha_{i,p} + \alpha_{s,q} + \beta_{1,p} \times UPIA_{s,q} + \gamma X_{i,q} + \epsilon_{i,p,s,q}, \tag{12}$$

where $\Delta w_{i,p,s,q}$ is defined as:

$$\Delta w_{i,p,s,q} \equiv w^{T}_{i,p,s,q} - w^{NT}_{i,p,s,q}, \tag{13}$$

with state-level weights defined as

$$w^{T}_{i,p,s,q} \equiv \frac{I^{T}_{i,p,s,q}}{\sum_i I^{T}_{i,p,s,q}} \quad \text{and} \quad w^{NT}_{i,p,s,q} \equiv \frac{I^{NT}_{i,p,s,q}}{\sum_i I^{NT}_{i,p,s,q}}, \tag{14}$$

respectively, where $I^{T}_{i,p,s,q}$ stands for the dollar amount of investment by trusts in state s at time t in stock i in ψ-portfolio quartile p and $I^{NT}_{i,p,s,q}$ denotes the corresponding item for all other institutions ("non-trusts"). To guard against outliers, we winsorize Δw at the 0.5% level.

As before, we run this regression separately for the four ψ portfolios. $UPIA_{s,q}$ is again an indicator variable that takes the value 1 if state s has adopted the prudent-investor rule in or after event quarter q, using 40 quarters before and after the introduction of an UPIA statute in the state. The coefficients of interest are the four coefficients $\beta_{1,p}$ which capture, for each of the four ψ-portfolios, the change in the holdings difference of a given stock in the portfolios of trusts and non-trusts in a given state around the passage of UPIA. In all specifications, we control for a set of firm level variables $X_{i,q}$ which includes market capitalization, the book-to-market ratio, the previous 12-month return, the stock return over the previous month, and stock turnover (all defined in the Appendix). We also include state $\times$ date fixed effects ($\alpha_{s,q}$), which absorb any time-varying heterogeneity at the state-level (e.g., other changes in regulation, local economic activity) as well as firm $\times$ ψ-portfolio fixed effects ($\alpha_{i,p}$). We double-cluster standard errors at the firm and date (year-quarter) level.

Table 6 presents results. Consistent with Prediction 2 and the results in Table 5, column 1 shows that the estimated coefficient β_1 on prudent stocks is negative. Thus, Δw, the difference in holdings of prudent stocks between trusts and non-trusts, decreases after the adoption of UPIA, that is: relative to non-trusts, trusts reduce their holdings of the most prudent stocks. This is in stark contrast to the positive and significant coefficient on the portfolio of less prudent stocks in column 2, which indicates that, relative to non-trusts, trusts increase their holdings of those stocks. The portfolio of less imprudent stocks in column 3 shows a similar pattern, but with a smaller magnitude, while column 4 shows effectively no effect for the most imprudent stocks. Combined, this evidence supports our previously documented finding that the portfolio rebalancing of trusts seems to be concentrated in the two categories of prudent stocks (which trusts sell) and less prudent stocks (which they buy).

In order to compare the changes in Δw with the difference in holdings before the enactment of the UPIA statue, we conduct the same regression as in equation (15), but include firm fixed effects instead of firm $\times$ $\psi\text{-}Portfolio_{i,q}$ fixed effects. We thus estimate

$$\Delta w_{i,p,s,q} = \alpha_i + \alpha_{s,q} + \alpha_p + \beta_{1,p} \times UPIA_{s,q} + \gamma X_{i,q} + \epsilon_{i,p,s,q}. \tag{15}$$

While the former specification is more rigorous and eliminates more potentially confounding variation, using the latter specification with only stock fixed effects allows us to estimate the average value of Δw for each ψ-quartile prior to the introduction of UPIA, which is given by α_p. Figure 3 plots Δw for the four different ψ-quartile portfolios before the UPIA adoption (blue squares) and Δw after the UPIA adoption (blue triangles), which is obtained via $\alpha_p + \beta_{1,p}$ from the regression above. The figure shows that prior to the UPIA, the holdings gap between trusts and non-trusts is positive for prudent stocks, while the holdings gap is negative for less prudent stocks. Consistent with Prediction 2 and the results in Tables 5 and 6, the holdings gap decreases after the adoption of UPIA laws. The holdings gap after the UPIA becomes much flatter, that is: after the UPIA, portfolios of trusts and non-trusts become similar. In fact, as indicated by the 5% confidence bands shown in the figure, we can not statistically reject the hypothesis that the holdings gaps after UPIA (blue triangles) are zero. These results suggest that the old prudent man laws induced substantial differences in the holdings of institutional investors, and that those differences were completely eliminated by changing the law from prudent man laws to the new prudent investor rule.

Overall, results in this and the previous section indicate that the introduction of UPIA statutes leads to significant changes in trusts' portfolio composition, consistent with the predictions of our theoretical framework. The direction and magnitude of these changes are consistent with prudent man laws being a driver of inelasticity in the U.S. equity markets.

7 Stock Returns around the Introduction of the UPIA

Results in the previous section indicate that after the adoption of UPIA statutes in US states, a significant fraction of money managed by trusts moves away from prudent stocks and into less prudent stocks. If equity markets are perfectly elastic, this change in demand should not be associated with any observable movement in asset prices. Conversely, under the *inelastic markets hypothesis* and according to Prediction 3 from our theoretical framework, the prices of prudent stocks should decrease upon the adoption of UPIA, while the prices of less prudent stocks should increase.

7.1 Portfolio-Level Analysis

In our theoretical framework, the regulatory tilt of trust portfolios towards certain stocks, relative to non-trust portfolios, derives from the prudence characteristics of those stocks. To examine the price impact of reducing the regulatory tilt through the adoption of UPIA laws, we run factor regressions using returns of monthly value-weighted prudence portfolios in Table 7.

To construct portfolios, we use the following procedure. We only keep months in which an UPIA statute was introduced in any of the past 12 months. For each month, we sort stocks into four ψ-portfolios using the values of ψ as of one quarter before the adoption of the most recent UPIA statute. Stocks within these portfolios are value-weighted. To evaluate the performance of these portfolios, we calculate the portfolios' alpha using a Fama and French (2015) five-factor model, with market (MKT), size (SMB), value (HML), profitability (RMW), and investment (CMA) as factors. t-statistics are computed using Newey-West standard errors with a lag length of 12.

In the first three columns of Table 7, we focus on the portfolios of prudent stocks ($\psi \leq -3$) and less prudent stocks ($-2 \leq \psi \leq 0$), the main portfolios affected by the UPIA according to our holdings results. The first column presents alphas for a strategy of buying prudent stocks, while the second column presents alphas from buying less prudent stocks. The third column presents results for the corresponding long-short portfolio. In the year following the introduction of UPIA in a state, we find that prudent stocks (i.e., the stocks which trusts sell) have negative risk-adjusted performance of -0.191% per month, while less prudent stocks (i.e., the stocks trusts buy) have a positive monthly alpha of 0.256%. These results are not only statistically significant but also economically meaningful. The value-weighted zero-investment portfolio, which goes long less prudent stocks and short prudent stocks, earns a monthly alpha of 0.447%, or 5.28% over one year.

The last three columns of Table 7 present analogous results for the sets of less imprudent and imprudent stocks. Unlike what we found for prudent and less prudent stocks, portfolios of less imprudent and imprudent stocks do not exhibit statistically significant risk-adjusted performance. Additionally, the alpha for the value-weighted zero-investment portfolio is now significantly lower and has the opposite sign. These results are noteworthy as they align with our findings in Sections 6.2 and 6.2.2 that trusts markedly increase (decrease) their holdings in less prudent (prudent) stocks, while they adjust their holdings of more imprudent stocks ($\psi > 0$) by much less. Thus, if return patterns are driven by regulatory-induced rebalancing, we would anticipate a price reaction for less prudent and prudent stocks but no, or at best a much weaker, effect for the less imprudent and imprudent categories. This is exactly what we find.

The pattern of the alphas across the four prudence portfolios in Table 7 is useful in attenuating identification concerns. Specifically, the fact that we see the strongest effects for the first two portfolios *with opposite signs* speaks against potential concerns that the five factors may not fully capture all relevant risk-exposure. If the prudence characteristic ψ were correlated with potential risk-factors not fully captured by the five factors in our model, we would expect the alphas to be correlated with ψ, which is in contrast to the stark discontinuity we observe across the ψ portfolios.

To further support the argument that changes in institutional demand around UPIA are driving return movements, we conduct a falsification test. The logic of this test is straightforward: if firms with different prudence scores ψ were simply different in unobserved but return-relevant ways (after adjusting for factor exposure), then UPIA and the exact timing of the regulatory change should not be important and we should observe risk-adjusted outperformance also in other periods. To investigate this, we employ the non-parametric permutation method as detailed in Chetty, Looney, and Kroft (2009). In each of the 1,000 iterations of this procedure, we randomly assign a different year-month for the UPIA statute's introduction to each firm, covering the entire sample period. The reassignment is done with replacement. Subsequently, we replicate our portfolio-level analysis from Table 7 using this dataset of pseudo UPIA implementation dates.

Figure 4 reports the empirical cumulative distribution function (cdf) of the alphas generated from running 1,000 iterations of this procedure. The vertical dotted line indicates the position of the actual coefficient estimate for the alpha of a portfolio and the implied p-value when placed in the context of the cdf. We report results of Column (2)-(1), which corresponds to the spread strategy that is long on less prudent stocks and short on prudent stocks. The p-value is 0.019, suggesting that the timing of the regulatory changes is crucial in determining the documented effect on asset prices and that the return differences we observe are not simply due to confounding variation across firms correlated with ψ.

To sum up, results in this section support the *inelastic markets hypothesis* and the view that non-fundamental changes in institutional demand due to changes in regulation can affect asset prices.

7.2 Stock-Level Analysis and Demand-Elasticity Estimates

To measure demand elasticities, we can use the change in *inelastic* trust demand due to UPIA as a shock to the supply of shares to the rest of the market. We label the change in inelastic trust demand due to UPIA as residual demand RD. In our model it is given by:

$$RD = -\frac{b\Delta c}{a+b}\lambda_T\hat{\psi}, \tag{16}$$

as per equation (8).

We consider three alternatives to measuring RD in the data. The first alternative uses the model to recover RD from the difference between the holdings of trusts and funds, which are quantities we can observe. Specifically, it follows from equations (6), (7) and (8) that:

$$\Delta\left(\theta_T^* - \theta_F^*\right) \equiv \left(\theta_{T1}^* - \theta_{F1}^*\right) - \left(\theta_T^* - \theta_F^*\right) = -\frac{b\Delta c}{a+b}\hat{\psi}, \tag{17}$$

which leads to:

$$RD = \lambda_T \Delta\left(\theta_T^* - \theta_F^*\right). \tag{18}$$

In the data, we implement this first version of RD for each stock i as:

$$RD_i^1 = \frac{I_{s,-3}^T \times \left(\left(w_{i,s,T}^T - w_{i,s,T}^{NT}\right) - \left(w_{i,s,-3}^T - w_{i,s,-3}^{NT}\right)\right)}{MV_{i,-3}}, \tag{19}$$

where $I_{s,-3}^T$ is the total dollar amount invested in 13F stocks by trusts headquartered in state s and $MV_{i,-3}$ is the stock market capitalization of stock i, both measured three months before the introduction of UPIA in state s. The weights of stock i in the state-level portfolio of trusts and non-trusts, respectively, $w_{i,s,-3}^T$ and $w_{i,s,-3}^{NT}$, are defined as in equation (14) above and also measured three months before the event. $w_{i,s,T}^T$ and $w_{i,s,T}^{NT}$ are defined analogously where T denotes the point in time at which we measure holdings post-UPIA (discussed in greater detail below). We follow Pavlova and Sikorskaya (2023) and divide by market capitalization to capture the realistic feature that the same absolute change in demand should have a larger price impact for stocks with smaller market capitalization (a feature which our model does not capture for simplicity).

While residual demand in equation (18) is both theoretically correct under our model and measurable in the data, a potential empirical concern in the actual data is that the change in fund and trust holdings across time are endogenous with the law change. Therefore, as a second alternative to measuring RD, we use the difference in trust and other fund holdings before the law change, $(\theta_T^* - \theta_F^*)$, which is not subject to this endogeneity concern. This measure relates directly to the model as follows. From equation (3) we know that $(\theta_T^* - \theta_F^*)$ is equal to $-\frac{bc}{a+b}\hat{\psi}$. Thus, using the difference in the holdings rather than the difference in the difference of the holdings in our demand elasticity tests means that we are estimating an upper bound on the demand elasticity since $c > c - c_1 = \Delta c$. If $c_1 \to 0$, i.e., if the law change eliminates all of the difference between trust and other fund holdings, we will recover the demand elasticity without error, since Δc then approaches c. We label this version of residual demand RD^2 and construct it analogously to RD^1 as:

$$RD_i^2 = \frac{I_{s,-3}^T \times (w_{i,s,-3}^T - w_{i,s,-3}^{NT})}{MV_{i,-3}}. \tag{20}$$

As a final alternative to measuring RD in the actual data, we consider an instrumented version of the actual holdings change of trusts in a given state and stock around the passage of UPIA:

$$RD_i^3 = \frac{I_{s,-3}^T \times (w_{i,s,T}^T - w_{i,s,-3}^T)}{MV_{i,-3}}, \tag{21}$$

with RD^2 acting as an instrument. RD^2 will be a valid instrument under two conditions. First, it needs to predict post-UPIA holdings changes (the first stage). Second, it needs to affect returns only through the predicted holdings change RD^3, which in our setting amounts to the assumption that the observable variables and fixed effects in our regressions capture all relevant risk factors.

To estimate price-elasticities, we run OLS regressions of stock returns on residual demand

RD in event time, with state-level introductions of UPIA as events. Specifically, we estimate for each stock and event:

$$R_i = \delta + \beta RD_i + \gamma X_{i,-3} + \epsilon_i \tag{22}$$

where the dependent variable R_i is the return of stock i after the passage of a UPIA statute at date $t = 0$ from $t = 0$ to T. $X_{i,-3}$ is a vector of control variables measured at event time $t = -3$. Control variables include market-cap, book-to-market, previous 12-month return, lag 1-month return, and CAPM beta. δ indicates different set of fixed effects, including time (year-month) and industry-time (Fama-French 48 industries) fixed effects. We double-cluster standard errors at the stock and time (year-month) level. We winsorize all variables at the first and last percentiles.

One additional consideration, which was not pertinent to our static model, relates to the measurement period T we use for holdings changes and returns. Based on Figure 3, which suggests that it takes a considerable amount of time for trusts to adjust their holdings, we set $T = 5$.[14] To make sure that noise in long-term returns are not contaminating our inferences, we show in the Appendix that the essence of our results is unchanged when we use $T = 1$, instead.

Table 8, Panel A, presents results from looking at one-year returns. Elasticities are computed as $\varepsilon = \frac{1}{\beta}$. Specifications (1) and (2) both imply elasticities of 0.22 (rounded). Specifications (3) and (4) imply higher elasticities of 0.34 and 0.36, respectively.[15] Specifications (5) and (6) imply elasticities of 0.10 and 0.11.

Overall, these estimates are squarely in the ballpark of estimates from the related literature presented in Gabaix and Koijen (2021), Figure 2. Given that standard efficient market benchmarks would prescribe elasticites of 5,000 or higher, our estimates unambiguously support the inelastic markets hypothesis.

[14] Here we follow Hartzmark and Solomon (2023) in assuming that it is the trades themselves that move markets, rather than anticipation of trades.

[15] Table A.1 in the Appendix presents first stage results, which show RD_i^2 is a strong predictor of RD_i^3. The F-statistics are around 25. An F-statistic above 10 is generally regarded as evidence against weak instruments (Stock and Yogo (2002)).

To further support a causal interpretation of these results, we employ again the non-parametric permutation test from Chetty, Looney, and Kroft (2009). If firms with different values of RD were simply different in unobserved but return-relevant ways, then UPIA and the exact timing of the regulatory change should not be important and we should observe a relation between RD and returns also in other periods. Figure 5 presents results which show that the timing of the regulatory changes is crucial in determining the documented effect on asset prices and that the return differences we observe are unlikely due to confounding variation across firms correlated with RD.

8 Additional Analyses and Robustness

The Chetty, Looney, and Kroft (2009) falsification tests we presented earlier speak against the concern that heterogeneity unrelated to UPIA is inducing results, but they leave open the possibility that results are due to other variables changing at the same time as the regulatory shock. Our results from Table 7 already suggest that explanation is unlikely. Return differentials arise precisely for those groups for which holdings change in a predictable way (prudent and less prudent stocks) but not for other sets of stocks. Thus, while it is impossible to fully rule out that some unobserved variable changes precisely when UPIA is introduced, the unobserved variable would have to behave in a highly specific way to explain our results.

In this section, to be conservative, we present additional tests to support our belief that our return results are not driven by another variable that contemporaneously changes when UPIA is introduced. To that end, we repeat the estimation of equation (22) but with different dependent variables: changes in institutional ownership, Amihud illiquidity, analyst forecasts (one-year ahead EPS forecast), and profitability (return on assets). We look at institutional ownership as it could change as a direct result of UPIA adoption, particularly if the counterparties to trusts' trades are retail investors, thereby altering the overall fraction of a firm shares in the hand of institutional investors. Likewise, UPIA could affect stock liquidity which in turn could affect returns. We consider analyst forecasts and profitability to take into account the possibility that other profit-relevant firm fundamentals might change around UPIA events. If, for whatever reason, UPIA would be financially beneficial to firms that were previously underweighted by trusts, relative to non-trusts, then this may explain why returns for those stocks would be higher post UPIA and vice versa.

Results are presented in Table 9 for each measure of residual demand. As can be seen from the table, we find no evidence that changes in institutional ownership, analyst forecasts, and profitability are related to residual demand around the passage of UPIA laws. Across all variables, the only (weakly) significant results we obtain are for RD^2 and RD^3 and liquidity – but reduced illiquidity when residual demand is high would predict lower, not higher returns so illiquidity can therefore not explain our results. Overall then, the results in the section together with our previous results suggest that unobserved variables that change contemporaneously with UPIA are unlikely to induce our findings.[16]

As a final robustness check, we show that our main results are robust to variations in how we define trusts. Table A.4 in the appendix shows that holdings results also obtain when we exclude pension funds (Panel A); when we exclude institutions that were classified as trusts before the repeal of Glass-Steagall, but became financial holding companies after the repeal (Panel B);[17] and when we use the Thomson Reuters classification of institutional types instead (Panel C). Table A.5 presents analogous results for the demand elasticity regressions we had shown in Table 8.

9 Conclusion

In this paper, we provide novel evidence in line with inelastic markets. We address two central questions. The first question is what causes markets to be inelastic. We argue and provide empirical evidence for the view that financial regulation can make institutional investor demand

[16]In Table A.3 in the Appendix, we show that the same conclusions emerge when we use one year horizons $T = 1$.

[17]To identify the list of banks that moved to Financial Holding Company (FHC) structure after the passage of the Gramm-Leach-Bliley Act we use the institution history, as reported on the Federal Deposit Insurance Corporation (FDIC) website.

inelastic. The second question is whether shifts in demand by institutional investors change asset prices. Our contribution is to provide, to our knowledge for the first time, evidence from a natural experiment based on staggered state-level law changes that affect institutional investor demand for the entire cross-section of U.S. stocks.

The reform we study is the Uniform Prudent Investor Act (UPIA), which was implemented across states in the U.S. from 1986 to 2006. The core feature of the UPIA we exploit is that it reorients the standard of "prudence" by replacing so-called *prudent man laws*, which governed trust investments under the old regime, with the *prudent investor rule*. We show that, before the reform, trusts tilt their portfolios towards prudent stocks, a phenomenon we label "regulatory tilts". After the law change, trusts undo these tilts which introduces large and predictable changes in demand. Consistent with models of inelastic markets, we find that in the 12 months after the reform, a value-weighted zero-investment portfolio that goes long stocks that trusts are predicted to buy (i.e., less prudent stocks) and short stocks trusts are predicted to sell (i.e., prudent stocks) earns a monthly five-factor alpha of 0.45%, or 5.3% per year. These findings are consistent with the view that the change in trust law we examine induces economically large and long-lived shifts in relative prices of assets bought and sold by trusts.

Finally, we derive estimates of the elasticity of demand for U.S. stocks based on our staggered state-level regulatory change setting. Depending on the specification, we find average price elasticities of U.S. stocks in the range between 0.11 and 0.36. Our estimates strongly support the inelastic markets hypothesis for U.S. equities.

References

Abarbanell, Jeffery S., Brian J. Bushee, and Jana Smith Raedy, 2003, Institutional investor preferences and price pressure: The case of corporate spin-offs, *Journal of Business* 76, 233–261.

Amihud, Yakov, 2002, Illiquidity and stock returns: cross-section and time-series effects, *Journal of financial markets* 5, 31–56.

Appel, Ian R., Todd A. Gormley, and Donald B. Keim, 2024, Identification using Russell 1000/2000 index assignments: A discussion of methodologies, *Critical Finance Review* 13, 151–224.

Baker, Andrew C., David F. Larcker, and Charles C.Y. Wang, 2022, How much should we trust staggered difference-in-differences estimates?, *Journal of Financial Economics* 144, 370–395.

Bank for International Settlements, 2003, Incentive structures in institutional asset management and their implications for financial markets, March.

Ben-David, Itzhak, Jiacui Li, Andrea Rossi, and Yang Song, 2022, Ratings-driven demand and systematic price fluctuations, *The Review of Financial Studies* 35, 2790–2838.

Bennett, James A., Richard W. Sias, and Laura T. Starks, 2003, Greener pastures and the impact of dynamic institutional preferences, *The Review of Financial Studies* 16, 1203–1238.

Berger, Elizabeth A., 2023, Selection bias in mutual fund fire sales, *Journal of Financial and Quantitative Analysis* 58, 1039–1077.

Bushee, Brian J., 2001, Do institutional investors prefer near-term earnings over long-run value?, *Contemporary Accounting Research* 18, 207–246.

Chang, Yen-Cheng, Harrison Hong, and Inessa Liskovich, 2014, Regression discontinuity and the price effects of stock market indexing, *The Review of Financial Studies* 28, 212–246.

Chetty, Raj, Adam Looney, and Kory Kroft, 2009, Salience and taxation: Theory and evidence, *American Economic Review* 99, 1145–1177.

Coval, Joshua D., and Erik Stafford, 2007, Asset fire sales (and purchases) in equity markets, *Journal of Financial Economics* 86, 479–512.

Del Guercio, Diane, 1996, The distorting effect of the prudent-man laws on institutional equity investments, *Journal of Financial Economics* 40, 31–62.

DeVault, Luke, Richard W. Sias, and Laura T. Starks, 2019, Sentiment metrics and investor demand, *The Journal of Finance* 74, 985–1024.

Edmans, Alex, Itay Goldstein, and Wei Jiang, 2012, The real effects of financial markets: The impact of prices on takeovers, *The Journal of Finance* 67, 933–971.

Ellul, Andrew, Chotibhak Jotikasthira, and Christian T. Lundblad, 2011, Regulatory pressure and fire sales in the corporate bond market, *Journal of Financial Economics* 101, 596–620.

Fama, Eugene F., and Kenneth R. French, 2015, A five-factor asset pricing model, *Journal of Financial Economics* 116, 1–22.

French, Kenneth R., 2008, Presidential address: The cost of active investing, *The Journal of Finance* 63, 1537–1573.

Gabaix, Xavier, and Ralph S. J. Koijen, 2021, In search of the origins of financial fluctuations: The inelastic markets hypothesis, National Bureau of Economic Research.

Glossner, Simon, 2024, Russell index reconstitutions, institutional investors, and corporate social responsibility, *Critical Finance Review* 13, 117–150.

Gompers, Paul A., and Andrew Metrick, 2001, Institutional investors and equity prices, *The Quarterly Journal of Economics* 116, 229–259.

Greenwood, Robin, 2005, Short-and long-term demand curves for stocks: Theory and evidence on the dynamics of arbitrage, *Journal of Financial Economics* 75, 607–649.

Hankins, Kristine Watson, Mark J. Flannery, and Mahendrarajah Nimalendran, 2008, The effect of fiduciary standards on institutions' preference for dividend-paying stocks, *Financial Management* 37, 647–671.

Harris, Lawrence, and Eitan Gurel, 1986, Price and volume effects associated with changes in the S&P 500 list: New evidence for the existence of price pressures, *The Journal of Finance* 41, 815–829.

Hartzmark, Samuel M., and David H. Solomon, 2023, Marketwide predictable price pressure, Available at SSRN 3853096.

Jensen, Michael C., and William H. Meckling, 1976, Theory of the firm: Managerial behavior, agency costs and ownership structure, *Journal of Financial Economics* 3, 305–360.

Kashyap, Anil K, Natalia Kovrijnykh, Jian Li, and Anna Pavlova, 2023, Is there too much benchmarking in asset management?, *American Economic Review* 113, 1112–1141.

Kaul, Aditya, Vikas Mehrotra, and Randall Morck, 2000, Demand curves for stocks do slope down: New evidence from an index weights adjustment, *The Journal of Finance* 55, 893–912.

Koijen, Ralph S. J., Robert J. Richmond, and Motohiro Yogo, 2023, Which investors matter for equity valuations and expected returns?, *Review of Economic Studies* Forthcoming.

Koijen, Ralph S. J., and Motohiro Yogo, 2019, A demand system approach to asset pricing, *Journal of Political Economy* 127, 1475–1515.

Langbein, John H., 2004, Rise of the management trust, *Trusts & Estates* 142, 52–57.

Ma, Linlin, Yuehua Tang, and Juan-Pedro Gomez, 2019, Portfolio manager compensation in the US mutual fund industry, *The Journal of Finance* 74, 587–638.

Markowitz, Harry, 1952, Portfolio selection, *The Journal of Finance* 7, 77–91.

Ofek, Eli, and Matthew Richardson, 2000, The IPO lock-up period: Implications for market efficiency and downward sloping demand curves, *Working paper*.

Patel, Nimesh, and Ivo Welch, 2017, Extended stock returns in response to S&P 500 index changes, *The Review of Asset Pricing Studies* 7, 172–208.

Pavlova, Anna, and Taisiya Sikorskaya, 2023, Benchmarking intensity, *The Review of Financial Studies* 36, 859–903.

Restatement of the Law (Second), Trusts, 1959, *As Adopted and Promulgated by the American Law Institute at Washington, D.C., May 23, 1957* (American Law Institute Publishers: St. Paul, Minn.).

Schanzenbach, Max M., and Robert H. Sitkoff, 2007, Did reform of prudent trust investment laws change trust portfolio allocation?, *Journal of Law and Economics* 50, 681–711.

——— , 2017, The prudent investor rule and market risk: An empirical analysis, *Journal of Empirical Legal Studies* 14, 129–168.

Shleifer, Andrei, 1986, Do demand curves for stocks slope down?, *The Journal of Finance* 41, 579–590.

Sitkoff, Robert H., 2003, An agency costs theory of trust law, *Cornell Law Review* 89, 621.

——— , 2019, Fiduciary principles in trust law, in Paul Miller Evan Criddle, and Robert H. Sitkoff, ed.: *Oxford Handbook of Fiduciary Law* (Oxford University Press).

Stambaugh, Robert F., 2014, Presidential address: Investment noise and trends, *The Journal of Finance* 69, 1415–1453.

Stein, Jeremy C., 2009, Presidential address: Sophisticated investors and market efficiency, *The Journal of Finance* 64, 1517–1548.

Stock, James H., and Motohiro Yogo, 2002, Testing for weak instruments in linear IV regression, National Bureau of Economic Research.

Sun, Liyang, and Sarah Abraham, 2021, Estimating dynamic treatment effects in event studies with heterogeneous treatment effects, *Journal of Econometrics* 225, 175–199.

Wardlaw, Malcolm, 2020, Measuring mutual fund flow pressure as shock to stock returns, *The Journal of Finance* 75, 3221–3243.

Wei, Wei, and Alex Young, 2024, Selection bias or treatment effect? a re-examination of Russell 1000/2000 index reconstitution, *Critical Finance Review* 13, 83–115.

Wurgler, Jeffrey, and Ekaterina Zhuravskaya, 2002, Does arbitrage flatten demand curves for stocks?, *Journal of Business* 75, 583–608.

Zingales, Luigi, 2015, Presidential address: Does finance benefit society?, *The Journal of Finance* 70, 1327–1363.

Table 1: Uniform Prudent Investor Act Implementation Dates

This table lists UPIA implementation dates by state.

State	UPIA Statute Enactment	State	UPIA Statute Enactment
Alabama	16/05/1989	Nebraska	13/09/1997
Alaska	23/05/1998	Nevada	17/04/1989
Arizona	20/07/1996	New Hampshire	01/10/2004
Arkansas	01/08/1997	New Jersey	05/06/1997
California	01/01/1996	New Mexico	01/07/1995
Colorado	01/07/1995	New York	01/01/1995
Connecticut	13/06/1997	North Carolina	01/01/2000
District of Columbia	10/03/2004	North Dakota	01/08/1997
Delaware	03/07/1986	Ohio	22/03/1999
Florida	01/10/1993	Oklahoma	01/11/1995
Georgia	01/03/1988	Oregon	09/09/1995
Hawaii	14/04/1997	Pennsylvania	25/06/1999
Idaho	01/07/1997	Rhode Island	06/08/1996
Illinois	01/01/1992	South Carolina	05/06/1990
Indiana	01/07/1999	South Dakota	01/07/1995
Iowa	01/07/2000	Tennessee	01/07/2002
Kansas	01/07/1993	Texas	01/01/2004
Kentucky	15/07/1996	Utah	01/07/2004
Maine	01/01/1997	Vermont	01/07/1998
Maryland	01/07/1996	Virgin Islands	12/08/2004
Massachusetts	04/12/1998	Virginia	01/07/1992
Michigan	01/04/2000	Washington	01/01/1985
Minnesota	01/01/1997	West Virginia	01/07/1996
Mississippi	01/07/2006	Wisconsin	30/04/2004
Missouri	25/06/1996	Wyoming	01/07/1999
Montana	30/09/1989		

Table 2: U.S. Equity Holdings by Trusts and Other Institutional Investors

This table shows summary statistics for equity holdings of trusts and all other institutional investors in the Thomson Reuters 13F database. We only include institutional investors for which we are able to obtain the location of their headquarters. The statistics are calculated using end-of-year holdings. We use 2006 as our baseline and adjust all other dollar values for inflation. *% all Institutions* is the fraction of the total dollar value of the portfolio reported by 13F institutions that is held by trusts and all other institutions, respectively.

	Trusts			All Other Institutions		
Year	N	Value Holdings (in $B)	% all Institutions (in %)	N	Value Holdings (in $B)	% all Institutions (in %)
1986	132	532.46	24.27	520	1,661.07	75.73
1987	138	551.59	25.45	571	1,615.51	74.55
1988	138	560.36	25.52	599	1,635.77	74.48
1989	135	671.04	24.85	648	2,029.08	75.15
1990	137	596.92	25.11	696	1,779.90	74.89
1991	143	830.12	25.84	749	2,382.42	74.16
1992	147	914.75	25.68	813	2,647.22	74.32
1993	148	1,102.67	25.50	871	3,222.11	74.50
1994	153	959.77	23.94	917	3,049.04	76.06
1995	167	1,227.28	22.63	1,019	4,196.72	77.37
1996	161	1,574.44	21.59	1,118	5,716.74	78.41
1997	169	1,697.85	18.31	1,284	7,575.94	81.69
1998	180	2,184.75	19.28	1,434	9,147.77	80.72
1999	181	2,272.71	16.99	1,594	11,100.96	83.01
2000	176	2.173.16	17.49	1,758	10,253.33	82.51
2001	173	2,221.91	18.96	1,754	9,498.50	81.04
2002	159	1,537.32	17.65	1,828	7,171.46	82.35
2003	147	1,968.97	15.87	1,927	10,439.74	84.13
2004	152	2,425.56	17.24	2,105	11,640.89	82.76
2005	143	1,982.22	13.98	2,298	12,198.59	86.02
2006	135	2,298.24	14.19	2,555	13,895.50	85.81

Table 3: Summary Statistics

This table presents summary statistics for the main firm-level variables used in the paper. The summary statistics are calculated based on the full sample from 1986 to 2006. A detailed description of all the variables is provided in the Appendix. Panel A presents summary statistics on stock characteristics. Panel B presents summary statistics on portfolio shares. Portfolio share is the fraction of the portfolio invested by institutional investors in one of the four portfolios based on the ψ variable. Prudent stocks are defined as $\psi \leq -3$, less prudent stocks as $-2 \leq \psi \leq 0$, less imprudent stocks as $1 \leq \psi \leq 3$, and imprudent stocks are defined as $\psi > 3$. ψ is a composite measure of the six prudence variables, defined in the main text (equation 9).

Variable	Obs.	Mean	Median	SD
Panel A: Stock Characteristics				
ψ	38,120	-0.22	0.00	2.98
Market Capitalization ($B)	38,120	3.25	0.34	14.98
Book-to-market	38,120	0.60	0.48	0.52
Previous 12-month Return	38,120	0.20	0.09	0.65
CAPM Beta	38,120	1.06	1.00	0.72
Firm Age (Years)	38,120	17.06	11.42	16.18
Dividend Yield	38,120	0.01	0.00	0.09
Profitability	38,120	0.01	0.05	0.76
Return Volatility	38,120	0.13	0.11	0.10
S&P Index	38,120	0.12	1.00	0.99
Panel B: Portfolio Shares				
Prudent Stocks ($\psi \leq$ -3)	61,634	0.60	0.67	0.25
Less Prudent Stocks (-2 $\leq \psi \leq$ 0)	61,634	0.25	0.23	0.14
Less Imprudent Stocks (1 $\leq \psi \leq$ 3)	61,634	0.11	0.06	0.14
Imprudent Stocks ($\psi >$ 3)	61,634	0.03	0.00	0.09

Table 4: Portfolio Characteristics before UPIA

This table presents average characteristics of stocks held by trusts and all other institutions one year before the enactment of the UPIA statute. Sample averages are calculated by first taking a value-weighted average of the characteristics in an institutional portfolio, followed by either an equal-weighted or value-weighted average across all institutions in our sample. t-statistics are shown in parentheses.

	Equal-Weighted Average			Value-Weighted Average		
	Trust	All Other Institutions	Difference	Trust	All Other Institutions	Difference
ψ	-3.52	-2.47	-1.06	-3.32	-2.92	-0.40
			(-6.69)			(-12.26)
CAPM Beta	0.95	1.10	-0.15	1.02	1.07	-0.05
			(-5.29)			(-7.61)
Dividend Yield	2.3%	1.8%	0.5%	2.1%	1.8%	0.3%
			(3.11)			(6.27)
Firm Age	38.8	31.2	7.6	37.6	33.9	3.7
			(6.38)			(13.34)
Profitability	5.5%	2.9%	2.5%	5.3%	4.8%	0.4%
			(1.22)			(6.19)
S&P Index	85.5%	79.4%	6.1%	92.3%	91.4%	0.9%
			(2.39)			(2.21)
Volatility	7.3%	8.7%	-1.4%	7.8%	8.3%	-0.5%
			(-4.61)			(-6.45)

Table 5: UPIA and Changes in Holdings: Portfolio-Level Results

This table presents results obtained by estimating the following institution-level panel regression:

$$PortfolioShare_{j,p,s,q} = \alpha_j + \alpha_{s,q} + \beta_{1,p}Trust_{j,s,q} + \beta_{2,p}UPIA_{s,q} \times Trust_{j,s,q} + \epsilon_{j,p,s,q}$$

$PortfolioShare_{j,p,s,q}$ is the fraction of the portfolio invested by institutional investor j, headquartered in state s, in year-quarter q, in one of the four portfolios p based on the prudence index ψ: $\psi \leq$ -3; -2 $\leq \psi \leq$ 0; 1 $\leq \psi \leq$ 3; $\psi >$ 3. α_j and α_{sq} are institutional investor and state $\times$ date fixed effects, respectively. $UPIA_{s,q}$ is an indicator variable that takes the value 1 if state s has adopted the prudent-investor rule in event quarter q. $Trust_{j,s,q}$ is an indicator variable for trusts. We include in the analysis up to 40 pre-event quarters, and 40 post-event quarters around the passage of each law. t-statistics based on standard errors double-clustered at both the institutional manager and date level are shown in parentheses in Panel A and z-statistics are shown in parentheses in Panel B. *, ** and *** denote significance at the 10%, 5% and 1% levels, respectively.

Panel A: Two-way fixed effects

	Prudent Stocks ($\psi \leq$ -3)	Less Prudent Stocks (-2 $\leq \psi \leq$ 0)	Less Imprudent Stocks (1 $\leq \psi \leq$ 3)	Imprudent Stocks ($\psi >$ 3)
Trust	0.072***	−0.056**	−0.019***	0.002
	(2.73)	(−2.12)	(−2.78)	(1.16)
UPIA × Trust	−0.040***	0.032***	0.012**	−0.003*
	(−4.44)	(4.89)	(2.48)	(−1.91)
Investor FE	Yes	Yes	Yes	Yes
State × Date FE	Yes	Yes	Yes	Yes
Observations	70,221	70,221	70,221	70,221
Adjusted R^2	0.80	0.50	0.61	0.56

Panel B: Sun-Abraham (2021)

	Prudent Stocks ($\psi \leq$ -3)	Less Prudent Stocks (-2 $\leq \psi \leq$ 0)	Less Imprudent Stocks (1 $\leq \psi \leq$ 3)	Imprudent Stocks ($\psi >$ 3)
Trust	0.095***	−0.075***	−0.027***	0.007***
	(7.61)	(−6.40)	(−4.89)	(3.50)
UPIA × Trust	−0.047***	0.035***	0.016**	−0.004*
	(−4.60)	(3.57)	(2.90)	(−1.95)
Investor FE	Yes	Yes	Yes	Yes
State × Date FE	Yes	Yes	Yes	Yes
Observations	70,221	70,221	70,221	70,221

Table 6: UPIA and Changes in Holdings: Stock-Level Results

This table presents results obtained by estimating the following stock-level regression in event time:

$$\Delta w_{i,p,s,q} = \alpha_{i,p} + \alpha_{s,q} + \beta_{1,p} \times \mathit{UPIA}_{s,q} + \gamma X_{i,q} + \epsilon_{i,p,s,q},$$

$\Delta w_{i,p,s,q}$ is the difference between the weight of stock i, in prudence portfolio p, in the portfolio of trusts in state s, in quarter q, computed as the total dollar amount invested for that stock and date across all trusts in that state, divided by the total dollar amount invested across all stocks by those investors, and the analogous weight for that stock in the state-level portfolio of all other institutional investors. $X_{i,q}$ includes market capitalization, the book-to-market ratio, previous 12-month Return, the return over the past month, and turnover. We include in the analysis up to 40 pre-event quarters, and 40 post-event quarters around the passage of each law. t-statistics based on standard errors double-clustered at the firm and date level are shown in parentheses. *, ** and *** denote significance at the 10%, 5% and 1% levels, respectively.

	(1)	(2)	(3)	(4)
Prudent Stocks x UPIA	−0.403***			
	(−2.94)			
Less Prudent Stocks x UPIA		0.336***		
		(3.52)		
Less Imprudent Stocks x UPIA			0.154**	
			(2.06)	
Imprudent Stocks x UPIA				−0.042
				(−0.67)
Controls	Yes	Yes	Yes	Yes
State × Date FE	Yes	Yes	Yes	Yes
Stock × ψ-Portfolio FE	Yes	Yes	Yes	Yes
Observations	2,541,342	2,541,342	2,541,342	2,541,342
Adjusted R^2	0.11	0.11	0.11	0.11

Table 7: Monthly Portfolio Returns in the 12 Months after UPIA

This table shows estimates from factor regressions using monthly value-weighted portfolios and Fama and French (2015) five factor returns. The dependent variables are excess returns of portfolios formed based on ψ, measured one quarter before the adoption of a UPIA law. We build a portfolio of stocks with $\psi \leq -3$ ("prudent"); a portfolio of stocks with $-3 < \psi \leq 0$ ("less prudent"); a portfolio of stocks with $0 < \psi \leq 3$ ("less imprudent"); and a portfolio of stocks with $3 \geq \psi$ ("imprudent"). Portfolios are held for the subsequent 12 months after formation date. Returns are expressed as percentages. t-statistics based on Newey-West standard errors with 12 lags are reported in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

	Prudent	Less Prudent		Less Imprudent	Imprudent	
	(1)	(2)	(2)−(1)	(3)	(4)	(4)−(3)
Alpha	-0.191***	0.256**	0.447***	0.115	-0.035	-0.150
	(-3.77)	(2.37)	(3.21)	(1.01)	(-0.18)	(-0.77)
MKT	0.972***	1.083***	0.111**	1.262***	1.394***	0.132**
	(58.79)	(29.99)	(2.39)	(30.17)	(21.74)	(2.54)
SMB	-0.120***	0.062	0.182***	0.674***	0.743***	0.069
	(-7.71)	(1.34)	(3.26)	(12.19)	(9.60)	(1.08)
HML	0.137***	-0.082	-0.220**	-0.214***	-0.638***	-0.424***
	(4.22)	(-1.17)	(-2.33)	(-2.66)	(-5.44)	(-3.88)
RMW	0.315***	-0.059	-0.374***	-0.282***	-0.839***	-0.556***
	(15.17)	(-1.13)	(-6.05)	(-4.60)	(-7.37)	(-5.25)
CMA	0.240***	-0.287**	-0.527***	0.063	0.126	0.063
	(6.34)	(-2.55)	(-4.01)	(0.53)	(0.61)	(0.33)
N. Months	195	195	195	195	195	195
Adjusted R^2	0.967	0.929	0.739	0.937	0.934	0.638

Table 8: Elasticity Estimates

In this table we report estimates of the model:

$$R_i = \delta + \beta RD_i + \gamma X_{i,-3} + \epsilon_i$$

where the dependent variable R_i represents stock i's performance over the 60 months after the passage of a UPIA statute. RD^1, RD^2, and RD^3 are measures of residual demand defined in the text. δ indicates different sets of fixed effects. Our universe of stocks is restricted to the set of stocks with a non-missing value of RD^1, RD^2, and RD^3. $X_{i,-3}$ is a matrix of firm-level controls including: market capitalization, book-to-market, previous 12-month return, last month's return and the CAPM β. α_t denotes fixed effects. We cluster standard errors at the stock and time of the event (year-month) level. t-statistics are reported in parentheses. * denotes significance at the 10% level, ** denotes significance at the 5% level and *** denotes significance at the 1% level.

	(1)	(2)	(3)	(4)	(5)	(6)
RD^1	4.566***	4.485***				
	(3.09)	(3.16)				
RD^2			2.956***	2.807***		
			(3.90)	(3.45)		
RD^3					9.747***	9.222***
					(4.99)	(4.54)
Time FE	Yes		Yes		Yes	
Industry x Time FE		Yes		Yes		Yes
Observations	38,120	38,120	38,120	38,120	38,120	38,120
Adjusted R^2	0.062	0.123	0.049	0.110	0.110	0.100

Table 9: Demand Changes and Changes in Firm Characteristics

In this table we report estimates of the model:

$$\Delta Y_i = \delta + \beta RD_i + \gamma X_{i,-3} + \epsilon_i$$

where ΔY_i is one of the following variables: the growth rate of median analyst EPS forecast for stock i; the growth rate of institutional ownership (IO) of stock i; the growth rate of stock i's Amihud illiquidity; the growth rate of stock i's ROA. All other variables are defined as in the previous table. We cluster standard errors at the stock and time of the event (year-month) level. t-statistics are reported in parentheses. * denotes significance at the 10% level, ** denotes significance at the 5% level and *** denotes significance at the 1% level.

	EPS Forecast	IO	Illiquidity	ROA
RD^1	0.004	0.307	-0.199	-0.137
	(0.21)	(1.01)	(-1.69)	(-1.02)
RD^2	0.037	0.126	-0.113*	-0.008
	(1.18)	(0.84)	(-1.82)	(-0.47)
RD^3	0.118	0.403	-0.363*	-0.026
	(1.10)	(0.82)	(-1.86)	(-0.48)
Industry x Time FE	Yes	Yes	Yes	Yes
Observations	25,400	25,400	25,400	25,400
Adjusted R^2	0.001	0.001	0.009	0.001

Figure 1: Prudence in Trust and Non-Trust Portfolios one year before UPIA

This figure presents equal-weighted average portfolio weights separately for trusts (red bars) and non-trusts (grey bars). Portfolio weights are calculated for each institution and for each integer value of the prudence index, ψ one year before the state introduced a UPIA statute. Weights are the proportion of an institution's total portfolio that is invested in stocks with a given prudence value, ψ.

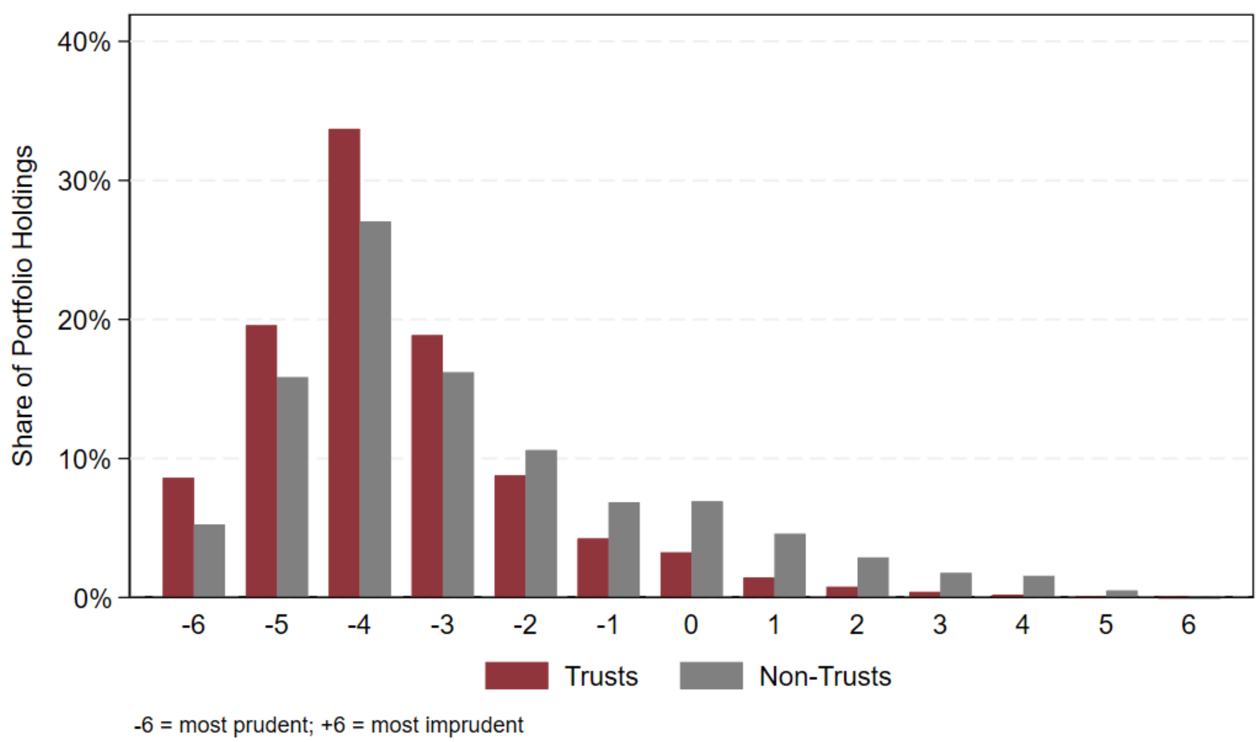


Figure 2: Trusts' Holdings around the Introduction of the UPIA

This figure presents changes in trusts' portfolio holdings in the 30 semesters around the introduction of UPIA in a state. The four portfolios are based on the ψ variable: prudent stocks are defined as $\psi \leq -3$, less prudent stocks as $-2 \leq \psi \leq 0$, less imprudent stocks as $1 \leq \psi \leq 3$, and imprudent stocks are defined as $\psi > 3$. Standard errors clustered at both the institutional manager and date level and 5% confidence intervals are shown.

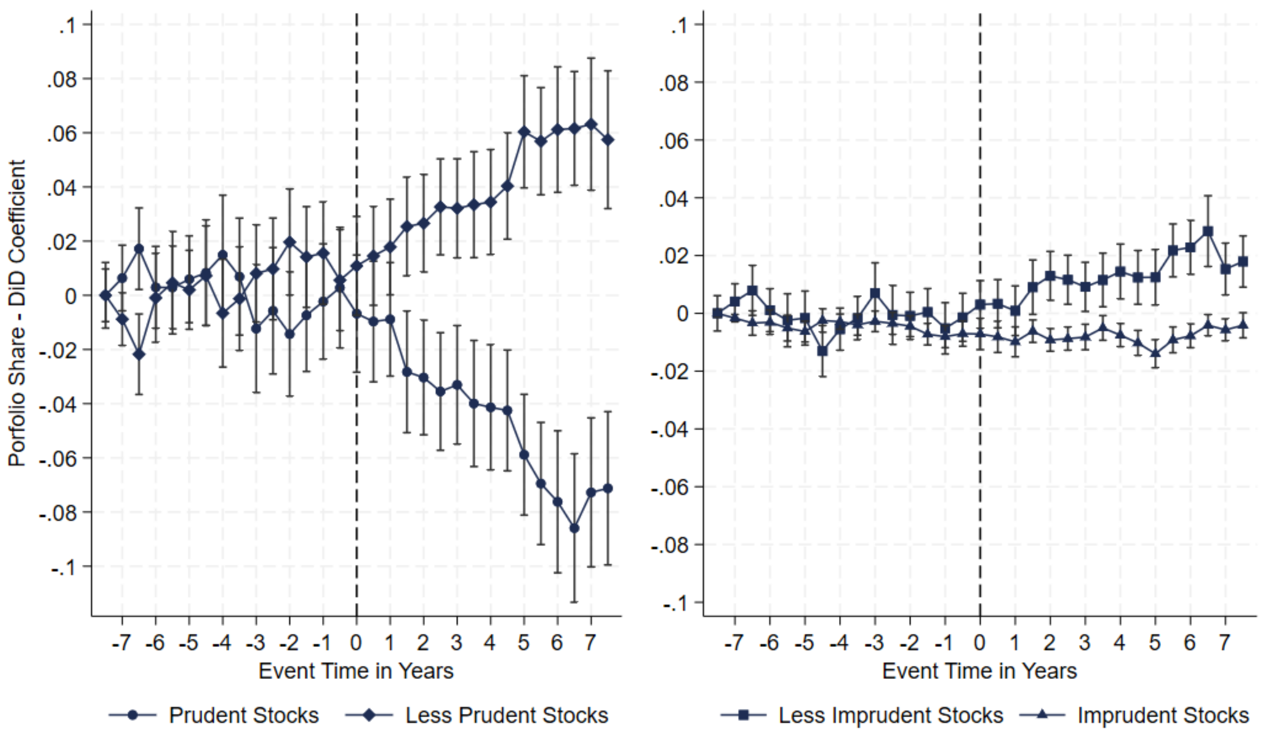


Figure 3: Stock-Level Holdings Changes around UPIA Introductions

This figure presents changes in Δw of the four ψ-Portfolios around the adoption of the UPIA statue based on the following regression.

$$\Delta w_{i,p,s,q} = \alpha_i + \alpha_{s,q} + \alpha_p + \beta_{1,p} \times UPIA_{s,q} + \gamma X_{i,q} + \epsilon_{i,p,s,q},$$

where $\Delta w_{i,p,s,q}$ is the difference between the weight of stock i in the portfolio of trusts in state s, in quarter q, computed as the total dollar investment in that stock and date across all trusts in that state divided by the total dollar amount invested in all stocks by those investors, and the analogous weight for that stock in the state-level portfolio of all other institutional investors. The figure plots Δw before adoption of UPIA (blue squares), obtained via α_p, and Δw after the UPIA adoption (blue triangles), which is obtained via $\alpha_p + \beta_{1,p}$ from the regression above. Control variables $X_{i,q}$ include market capitalization, book-to-market ratio, previous 12-month return, last month's return and turnover. We include in the analysis up to 40 pre-event quarters, and 40 post-event quarters around the passage of each law. We show 5% confidence bands computed based on standard errors clustered on the firm and date levels.

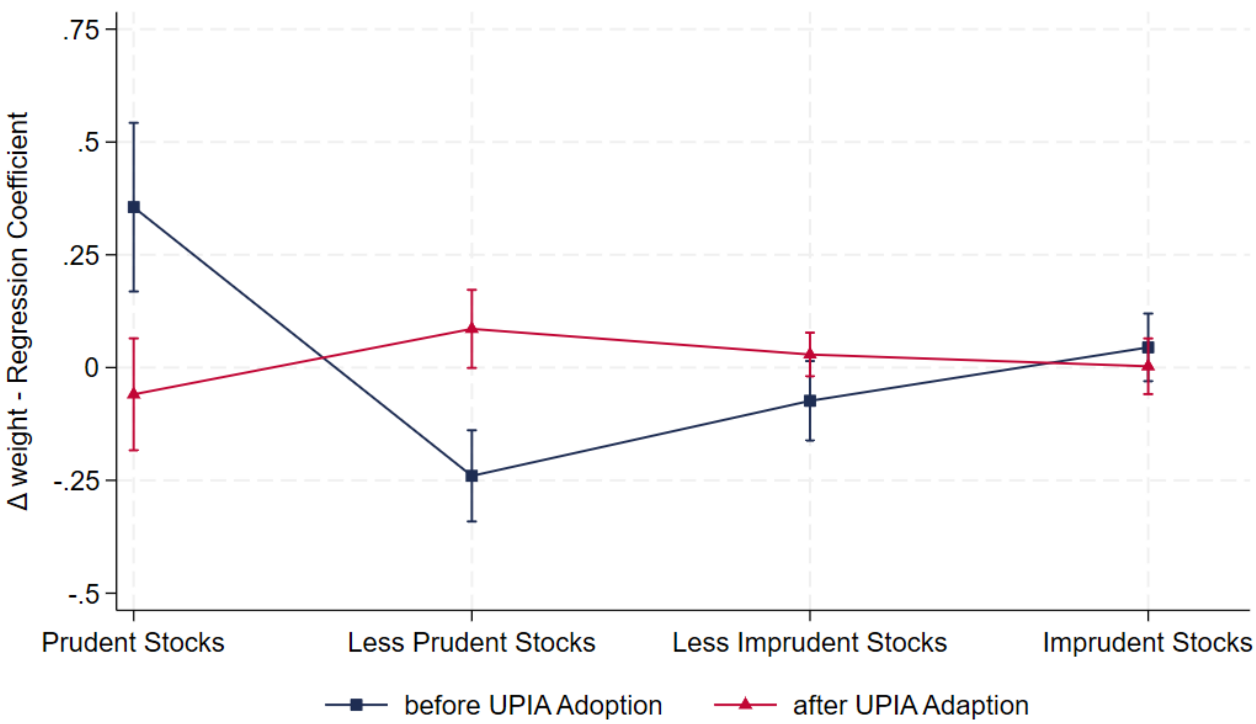


Figure 4: Non Parametric Permutation Tests: UPIA and Portfolio Returns

This figure shows the results of the block permutation procedure following the method in Chetty, Looney, and Kroft (2009). In each iteration, the date of a UPIA adoption is randomly re-assigned by firm with replacement as a placebo during the sample period. Our regression of column (2) - (1) of Table 7 is then estimated on the falsified data. The plots report the empirical cumulative distribution function (cdf) generated from running each of the regression models in 1,000 random iterations of this procedure and capturing the placebo coefficient estimate. The vertical red dotted line indicates the position of the actual coefficient estimate.

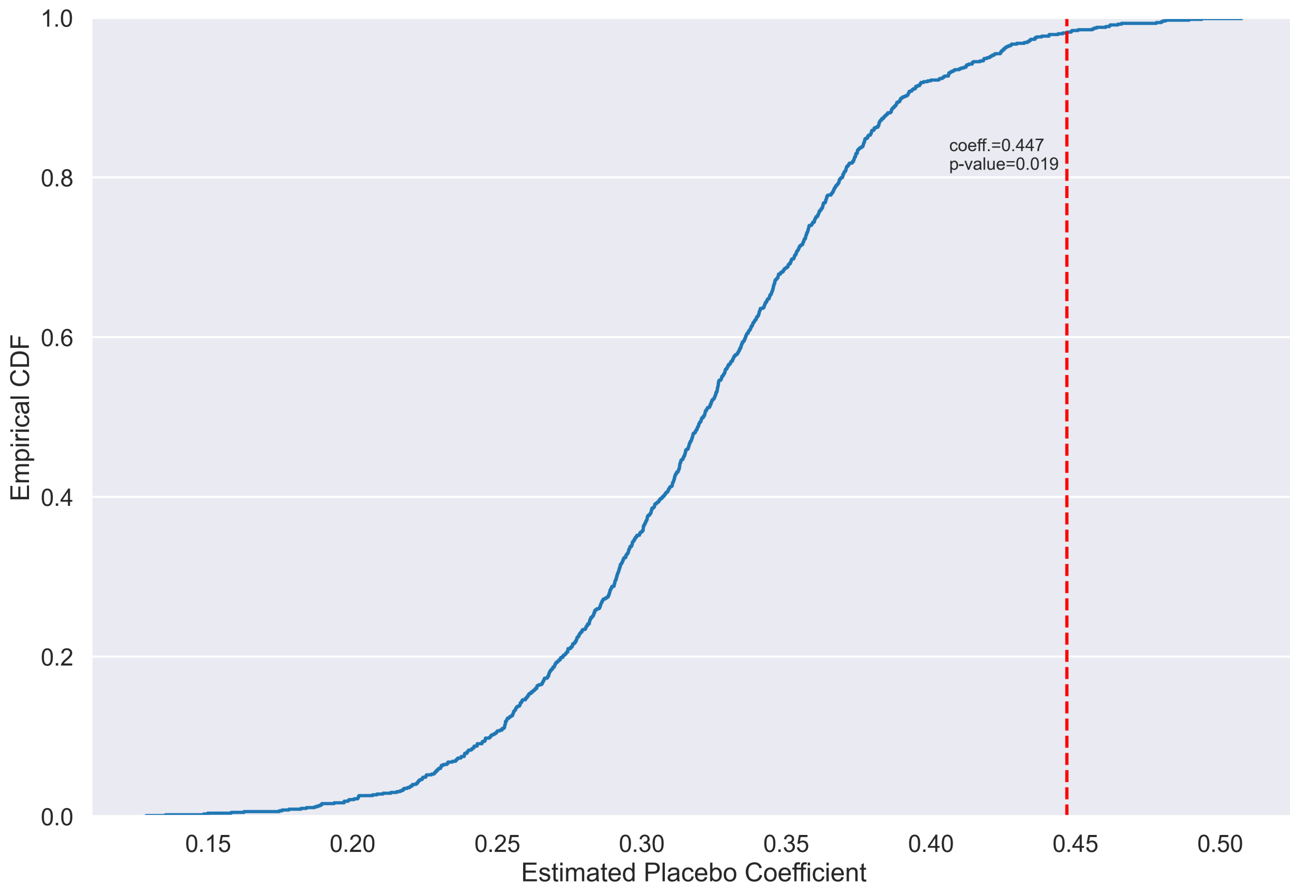
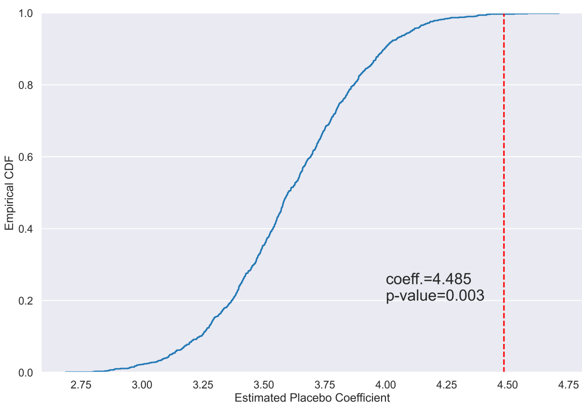
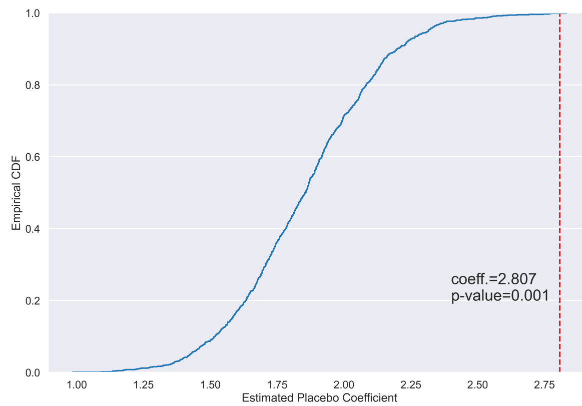


Figure 5: Non Parametric Permutation Tests: UPIA and Elasticities

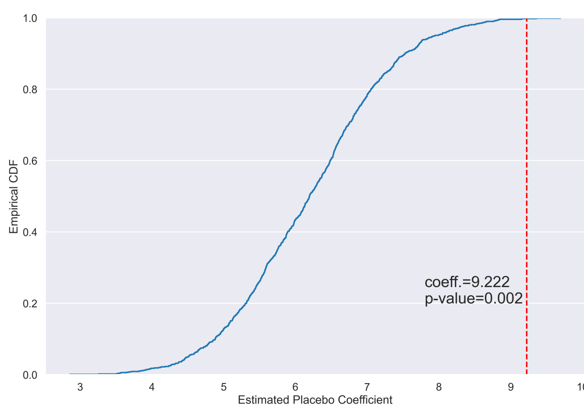
This figure shows the results of the block permutation procedure following the method in Chetty, Looney, and Kroft (2009). In each iteration, the date of a UPIA adoption is randomly re-assigned by firm with replacement as a placebo during the sample period. Our regressions of Table 8 are then estimated on the falsified data. The plots report the empirical cumulative distribution function (cdf) generated from running each of the regression models in 1,000 random iterations of this procedure and capturing the placebo coefficient estimate. The vertical dotted line indicates the position of the actual coefficient estimate for the impact that RD^1, RD^2, and RD^3 have on stock returns.



(a) Table 8, Column (2)



(b) Table 8, Column (4)



(c) Table 8, Column (6)

APPENDIX

A UNIFORM PRUDENT INVESTOR ACT – PREFATORY NOTE

Over the quarter century from the late 1960's the investment practices of fiduciaries experienced significant change. The Uniform Prudent Investor Act (UPIA) undertakes to update trust investment law in recognition of the alterations that have occurred in investment practice. These changes have occurred under the influence of a large and broadly accepted body of empirical and theoretical knowledge about the behavior of capital markets, often described as "modern portfolio theory."

[...]

Objectives of the Act. UPIA makes five fundamental alterations in the former criteria for prudent investing. [...]

(1) The standard of prudence is applied to any investment as part of the total portfolio, rather than to individual investments. In the trust setting the term "portfolio" embraces all the trust's assets. UPIA § 2(b).

(2) The tradeoff in all investing between risk and return is identified as the fiduciary's central consideration. UPIA § 2(b).

(3) All categoric restrictions on types of investments have been abrogated; the trustee can invest in anything that plays an appropriate role in achieving the risk/return objectives of the trust and that meets the other requirements of prudent investing. UPIA § 2(e).

(4) The long familiar requirement that fiduciaries diversify their investments has been integrated into the definition of prudent investing. UPIA § 3.

(5) The much criticized former rule of trust law forbidding the trustee to delegate investment and management functions has been reversed. Delegation is now permitted, subject to safeguards. UPIA § 9.

Table A.1: UPIA and Stock Returns: First Stage

In this table we report estimates of the model:

$$RD_i^3 = \delta + \beta RD_i^2 + \gamma X_{i,-3} + \epsilon_i$$

where RD_i^2 and RD_i^3 are defined in equations (20) and (21), respectively. Our universe of stocks is restricted to the set of stocks with a non-missing value of RD_i^1, RD_i^2, and RD_i^3. $X_{i,-3}$ is a matrix of firm-level controls including: market capitalization, book-to-market, previous 12-month return, last month's return and the CAPM β. α_t denotes fixed effects. We winsorize all variables at the first and last percentiles. We cluster standard errors at the stock and time of the event (year-month) level. t-statistics are reported in parentheses. * denotes significance at the 10% level, ** denotes significance at the 5% level and *** denotes significance at the 1% level.

	(1)	(2)
RD^2	0.303***	0.304***
	(5.00)	(4.96)
Time FE	Yes	
Industry x Time FE		Yes
Observations	38,120	38,120
Adjusted R^2	0.091	0.105
$F-$statistic	25.05	24.58

Table A.2: Elasticity Estimates: 12-month Horizon

In this table we report estimates of the model:

$$R_i = \delta + \beta RD_i + \gamma X_{i,-3} + \epsilon_i$$

where the dependent variable R_i represents stock i's performance over the 12 months after the passage of a UPIA statute. RD^1, RD^2, and RD^3 are measures of residual demand defined in the text. δ indicates different sets of fixed effects. Our universe of stocks is restricted to the set of stocks with a non-missing value of RD^1, RD^2, and RD^3. $X_{i,-3}$ is a matrix of firm-level controls including: market capitalization, book-to-market, previous 12-month return, last month's return and the CAPM β. α_t denotes fixed effects. We cluster standard errors at the stock and time of the event (year-month) level. t-statistics are reported in parentheses. * denotes significance at the 10% level, ** denotes significance at the 5% level and *** denotes significance at the 1% level.

	(1)	(2)	(3)	(4)	(5)	(6)
RD^1	4.617**	3.974**				
	(2.25)	(2.27)				
RD^2			0.612**	0.492**		
			(2.32)	(2.27)		
RD^3					6.636***	5.403***
					(3.47)	(3.19)
Time FE	Yes		Yes		Yes	
Industry x Time FE		Yes		Yes		Yes
Observations	38,120	38,120	38,120	38,120	38,120	38,120
Adjusted R^2	0.040	0.158	0.021	0.145	0.072	0.057

Table A.3: Demand Changes and Changes in Firm Characteristics: 12-month Horizon

In this table we report estimates of the model:

$$\Delta Y_i = \delta + \beta RD_i + \gamma X_{i,-3} + \epsilon_i$$

where ΔY_i is one of the following variables: the growth rate of median analyst EPS forecast for stock i; the growth rate of institutional ownership (IO) of stock i; the growth rate of stock i's Amihud illiquidity; the growth rate of stock i's ROA. All the dependent variables are measured between event date $t = 0$ and event date $t = 12$ of event s. All other variables are defined as in the previous table. We cluster standard errors at the stock and time of the event (year-month) level. t-statistics are reported in parentheses. * denotes significance at the 10% level, ** denotes significance at the 5% level and *** denotes significance at the 1% level.

	EPS Forecast	IO	Illiquidity	ROA
RD^1	0.021	0.273	-0.138***	0.020
	(0.60)	(1.02)	(-5.76)	(0.39)
RD^2	0.008	0.045	-0.004	0.040
	(1.65)	(0.73)	(-0.41)	(1.62)
RD^3	0.088	0.490	-0.044	0.441
	(1.16)	(0.70)	(-0.42)	(1.40)
Industry x Time FE	Yes	Yes	Yes	Yes
Observations	25,400	25,400	25,400	25,400
Adjusted R^2	0.001	0.001	0.009	0.001

Table A.4: UPIA and Changes in Trusts' Portfolio Choice: Robustness

This table presents results obtained by estimating the following institution-level panel regression:

$$PortfolioShare_{j,p,s,q} = \alpha_j + \alpha_{s,q} + \beta_{1,p}Trust_{j,s,q} + \beta_{2,p}UPIA_{s,q} \times Trust_{j,s,q} + \epsilon_{j,p,s,q}$$

$PortfolioShare_{j,p,s,q}$ is the fraction of the portfolio invested by institutional investor j, headquartered in state s, in year-quarter q, in one of the four portfolios p based on the prudence index ψ: $\psi \leq$ -3; -2 $\leq \psi \leq$ 0; 1 $\leq \psi \leq$ 3; $\psi >$ 3. α_j and α_{sq} are institutional investor and state × date fixed effects, respectively. $UPIA_{s,q}$ is an indicator variable that takes the value 1 if state s has adopted the prudent-investor rule in event quarter q. $Trust_{j,s,q}$ is an indicator variable for trusts. We include in the analysis up to 40 pre-event quarters, and 40 post-event quarters around the passage of each law. In Panel A, we exclude institutions classified as: Pension Funds; Pension Sponsor; Public Pension Fund; and Employee Benefit/Pension Plan. In Panel B, we exclude institutions that become a Financial Holding Company (FHC). In Panel C, we identify trusts and other institutions using the standard Thomson Reuters institutional investors classification. t-statistic based on standard errors clustered at both the institutional manager and date level are shown in parentheses. *, ** and *** denote significance at the 10%, 5% and 1% levels, respectively.

Panel A: Excluding Pension Funds

	Prudent Stocks ($\psi \leq$ -3)	Less Prudent (-2 $\leq \psi \leq$ 0)	Less Imprudent Stocks (1 $\leq \psi \leq$ 3)	Imprudent Stocks ($\psi >$ 3)
Trust	0.055**	−0.049**	−0.011	0.005
	(2.24)	(−1.99)	(−1.60)	(1.36)
UPIA × Trust	−0.030***	0.027***	0.006	−0.004
	(−3.11)	(3.85)	(1.21)	(−1.28)
Investor FE	Yes	Yes	Yes	Yes
State × Date FE	Yes	Yes	Yes	Yes
Observations	76,154	76,154	76,154	76,154
Adjusted R^2	0.79	0.47	0.61	0.56

Panel B: Excluding Financial Holding Companies

	Prudent Stocks ($\psi \leq$ -3)	Less Prudent (-2 $\leq \psi \leq$ 0)	Less Imprudent Stocks (1 $\leq \psi \leq$ 3)	Imprudent Stocks ($\psi >$ 3)
Trust	0.063**	−0.053**	−0.014**	0.005
	(2.46)	(−2.09)	(−2.24)	(1.54)
UPIA × Trust	−0.038***	0.033***	0.009*	−0.004
	(−4.41)	(5.18)	(2.08)	(−1.63)
Investor FE	Yes	Yes	Yes	Yes
State × Date FE	Yes	Yes	Yes	Yes
Observations	74,806	74,806	74,806	74,806
Adjusted R^2	0.79	0.47	0.61	0.56

Panel C: Thomson Reuters Classification

All	Prudent Stocks ($\psi \leq$ -3)	Less Prudent (-2 $\leq \psi \leq$ 0)	Less Imprudent Stocks (1 $\leq \psi \leq$ 3)	Imprudent Stocks ($\psi >$ 3)
Trust	0.182***	−0.095***	−0.070***	−0.017
	(4.56)	(-3.53)	(-3.40)	(-1.51)
UPIA × Trust	−0.042***	0.035***	0.010***	-0.003
	(-5.05)	(5.55)	(2.75)	(-1.49)
Investor FE	Yes	Yes	Yes	Yes
State × Date FE	Yes	Yes	Yes	Yes
Observations	74,651	74,651	74,651	74,651
Adjusted R^2	0.80	0.48	0.63	0.59

Table A.5: Elasticity Estimates: Robustness

In this table we report estimates of the model:

$$R_i = \delta + \beta RD_i + \gamma X_{i,-3} + \epsilon_i$$

where the dependent variable R_i represents stock i's performance over the 12 months after the passage of a UPIA statute. RD^1, RD^2, and RD^3 are measures of residual demand defined in the text. δ indicates different sets of fixed effects. Our universe of stocks is restricted to the set of stocks with a non-missing value of RD^1, RD^2, and RD^3. Moreover, in Panel A, we exclude institutions classified as: Pension Funds, Pension Sponsor, Public Pension Fund, and Employee Benefit/Pension Plan; In Panel B, we exclude institutions that become a Financial Holding Company (FHC); In Panel C, we identify trusts and other institutions using the standard Thomson Reuters institutional investors classification. $X_{i,-3}$ is a matrix of firm-level controls including: market capitalization, book-to-market, previous 12-month return, last month's return and the CAPM β. α_t denotes fixed effects. We cluster standard errors at the stock and time of the event (year-month) level. t-statistics are reported in parentheses. * denotes significance at the 10% level, ** denotes significance at the 5% level and *** denotes significance at the 1% level.

Panel A: Excluding Pension Funds

	(1)	(2)	(3)	(4)	(5)	(6)
RD^1	4.439***	4.359***				
	(3.06)	(3.13)				
RD^2			2.699***	2.539***		
			(3.57)	(3.08)		
RD^3					9.703***	9.108***
					(4.89)	(4.31)
Time FE	Yes		Yes		Yes	
Industry x Time FE		Yes		Yes		Yes
Observations	38,120	38,120	38,120	38,120	38,120	38,120
Adjusted R^2	0.062	0.122	0.049	0.109	0.110	0.100

Panel B: Excluding Financial Holding Companies

	(1)	(2)	(3)	(4)	(5)	(6)
RD^1	4.973**	5.021***				
	(3.01)	(3.53)				
RD^2			2.933***	2.778***		
			(4.80)	(4.21)		
RD^3					12.273***	11.564***
					(3.31)	(3.08)
Time FE	Yes		Yes		Yes	
Industry x Time FE		Yes		Yes		Yes
Observations	38,120	38,120	38,120	38,120	38,120	38,120
Adjusted R^2	0.049	0.111	0.047	0.108	0.004	0.013

Panel C: Thomson Reuters Classification

	(1)	(2)	(3)	(4)	(5)	(6)
RD^1	4.574***	4.492***				
	(3.10)	(3.16)				
RD^2			2.942***	2.794***		
			(3.89)	(3.44)		
RD^3					9.702***	9.180***
					(4.98)	(4.52)
Time FE	Yes		Yes		Yes	
Industry x Time FE		Yes		Yes		Yes
Observations	38,084	38,084	38,084	38,084	38,084	38,084
Adjusted R^2	0.062	0.123	0.049	0.110	0.110	0.100

B Description of Variables

Variable	Description
Prudence-related Characteristics	
CAPM β	For any stock, CAPM β is calculated over a window of prior 60 observations, and over that period, a minimum of 24 observations is required for the stock to be admitted into a portfolio. Source: CRSP.
Dividend Yield	Ratio of dividends over the market capitalization of the stock. Dividends are as of the fiscal year ending in calendar year t-1, and are measured through the first available of the following: i) dividend per share (DVPSX C); ii) ordinary dividends (DVC), (iii) cash dividends (DV). Market capitalization is computed as of June year t. Source: CRSP/Compustat Merged.
Firm Age	For any stock, Age is calculated as of June of year t, as the number of months from its first appearance in CRSP. Source: CRSP.
Profitability	Ratio of firm earnings over the market capitalization of the stock. Firm earnings are calculated as income before extraordinary items (IB), plus deferred taxes (TXDI) when available, minus dividends paid to preferred stock when available. When IB is not available, we use income before extraordinary items from the cash flows statement (IBC). Earnings are as of the fiscal year ending in calendar year t-1. Market capitalization is computed as of June year t. Source: CRSP/Compustat Merged.
S&P Index	An indicator variable for whether the firm is a member of the S&P 1500 Super Composite Index. Source: CRSP/Compustat Merged.
Volatility	For any stock, Volatility is computed as the standard deviation of monthly stock returns over the prior 12 months. A minimum number of 9 monthly returns is required for the calculation. Source: CRSP.
ψ	For any stock-date observation, a stock is assigned an imprudence score. The score increases by one if the stock is in the top tercile of the distribution of one capm beta or return volatility, or if it is in the bottom tercile of firm age, dividend yield, profitability, or if it is an S&P member. Source: CRSP/Compustat Merged.
Other Firm-level Characteristics	
Book-to-market ratio	The ratio of the book equity for the fiscal year ending in calendar year $t-1$ divided by the market value of equity at the end of December of yeat $t-1$. The book value of equity is calculated as stockholder equity, plus deferred taxes and credits, minus the book value of preferred stock. Stockholders' equity is the first available from the following list: i) the Compustat item (SEQ); ii) the book value of common equity (item CEQ), plus preferred stock (item PSTK); iii) the book value of total assets (AT) minus the book value of total liabilities (LT). Deferred taxes and credits are measured through the first available of the following: i) the Compustat item (TXDITC); ii) the sum of balance-sheet deferred taxes (TXDB) and investment tax-credit, (TCB); iii) zero. The book value of preferred stock is the first available of the following: i) redemption value (PSTKRV); ii) liquidation value (PSTKL); iii) par value (PSTK); iv) zero. Source: CRSP/Compustat Merged.
EPS Forecast	Growth rate of median analyst EPS forecast. To compute the growth rate of the median analyst EPS forecast, we select forecasts made for a 1-year horizon. Source: IBES

Illiquidity	Growth rate of Amihud illiquidity. We compute the illiquidity measure as in Amihud (2002).
IO	Growth rate of institutional ownership. We calculate Institutional Ownership (IO) as the ratio of 13(f) holdings of a given share to the total shares outstanding. Source: Thomson Reuters and CRSP/Compustat Merged.
Market Capitalization	The market value of common equity. Market value of equity is the product of the price (PRC) times the contemporaneous number of shares outstanding (SHROUT). Source: CRSP.
Previous 12-month Return	The cumulated continuously compounded stock return from month j-12 to month j-2, where j is the month of the forecasted return. Source: CRSP.
Return_{t-1}	The lagged one month stock return. Source: CRSP.
ROA	Growth rate of return on assets. We compute ROA as income before extraordinary items (IB) plus depreciation (DP), divided by total assets (AT). Source: CRSP/Compustat Merged.
Turnover	The average ratio between trading volume (VOL) and shares outstanding (SHROUT) over the previous 12 months. Source: CRSP.