Stock Market Valuations across U.S. States

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Abstract

While most consider the United States the world's flagship capital market in terms of integration and efficiency, we show this is not necessarily the case. Using industry-specific measures of state segmentation, we reveal significant valuation differences across states. Our analysis attempts to explain these differences using state-specific regulatory data such as banking regulations, minimum wage levels, and taxation, as well as non-regulatory factors, such locational behavioral biases, the health of the economy within each state and a number of firm-specific characteristics. Our results demonstrate important roles for cross-state variation in information transmission, the regulatory environment, and economic conditions in determining state segmentation. Finally, we adopt our framework to apply to valuation differences across states. This framework would seem to be useful for certain states desiring to create investment-friendly environments for their residents.

Keywords: market integration, home bias, information hypothesis, local preferences, banking deregulation and valuation, anti-takeover laws, investment and location bias, familiarity.

1 Introduction

In December 2013, the average price to earnings ratio for the Illinois-based companies in the machinery industry was 16; yet, the price-earnings ratio for the same industry in Minnesota was 26. Could this difference be related to regulatory state policies such as minimum wage differentials ($8.25 per hour in Illinois and $6.15 in Minnesota at the time)? Our paper provides a framework to potentially answer this question. Indeed, in perfectly integrated capital markets, price-earnings ratios – or earnings yields – should be similar across states for the same industries. We show that within the United States there is wide variation in the degree to which particular states are integrated.

Segmentation is measured by the absolute difference of each industry's earnings yield within a particular state relative to a carefully constructed benchmark. We aggregate these differences across up to 28 non-financial industries within each state to determine a state-wide measure of segmentation at each point in time. While the degree of segmentation in the U.S. (aggregating across all states) has decreased through time, there is significant dispersion of segmentation across states, even in the most recent data.

Importantly, our goal is not just to document the time-series and interstate variation in segmentation, we are interested in the factors that explain the observed variation in segmentation. Our analysis looks at four main categories: basic control variables, information and behavioral biases of investors, the state-level regulatory environment, and the economic health of the state.

First, variation in earnings yields can arise naturally. In a rational pricing framework, such valuation differentials are due to differing earnings expectations or differing discount rates for stocks in the same industry across states. However, for the U.S., with highly efficient capital markets concentrated in New York, we would expect discount rates to be equalized for companies of similar risk. Since systematic risk is often measured at the industry level, our procedure already controls for a first-order source of discount rate variation. Our basic controls include both leverage, earnings growth volatility, and sales growth. Financial leverage may differ across state lines for a variety of reasons. Analogously, in an advanced

economy such as the U.S., we would also expect that industry wide growth opportunities would rapidly transmit across state lines. Nevertheless, the volatility of earnings growth shocks may differ across states and these volatility differences will be priced (see Pastor and Veronesi (2006) and Bekaert, Harvey, Lundblad and Siegel (2007)). We also control for cross-state variation in firms' growth opportunities by including a variable that captures differences in state-level sales growth rates. Our results show that after controlling for leverage, earnings growth volatility, sales growth, as well as other computational biases, interstate earnings yield differentials remain substantial and continue to show a significant downward trend over time.

Second, we focus on investor behavior and information flow. A large and growing literature has documented locational tilts in the portfolios of domestic investors, with investors allocating more heavily to stocks that are located close to their homes (see Coval and Moskowitz, 1999; Huberman, 2001; Grinblatt and Keloharju, 2001; Ivkovic and Weisbenner, 2005). The interpretations for this behavior vary from arguments involving rational asymmetric information (Coval and Moskowitz, 2001) to behavioral explanations suggesting that people prefer investing in familiar stocks. These locational tilts induce market segmentation across states. Given that a very large portion of the market is held by institutional investors, including mutual funds, the physical distance from financial centers with a high concentration of investment managers may increase segmentation.

Third, the regulatory environment such as banking regulations, labor laws (including the statutory minimum wage mentioned above), and state taxes could impact the cost of doing business in a particular state and lead to market segmentation. Indeed, a prime candidate is banking regulation. Before the mid-1970s most American states had laws preventing banks incorporated in one state from opening branches in another state, and often even in other cities of the same state. One consequence of this was scant competition and a highly balkanized banking system. Banking deregulation (between the 1970s and 1994) removed geographical restrictions on banks operations leading to increased competition between banks. Jaratyane and Strahan (1996) and Strahan (2003) show that intrastate and interstate banking deregulation led to higher real growth rates and lower real growth rate volatility in the deregulating states. These real effects likely have valuation implications which have not yet

been examined.

States also differ in their regulations regarding corporate governance (see e.g. Karpoff and Malatesta, 1989), regarding worker protection (see Claessens and Ueda (2008)), and corporate taxation (Heider and Ljungqvist (2014)). Given that the introduction and/or removal of these various regulations differ across states, we use panel data to assess their value-relevance. Our results show that an important driver of variation in interstate valuation differentials is the regulatory environment. In particular, financial deregulation in terms of banking reforms, substantially decreased segmentation.

It is important to realize that regulatory differences or locational investment biases may not have any valuation implications. Firms can select where to headquarter and therefore valuation disadvantages can be potentially undone. More importantly, since the stocks we analyze trade on national exchanges, barring significant limits to arbitrage, any irrational valuation differentials should be arbitraged away. However, we will show below that our valuation perspective can usefully distinguish between various hypotheses put forward to interpret findings in both the literature on the effects of state-specific regulations and the literature on the effects of locational biases.[1]

Our fourth category includes some additional variables that might be relevant for cross-state valuation differences, including information on the economic environment measured by variables such as the state unemployment rate or the per capita gross state product (GSP). Our results show that higher unemployment is associated with higher segmentation in some specifications. The single most important variable is the U.S. market-wide measure capturing the yield spread difference between Baa and Aaa rated corporate bonds, which

[1]There are of course many parallels between our efforts here and the voluminous international literatures on home bias and market segmentation. In international finance, home bias refers to the phenomenon that investors are not sufficiently internationally diversified. While capital restrictions still play a role, especially in emerging markets (Bekaert, Siegel and Wang, 2012), a consistent finding in the literature is that foreign investment biases are inversely related to the distance between countries (Portes and Rey, 2005). Whether the preference for neighboring countries is a behavioral bias or derives from investors investing more in countries on which they have more and better information is an open question (see Brennan and Cao, 1997; Van Nieuwerburgh and Veldkamp, 2008). Recent work (see Chan, Covrig and Ng, 2009; Ferreira and Matos, 2008; Lau, Ng, and Zhang, 2010) has also started to explore the link between home bias and valuation differentials across countries. The literature on international market integration has often rejected the hypothesis that securities of similar risk are priced the same with cross-country data (see Bekaert and Harvey, 1995). Yet, both home bias (see Kho, Stulz, and Warnock, 2009) and international valuation differentials (Bekaert, Harvey, Lundblad, and Siegel, 2011) seem to have decreased over time.

has a strong correlation with the U.S. business cycle. Higher yield spreads are associated with higher levels of U.S. market segmentation.

Our research also has policy implications for states that are considering changes in the regulatory environment. In the past, it has been notoriously difficult to assess the impact of regulatory changes. Our framework allows for the direct measurement of marginal responses to policy changes using a measure of segmentation that is relatively easy to compute and does not rely on many assumptions.

While most of our paper focuses on absolute valuation differences, our framework is ideally suited to explain cross-state variation in equity valuation. We provide a preliminary analysis of how locational, behavioral, regulatory, and economic factors affect valuations in a standard difference-in-difference framework. We find that neither banking deregulation, nor pure distance effects have strong valuation effects. However, we find that states with substantial information flow (as measured by long-distance telephone minutes) have higher valuations. We also find evidence consistent with the "only game in town" hypothesis of Hong et al. (2008) (suggesting stocks, in thinly populated locales with many investment dollars chasing few stocks, have higher valuations). Finally, economic development, higher minimum wages and high correlations between state income and equity returns all lead to relatively higher valuations.

Our paper is organized as follows. The second section details the economic framework that we use to develop our measure of market segmentation. An analysis of the sources of variation of interstate segmentation is presented in the third section. Section four evaluates several extant hypothesis concerning the valuation implications of the state-level environment. Some concluding remarks are offered in the final section.

2 Market segmentation in the U.S.

2.1 A market segmentation measure

As a starting point, consider the Gordon growth model, which assumes that the discount rate, r, is constant and expected earnings grow at a constant rate, g. If a firm pays out all

earnings every year, its earnings yield simply is $r - g$. Hence, in this simple model, discount rates and growth opportunities are linearly related to the earnings yields. In addition, let's assume systematic risk is industry rather than firm specific, as is typically assumed in capital budgeting.[2] This assumption is more plausible when the industry structure is quite granular so that industries are comparable across states. Financial market integration then equalizes industry betas as well as industry risk premia across states. Furthermore, assume that in economically integrated states, persistent growth opportunities are mostly industry rather than state specific or at least rapidly transmitted across states. This is plausible as firms in the same industries face similar production processes and market conditions (again under the null of free competition and lack of trade barriers). It then follows that the process of market integration should cause valuation differentials between industries in different states to converge. We build on this intuition to create valuation differentials that serve as our segmentation measure.

Specifically, let $EY_{s,k,t}$ denote industry k's earnings yield in state s at time t and $EY_{US,k,t}$ the corresponding value-weighted average for the same industry k across the entire United States.[3] Our main variable of analysis is the absolute value of the difference between the two industry valuations, $|EY_{s,k,t} - EY_{US,k,t}|$. The weighted sum of these industry valuation differentials is our measure of the degree of effective or *de facto* equity market segmentation for state, s:

$$SEG_{s,t} = \sum_{k=1}^{N_{s,t}} IW_{s,k,t} |EY_{s,k,t} - EY_{US,k,t}|, \tag{1}$$

where $IW_{s,k,t}$ is the relative market capitalization of industry k in state s at time t and $N_{s,t}$ is the number of industries for the state s at time t.

In a related context, Bekaert, Harvey, Lundblad, and Siegel (2013) point out a number of biases in this type of segmentation measure. State-specific differences in financial leverage may cause different valuation ratios even when asset market betas are equalized. In a dynamic setting, financial and economic integration do not restrict the volatilities of the

[2]It is well known that real interest rate variation does not account for much variation in valuation ratios.

[3]To address the robustness of our main findings to this assumption, we consider an alternative measure of segmentation for which we instead benchmark state earnings yield differentials against a value-weighted average of the largest financial center states, California, New York, and Texas. As the evidence is quite similar for this alternative, we exclude the detailed results in the interest of brevity.

shocks to earnings growth rates and discount rates, but they will nonetheless be reflected in valuation ratios. In addition, the number of firms in a particular industry should affect the accuracy of the measure. Given that we use absolute values of yield differentials, noise will bias the measure upward, so it should be decreasing in the number of firms present in the industry. However, it is straightforward to control for these biases in a regression analysis.

We construct our measure of valuation differentials, SEG, for the sample of 50 U.S. states plus the District of Columbia using quarterly data from Compustat and monthly data from CRSP from 1982 to 2013. While CRSP/Compustat data extend back further, our sample begins in 1982 as this year is marked by a sizable increase in the number of firms covered. We begin by collecting quarterly earnings data for each firm covered by Compustat. To ensure that accounting values are public knowledge, we allow for a three month lag relative to the end of the quarter to which the earnings numbers refer. For example, earnings reported for the quarter ending on March 31 of a given year will be associated with June 30 of the same year. We then calculate annual earnings as the sum of the last four quarterly earnings. We merge the quarterly accounting data from Compustat with firm-level monthly return and market capitalization data from CRSP.[4] We associate quarterly accounting data with the last month of a given quarter and the following two months and thereby obtain monthly earnings yields by dividing historical annual earnings by current end-of-month market capitalization. In cases where annual earnings are negative, we set the earnings yield to zero. Earnings yields larger than one are set to missing. Further, we set to missing any earnings yield that deviates from the sample mean (at a given point in time) by four standard deviations, and we replace earnings yields that deviate by three standard deviations from the mean (again at a given point in time) by the mean plus/minus three standard deviations.

Finally, we obtain a firm's industry as well as the state in which the firm is headquartered from Compustat.[5] For our analysis, we apply the Fama French industry classification consisting of 30 industries. We drop firms in the industry "Other" and exclude "Finance" for the main results. We also drop non-U.S. firms or firms with missing industry or headquarter

[4]In case a given firm (as identified by its *gvkey*) has multiple equity securities (i.e. securities with CRSP share codes 10 or 11), we use the consolidated market capitalization.

[5]We thank Alexander Ljungqvist for sharing historical HQ state information with us.

information.[6] We form up to 28 market value-weighted non-financial industry earnings yields for all 50 U.S. states and the District of Columbia. For each state and month, we compute $SEG_{s,t}$ as described in (1).

The categorization of a firm into a particular state is not unambiguous. A firm that has business operations, supply chains, or product markets around the United States, or potentially even the globe, is difficult to classify. We focus on the firm's headquarters to define the state domicile. The examination of a distance effect (in later sections) that links investment biases to familiarity or information flow should be related to the actual location of the firm's operations. The provision of financing may also depend on key firm personnel being in close physical proximity to funding banks. However, for some regulatory variables, e.g. antitakeover statutes, the state of incorporation of the firm may be the relevant classification. We therefore also obtained the state of incorporation for each firm in our sample, and use this for a later analysis.[7]

In Figure 1 (Panel A), we show the average SEG measures for all states. For example, Kansas has an average segmentation measure of 2.72%, whereas New Jersey's is only 0.97%. It is, of course, striking that Kansas is a state that is far away in physical distance from financial centers, whereas New Jersey is a state neighboring New York. Panel B shows the time-series variation in a U.S. wide (equally-weighted) version of the SEG measure. Apart from the marked increase in segmentation around the height of the recent global financial crisis, segmentation seems to have substantially decreased over time, dropping from a peak of slightly over 3.82% in 1982 to values around 1.55% at the end of 2013.

[6]Before 1987, we use CRSP historical SIC industry information to associate a firm with one of 30 Fama French industries. From 1987 onwards, we use historical SIC industry information from Compustat. We replace missing industry information with the earliest or latest available industry information. We obtain concordance between SIC industry classification and the Fama French 30 industry classification from Ken French's web site.

[7]We do not consider the state of incorporation directly as a means of classifying firms into states as it provides a highly skewed picture of firm locales. Under such a definition, many states would have relatively few firms (despite potentially being headquarter states for many), and Delaware would make up one-half to - later in the sample - two-thirds of the firm sample. If one were to construct SEG defined in this way, the two measures of market segmentation for a given state would not be very highly correlated, and the SEG measure based on state of incorporation would be 27% more volatile than our baseline SEG measure based on headquarters. As a result, we exclude the state of incorporation as a direct classification, but we do incorporate the information where appropriate below.

2.2 A benchmark regression

It is, of course, possible that the observed variation in valuation ratios across states is consistent with our simple pricing model under the null of integration if different states house firms with very different leverage ratios, earnings growth rate volatilities, or growth opportunities. Moreover, the number of firms has increased significantly over time and may explain the downward trend in the segmentation measure. In Table 1, the first column shows the results of a panel regression of the SEG measure in 50 states plus D.C. onto five control variables: leverage differentials, earnings growth and return volatility differentials, sales growth differentials, and the log of the number of firms in the state.[8] In all of our regressions (unless otherwise mentioned), standard errors are robust to heteroskedasticity and to correlation across states in a given month as well as across months for a given state. The coefficients on each variable generally have the expected sign, but only the return volatility differentials and the number of firms have a statistically significant effect on the segmentation measure. The adjusted R^2 is 22%, suggesting these variables represent an important part of cross-state valuation differentials; we need to control for these features of the data before interpreting SEG as a market segmentation measure. When we add a time trend in the second column, it receives a highly significant and strongly negative coefficient. As a means of comparison, a purely statistical regression on state fixed effects and monthly time indicators delivers an adjusted R^2 of 43%, suggesting that more than half of the variation in SEG is not explained by the bias controls and a time trend.

At this point, we also consider an alternative specification to evaluate the robustness of these findings and the appropriateness of our control variables. In columns III and IV, we run the same panel regressions except that we focus only on the largest 35 states as judged by gross state product. This sample allows us to remove small states with potentially few firms and volatile earnings yield data. As can be seen, the results are quite similar in terms of significant coefficients and adjusted R^2's, with the exception of the significant and negative coefficient on absolute leverage differences. The trend variable in column IV

[8]These variables are constructed using the merged Compustat CRSP data set and include only those firms that have also been included in the calculation of SEG. See Appendix Table A1 for details on all variables.

remains negative and statistically significant.

Taken together, we view the results from these benchmark regressions as an indication that the inclusion of these control variables is important going forward. We therefore include them in all subsequent panel regressions. In addition, we have repeated (in untabulated results) this regression exercise for financial firms finding largely similar results, but with a weaker time trend.

3 Sources of market segmentation

3.1 The determinants of segmentation

In this section, we explore a number of potential determinants of state segmentation. We place candidate variables into one of three groups: information and behavioral biases, state-level regulation, and state-level economic conditions.

Information and Behavioral Biases

The first group of variables centers around behavioral biases, including those related to location. The literature on locational biases is vast, with some studies focusing on investment managers (Coval and Moskowitz, 1999) and others on retail investors (Huberman, 2001). Local investor biases imply that the distance to major investment centers may affect valuations and segmentation, but how this mechanism works is not immediately obvious. The literature has been remarkably silent about valuation effects. Pirinsky and Wang (2006) show that investor "habitats" have pricing effects, as stocks tend to co-move more with other stocks with proximate headquarters (using changes in headquarters to obtain identification). If the bias is entirely irrational, we would expect stocks headquartered closest to major investment centers such as California or New York to be relatively richly priced relative to similar stocks that do not benefit from the familiarity/network biases. However, Coval and Moskowitz (2001) argue that mutual fund managers only invest in those local stocks in which they truly have an informational advantage and that these stocks outperform benchmarks after they are bought. Their analysis suggests that only a subset of "local" stocks are efficiently

priced, whereas stocks far away from investment centers may be inefficiently priced and the degree to which they are may be correlated with information flow.[9] In Table 2 (Panel A), we explore the importance of the investment bias explanations.

Our first measure is the minimum geographic distance of the state capital from one of the financial center states, California, New York, or Texas.[10] While a pure location bias seems *ex-ante* implausible given that all stocks trade in New York, familiarity bias has been well documented and there exist elaborate rationales linking location and distance to valuation. Aside from the information advantage channel argued in Coval and Moskowitz (2001), the proximity to institutional shareholders may also influence corporate policies. Chhaochharia, Niessen-Ruenzi, and Kumar (2012) show that such proximity leads to better corporate policies, presumably through the monitoring activities of these large shareholders.[11]

Instead of using distance to institutional investors, we build several additional explanatory variables following Loughran and Schultz (2005) and Hong et al. (2008). First, Loughran and Schultz (2005) contrast 'rural' and 'urban' stocks, with a stock being urban if its company headquarters are within 100 miles of one of the 49 metropolitan US areas (according to the 2000 census). They show that rural stocks, which are local to fewer people, have lower analyst following, a lower percentage of institutional investors, and lower liquidity. These features clearly could have pricing implications, although the channel may be information-based or behavioral. Interestingly, the pricing implications of the liquidity channel (making rural stocks "cheap") would appear to be the reverse of the one predicted by Hong et al. (2008), the only paper that explicitly considers the pricing implications of location bias. They argue that in a segmented world local supply and demand conditions can affect valuations. In particular, regional stock prices should be decreasing in the ratio of aggregate book

[9] In studying international markets, we would expect international firms with lots of international sales and/or foreign operations to be less segmented than purely domestic firms. Similarly, firms with lots of sales and/or operations outside the state may be less segmented within the U.S. Using 10-K filings, Garcia and Norli (2012) measure the percentage of operating activity outside the headquarter state. Specifically, they distinguish firms with business operations in only a few states from firms with operations in multiple states. Unfortunately, these data do not extend to our full sample, so we exclude them from our analysis.

[10] Using BLS employment data, we find that these three states have the largest fractions of employees engaged in financial activities in each state (divided by the number of employees engaged in financial activities across the entire country).

[11] We considered an institutional investor distance measure – the distance between a firm's headquarters and its ten largest institutional shareholders taken from Chhaochharia, Niessen-Ruenzi and Kumar (2012). However, their data do not extend beyond 2007.

value to aggregate income. That is, stocks in locales where they have to compete with fewer stocks for investment dollars ('the only game in town') should have higher prices. The result also follows from a simple CARA model with segmentation and total household income is then used as a proxy for risk tolerance. They also claim that these effects are permanent and cannot be arbitraged away. Also note that the ratio variable in Hong et al. (2008) is highly correlated with population density, a variable that is likely highly correlated with the rural indicator from Loughran and Schultz (2005). In terms of segmentation, the Loughran and Schultz (2005) and Hong et al. (2008) narratives have similar implications, but because the mechanisms differ, the use of variables such as liquidity and analyst following may help to differentiate them. In terms of valuation though, it would appear that they have opposite effects, with rural (metropolitan) stocks having low (high) valuations in the Loughran and Schultz (2005) (Hong et al. (2008)) world.

To differentiate the valuation effects of these two explanations, we collect data on population density, the ratio of aggregate book value to aggregate income, analyst following, and liquidity (see Appendix Table A1 for descriptions). Specifically, we use the absolute difference in state level population density, measured as the log of the number of people per square mile, relative to the U.S. average and the absolute difference between a given state and the U.S. average in the state-level book equity/personal income variable suggested in Hong et al. (2008). We also consider the absolute differences between a given state and the U.S. average in analyst coverage, averaged across all firms in the state and the absolute difference in liquidity, measured using the fraction of zero daily equity returns, between a given state and the U.S. average. Finally, we investigate a pure information flow effect, by examining the effect of the absolute difference between the log of the number of long-distance minutes and the U.S. average, obtained from the FCC's report on trends in telephony (see Appendix Table A1).

Table 2 (Panel A) provides results for a panel regression of SEG onto our usual control variables and the variables related to potential behavioral biases.[12] The pure distance vari-

[12]Given that there are many candidate right-hand side variables, it is necessary to adjust our notion of statistical significance to take multiple testing into account. In general, we focus our discussion on coefficients that are near to or exceed three standard errors from zero. See Harvey, Liu, and Zhu (2015) as well as Harvey and Liu (2014).

able is not statistically significant. The absolute difference in state level population density is associated with larger segmentation, but the effect is not statistically significant. Absolute differences in the book equity/personal income variable suggested in Hong et al. (2008) has a unexpectedly negative and significant coefficient. Absolute differences in analyst coverage and long-distance minutes are not significant. Finally, liquidity differences are highly statistically significant with a positive coefficient.

Table 3 (Panel A) repeats the exercise for a sample of the 35 largest states (by headquarters). The results do exhibit some variation across the two specifications, but negative and statistically significant coefficient the book equity/personal income variables and the positive and significant coefficient on absolute liquidity differences are robust.

Regulatory Effects

Aside from locational biases, state specific regulations are an important alternative explanation for state specific valuations, and the fact that many such salient regulations have changed over time may help account for the significant negative time trend we observe in the data. To start, we focus on state specific banking regulations that may affect the financing of the firm. The literature on banking deregulation, particularly the lifting of restrictions on within-state branching and interstate banking, suggests it led to more efficient financial intermediation. As a consequence, overall economic growth accelerated following deregulation, with the formation of new businesses as an important channel (Jayaratne and Strahan, 1996). Strahan (2003) also shows that economic volatility declined after banking deregulation. Both of those effects are likely to reduce segmentation across states.[13]

Regulations regarding corporate governance may also be state-specific and value-relevant. One key regulatory difference between states in this regard is their anti-takeover laws. Karpoff and Malatesta (1989, 1995) show that the announcement of anti-takeover laws leads to a

[13]It is conceivable that the banking deregulation channel has differential effects across states. For example, in the finance-growth literature, there is a debate whether financial development leads to higher growth because it relaxes financial constraints (Rajan and Zingales, 1995) or whether financial development simply aligns growth opportunities better with actual growth (Fisman and Love, 2004; Bekaert, Harvey, Lundblad, and Siegel, 2007). If the Rajan-Zingales story is at work with banking deregulation expanding the growth potential of firms facing financial constraints, we should see stronger effects when our measures are interacted with measures of financial constraints at the state level. Using the Whited-Wu (2006) measure of financial constraints, we do not find evidence of such interaction effects (the results are available upon request).

statistically significant decrease in stock prices. Bertrand and Mullainathan (2003) show that the passage of such laws leads to lower profitability and productivity. The recent literature has also focused on the effects on debt and credit spreads (see Garvey and Hanka (1999); Francis, Hasan, John and Waisman (2008); Qiu and Yu (2009)) with somewhat mixed findings. If leverage is affected, it will already be controlled for, as leverage differentials are a control variable in our regressions.[14] To measure antitakeover laws across states and time, we use a 0/1 measure that takes the value of zero so long as none of the following five standard antitakeover statutes are enacted: (i) Control Share Acquisition, (ii) Fair Price, (iii) Business Combination, (iv) Poison Pill Endorsement, and (v) Constituencies Statute. One any one is enacted, the indicator takes the value of one. We refer to Bebchuk and Cohen (2003, p. 408) for a detailed discussion of each statute. As a robustness check, we also considered a similarly defined 0/1 indicator that focuses solely for the 'business combination' statute which has received considerable attention in the literature (see, for example, Karpoff and Wittry (2014)); the results are similar and excluded in the interest of brevity. Unlike the other regulatory variables under consideration, this variable largely pertains to the firm's state of incorporation. Hence, we will consider the role for this anti-takeover statutes in concert with the measurable distinction between headquarter and incorporation locales. Detailed are provided below.

From the perspective of the stakeholder's view of corporate governance, firm performance may vary with the legal rights and relative bargaining power of multiple stakeholders. Allen (1995) argues that in a second-best world with information asymmetries, agency issues, incomplete contracting and other deviations from perfect factor markets, a proper configuration of stakeholders' rights can lead to overall firm value maximization. Important stakeholders are the employees and workers of the firms, not only because labor costs comprise a dominant part of costs for many firms, but also because labor may be more or less organized across states, and may be subject to state specific laws and regulations.

Claessens and Ueda (2010) examine state-specific laws on worker protection (measuring

[14]Instead, Wald and Long (2007) and Mansi, Maxwell and Wald (2007) focus on state-specific payout restrictions, showing that payout restrictions reduce leverage and increase credit spreads. Hence, payout restrictions may indirectly affect equity valuations as well. We do not examine such restrictions as the available data are purely cross-sectional.

the difficulty with which to fire workers), in addition to unionization data and state-specific minimum wages.[15] They argue that worker protection may negatively affect firm value, although firms can internalize such costs. Union membership, in particular, may dampen the effect of employment protection since it constitutes an alternative means to protect employees. However, it may also be associated with rent seeking leading to lower value-added growth. Claessens and Ueda find that worker protection has ambiguous effects on state-specific growth, with growth increasing for "high skill" industries but decreasing for "low skill" industries. Union membership is measured as the percentage of each state's nonagricultural wage and salary of employees who are covered by a collective bargaining agreement from Hirsh and McPherson (2003). Minimum wages can be viewed as another form of labor protection. Annual state specific minimum wages are obtained from the Department of Labor.

Finally, following Heider and Ljungqvist (2014), we also consider cross-state differences in corporate taxation rates. We obtain bi-annual data on state-level corporate tax rates from the *The Book of the States* (various issues).

Table 2 (Panel B) provides results for panel regression of SEG onto our usual control variables and this collection of variables related to the state-level regulatory environment. First, we observe that banking deregulation meaningfully decreased segmentation by almost 30 basis points for inter-state deregulation and by 50 basis points for intra-state deregulation. Given that the pooled time-series, cross-sectional standard deviation of SEG for this sample is 140 basis points, this represents a sizable economic effect.

To evaluate the role for anti-takeover statutes, we must incorporate into the analysis the fact that state of incorporation is first-order for this aspect of the regulatory environment. Hence, we construct an additional variable that measures the degree to which the firms headquartered in each state - that we use to construct SEG - are also incorporated there.

[15] As an alternative, Autor, Donohue and Schwab (2006) measure a labor law index as an annual index of wrongful discharge laws by state. These authors investigate three common-law exceptions to the employment-at-will doctrine that limited employers' ability to fire: (1) the tort of wrongful discharge in violation of public policy (public policy exception); (2) the implied covenant to terminate only in good faith and fair dealing (good-faith exception); and (3) the implied-in-fact contract not to terminate without good cause (implied-contract exception). Several states adopted one or more such wrongful termination protections during the 70s and the 80s. Unfortunately, their data stop in 2000, so we do not consider this measure for our exercise.

Specifically, we construct the fraction of firms headquartered but not incorporated in the state relative to the total number of firms headquartered there. From 1982-2013, this fraction is 62%, on average, across the states in our sample, but has been steadily increasing over time. The fraction for Delaware, in contrast, is less than 5% over the last decade.

In our panel regression, we consider the anti-takeover variable directly, but also allow for an interaction with the fraction of headquartered firms not incorporated in that state since a large value of this variable would suggest that the anti-takeover variable is perhaps less important. We also allow for a direct effect of the interaction variable to facilitate interpretation of the interaction effect. We find that the coefficient on the absence of an anti-takeover statue is unexpectedly positive, but it is not statistically significant. This relationship is unaffected by the fact that some headquarters firms are not incorporated there; that is, the interaction effect is absent. Interestingly, the 'own'-effect of the interaction variable is positive and significant. It seems that states with a large number of firms that have different states of incorporation are associated, on average, with higher levels of market segmentation.

Finally, we find that the absolute difference in union coverage has a small, but significant valuation effect, whereas minimum wage and corporate tax differentials are not significantly related to segmentation.

As above, Table 3 (Panel B) repeats the exercise for the sample of 35 largest states (by headquarters). The results are quite similar for this subsample. In particular, the union membership variable remains positive and statistically significant, but economically small. The coefficients on the anti-takover (and interaction) variables remains statistically insignificant (though again the direct effect of the fraction of non-incorproated firms is positive and significant). Most importantly, the banking deregulation variables are both highly statistically significant and economically important across all cases considered. Banking deregulation does appear to be an important driver of cross-state variation in valuation differentials.

Economic Conditions

Under the hypothesis that markets are segmented, any variable that reflects state-specific growth opportunities or discount rates may affect local valuation. In Panel C of Table 2, we

consider some additional explanatory variables for SEG; among them, we consider cross-state differences in economic conditions.

First, if local risk aversion matters, it may be correlated with the level of development as wealthy people tend to be more risk tolerant. We therefore also introduce real per capita income differentials for each state relative to the U.S. average (from the U.S. Bureau of Economic Analysis). We find that absolute differences in the log income level across states is positive associated with observed segmentation.

Korniotis and Kumar (2013) claim that locational biases create predictable patterns in returns, using the growth rate of state labor income (a proxy for the return to human wealth), the relative unemployment rate in the state, and the state level housing collateral ratio (housing equity to state labor income, a proxy to borrowing constraints) as predictors. While their predictive variables may be correlated with local risk aversion, they show that the predictability entails valuable trading strategies. However, these mis-pricings are arbitraged away by non-local and foreign investors in the space of about one year. Thus, location bias implies that local macro-economic conditions affect current prices and future returns in the presence of limits to arbitrage. Their findings seem diametrically opposed to the claims made in Hong et al. (2008). We observe that the absolute unemployment rate differential does positively and significantly affect segmentation.

One rationale for home bias in the international finance literature is that domestic stock returns may be better hedges of domestic human capital than are foreign stock returns (see Baxter and Jermann, 1997), or may hedge against local risk aversion shocks (Stathopoulos, 2012). We proxy this channel using the correlation between domestic equity returns and local income growth. However, we find an unexpectedly negative effect on segmentation.

Finally, the time pattern displayed by the valuation differentials in Figure 1 (Panel B) suggested that segmentation increases in recessions and periods of market stress. Bekaert, Harvey, Lundblad and Siegel (2011) also observed such a phenomenon in international markets. To verify this conjecture, we add the Baa-Aaa corporate bond spread to the regression. The credit spread obtains a highly significant positive coefficient. Recall that we control for absolute return and earnings growth differentials, so this is not just a volatility effect.

To the extent that we observe valuation differentials across states that cannot be ex-

plained by fundamentals, there must be frictions (e.g. exorbitant costs of short selling) that prevent these differentials from being arbitraged away quickly (see Gromb and Vayanos (2010) for a survey of the limits to arbitrage theory). There is no doubt that arbitrage is more difficult in crises times and the credit spread may be a good indicator of the dearth of speculative capital, poor liquidity and funding conditions, and other factors impairing arbitrage.

As before, Table 3 (Panel A) repeats the exercise for the sample of 35 largest states (by headquarters). The results for the 35 largest state case are quite similar with the exception of the absolute income difference. This is likely due to the fact that we are excluding many of the poorest states. It does appear that we need to consider (at least some of) these other plausible determinants of state-level market segmentation. We turn to building a consolidated specification next.

3.2 Consolidated specification

Given that we have a large number of potential determinants of segmentation that span several different categories, we build a consolidated specification by taking the statistically significant variables from each of the three groups, information and behavioral biases, regulatory variables, and economic conditions. With this large collection of candidate variables, we then run panel regressions of SEG on all the variables, including the benchmark controls, and report the evidence in Table 4 (Panel A). To keep things relatively manageable, the variable selection is dictated by the results presented in Table 2 (for all states). Given the dominant role of the Baa-Aaa spread as one time-series variable shared by all states, we also consider an additional specification that only focuses on purely state-level data by excluding this variable.

Columns I and II provide evidence for the consolidated panel regression for all states, and columns III and IV provide the same for only the largest 35 states. First, the adjusted R^2's for these regressions are generally near or above 30%, suggesting that we are capturing roughly 70% of the likely explainable variation in SEG; recall the that pure fixed effect panel regression had an R^2 of 0.43 (the comparable pure fixed effect R^2 for the 35 state

sample is 41%). Second, in unreported results, the coefficient on a time trend is statistically insignificant, suggesting that the temporal variation in these variables is sufficient to capture the general narrowing of cross-state yield spreads over time.

Columns I and III demonstrate that the Baa-Aaa corporate bond yield spread is an important determinant of cross-market segmentation. We continue to find a significant role for the book equity / personal income, market liquidity, banking deregulation (particularly intrastate) - though this depends a bit on the specification, unionization, and cross-state economic conditions.

Since there are large number of variables rendering interpretation somewhat difficult, we present a variance decomposition for these four specification considered in Panel B of Table 4. The variance decomposition splits the predictable variation in the regressions into variances contributed by the different independent variables by computing the covariance between the coefficient times the variable and the fitted value, divided by the total predictable variation. With such a decomposition, the numbers add to 100%. We bucket the various explanatory variables considered in Panel A into our four main groups: control variables, information and behavioral biases, regulation, and economic conditions.

The control variables play a primary role, explaining the better part of variation in cross-market yield spread differences. The remaining variation we can then view as associated with market segmentation. In that context, the roles for locational biases, state-level regulation, and economic conditions are all important in explaining variation in market segmentation. Further, by comparing columns I to II and III to IV, we observe that much of the variation in the economic conditions category is actually attributable to the purely temporal variation in the Baa-Aaa spread. Once removed, the role for state-level regulation is amplified.

3.3 Robustness: bilateral segmentation

In order to evaluate the robustness of our key findings, we consider an alternative measure of SEG that focuses on the bilateral difference *between* states. We compare yield differentials for the same industry across two states. Specifically, let $EY_{i,k,t}$ and $EY_{j,k,t}$ denote industry k's earnings yield in states i and j, respectively, at time t. The weighted sum of these

bilateral industry valuation differentials is an alternative measure of the degree of effective or *de facto* equity market segmentation between two states, i and j, and presents a powerful robustness check to our earlier analysis.:

$$SEG_{i,j,t} = \sum_{k=1}^{N_{i,j,t}} IW_{i,j,k,t} |EY_{i,k,t} - EY_{j,k,t}|, \tag{2}$$

where $IW_{i,j,k,t}$ is the relative market capitalization of industry k at time t and $N_{i,j,t}$ is the number of industries for the state-pair i, j at time t. The relative market capitalization of a given industry is calculated as the combined market capitalization of the industry in both states divided by the combined market capitalization of all industries in both states. With this weighting scheme the industry structure of the state with the larger market capitalization has more influence on the segmentation measure.

Table 5 provides results for panel regressions from 1982-2013 of bilateral SEG onto our usual control variables and the same collection of bilateral explanatory variables considered in Table 2 above. We consider 1,259 state-pairs; a few state-pairs are dropped for lack of data as 50 U.S. states and D.C. would yield 1,275 state-pairs. All absolute differences are measured with respect to the bilateral state-pair. Panel A considers the information and behavioral bias variables, Panels B and C explore two versions of our regulatory variables, and Panel D considers state-level economic conditions. Each column includes the standard control variables, and they are generally statistically significant and of the expected sign. Standard errors are robust to heteroskedasticity and to correlation across state-pairs in a given month as well as across months for a given state-pair. Accounting for cross-state-pair correlation is particularly important in this case give that we have a very large number of relatively highly correlated state-pair yield differentials.

Panel A presents evidence on information and behavioral biases. Given the primacy of the investor in the locational bias narrative, distance here is measured not as the distance between states, but rather as the absolute difference in the minimum distance from financial centers for the two states. This coefficient is positive and statistically significant, suggesting the bilateral measure may help to better identify the distance effect. Absolute differences in population density, the book equity to income ratio, and market liquidity also show

significant effects, though not always in the expected direction. The absolute difference is long-distance minutes between the two states is positive and significant. Taken together, these results suggest a role for locational biases, but the adjusted R^2 for this regression is only 5.4%. As a point of reference, a purely statistical regression on state-pair fixed effects and monthly time indicators delivers an adjusted R^2 of 24%, significantly lower than the comparable figure for the state-level analysis provided above.

Panels B and C offer evidence on the role for regulation; the two panels are nearly identical (mirroring Table 2), only that the latter employs an alternative measure of interstate banking deregulation. In Panel B, the banking deregulation (both inter- and intrastate) are 0/1 indicators that take a 1 when *both* states are deregulated. Note that this is slightly different from our earlier regressions (Table 2) at the state level where the banking deregulation variables were just for that state - now it pertains to the pair. The highly significant and negative coefficients on the banking variables confirm our earlier finding that absolute earnings yield spreads are narrower if both states have reformed. In Panel C, we replace the 0/1 interstate banking deregulation variable with a bilateral measure that captures the more nuanced nature of U.S. banking deregulation. Throughout the 1980s and 1990s, banking deregulated takes place first at the bilateral level where one state allowed banks of another state to enter its banking market via acquisitions, often conditional on the other state granting entry rights as well.[16] We find that this alternative measure yields similar conclusions for the role of banking deregulation across segmentation.

For the bilateral specification, the antitakeover variable is defined as a 0/1 indicator, where a 1 indicates that *both* states in the pair are unconstrained (i.e., an absence of takeover regulation). Further, since state of incorporate is important for this aspect of corporate regulation, we again interact the anti-takeover variable with information on the fraction of headquartered firms that are not incorporated in the state. For the bilateral case, we measure the average of this fraction across the state-pair and this becomes our interaction variable. We observe a positive and statistically significant coefficient on antitakeover; this unexpectedly suggests that if both states do not have anti-takeover measures in place, then

[16]We thank Denis Sosyura for providing us with a state-by-state matrix of dates when each state was allowed to enter into every other state via bank acquisitions, which takes into account reciprocity clauses, where applicable.

they have wider absolute earnings yield differentials. The interaction effect is statistically insignificant, but direct effect of a large fraction of headquartered firms incorporated elsewhere is associated with higher levels of market segmentation similar to what we observed in the state-level analysis.

We also observe small, but significant coefficients for union coverage and minimum wage differentials. The effect of corporate tax differentials is not statistically significant.

Finally, Panel D includes the set of economic conditions considered in Table 2 (Panel C). Not all the variables are significant or of the expected sign; however, there is a important role for the bilateral unemployment rate difference and, in particular, the Baa-Aaa corporate bond yield spread.

Largely, the bilateral results corroborate many of the main implications of our state-level analysis. There is a signifiant, but modest role for locational biases; regulation – particularly banking deregulation – is an important determinant of cross-state segmentation; and, finally, the Baa-Aaa corporate bond spread is closely linked to cross-state market segmentation.

4 Valuation Implications

A number of the theories that we discussed predict actual valuation differentials between states and this section provides an initial analysis of these predictions. For now, we test five hypotheses regarding location versus information flow effects, the "only game in town" versus "rural stock" stories, the valuation effects of banking deregulation, the valuation effects of labor laws, and finally of economic conditions. Econometrically, we use bilateral differences between state earnings yields as the left hand side variable and each regression has the five control variables and time fixed effects. All of the models include fixed effects for each state-industry pair, except for the first model where the minimum distance measure is used. A reported negative coefficient means that a positive change in an explanatory variable is value enhancing (leads to lower earnings yields).

Table 6 contains the results. Our first hypothesis pits the familiarity hypothesis, proxied by the difference in minimum distance from states with high financial activity against an information flow hypothesis, where we measure the extent of information flow by the number

of long distance minutes and the number of analysts following stocks headquartered in the state. Both variables are in difference form. Given that the distance variable has no time dimension we cannot include state-pair fixed effects. The only significant variable is the long distance minutes variable. States with more phone connectivity have higher valuations. Note that the physical distance variable even has the wrong sign suggesting states further away from the financial activity centers have higher, not lower, valuations.

Our second hypothesis regards population concentration and stock valuation. According to Hong et al. (2008), states with low aggregate book values to personal income should feature relatively high valuations because there are more "segmented" investment dollars competing for stocks; but Loughran and Schultz (2005) suggest that "rural" stocks should have lower valuations. To the extent that few stocks have their headquarters in rural communities, it would appear these stories contradict one another. We use book value to personal income ratio and population density in difference form as additional independent variables in our regression. Both variables have highly statistically significant positive coefficients. In other words, in states with high book value to personal income and high population density, earnings yields are higher and thus valuations lower. This confirms the Hong et al. (2008) story.

Our third series of tests verifies whether banking deregulation had valuation effects. Note that we do already control for growth opportunities (but they are not significant to begin with), so that we are primarily testing for discount rate effects on valuation. It is conceivable that most of the valuation effect of banking deregulation occurs through cash flow channels, by letting firms better align growth opportunities with actual cash flow growth (see Bekaert, Harvey, Lundblad and Siegel, 2007); however, it is also possible that relaxing financial constraints lowers systematic risk, as financial constraints may appear particularly binding in bad times. The results are surprising. We find either insignificant coefficients (for interstate deregulation) or significant coefficients of the wrong sign (for intrastate deregulation). That is, deregulating the intrastate banking system leads to higher earnings yields and thus lower valuations. Why this is so deserves further scrutiny.

Our fourth hypothesis investigates the effects of union coverage and minimum wage laws. We find that higher minimum wages lead to lower earnings yields and thus higher valuations.

It is conceivable that a higher minimum wage leads firms to select more capital intensive, higher productivity production processes, which increase their valuations.

Finally, we test the effects of economic income, unemployment, and the correlation between income and returns on valuations. We find that states with higher per capita income have significantly and substantially higher valuations. A 25% higher per capita income leads to a 0.5% lower earnings yield. Unemployment differences do not generate a significant valuation effect, but a higher correlation between state specific income and equity returns also leads to higher valuations. This suggests that in such states, there may be a more diversified investor pool, lowering discount rates.

5 Conclusions

We show that the valuations of firms within the same industry across different U.S. states may vary substantially. Using a measure of market capitalization weighted absolute industry earnings yields differentials across U.S. states, we demonstrate that the U.S. market demonstrates significant cross-sectional and temporal segmentation. While there has been a significant downward trend in these valuation differentials, they are still at about 2%, on average, over the last few years.

We provide an in-depth analysis of various factors that could be associated with such "within the U.S." segmentation. We find a role for explanatory variables that could be interpreted as related to investors' information or behavioral locational biases, as well as differences in economic conditions across states. We also uncover an important role for state specific regulatory changes, in particular the banking deregulations that took place in several states in the late 1980s and early 1990s

In ongoing work, we plan to use this framework to address several interesting issues, including segmentation *within* the financial and banking industry, which is of special interest given the recent financial crisis. We also will further develop our analysis of raw (signed) valuation differentials rather than absolute valuation differentials. A number of extant theories predict particular valuation reactions to legal changes, for instance, and we will test this formally. Finally, we will also examine the behavior of valuation differentials during crises

in more detail.

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Figure 1, Panel A

Average Absolute Valuation Differentials

Non-financials

(1982-2013)

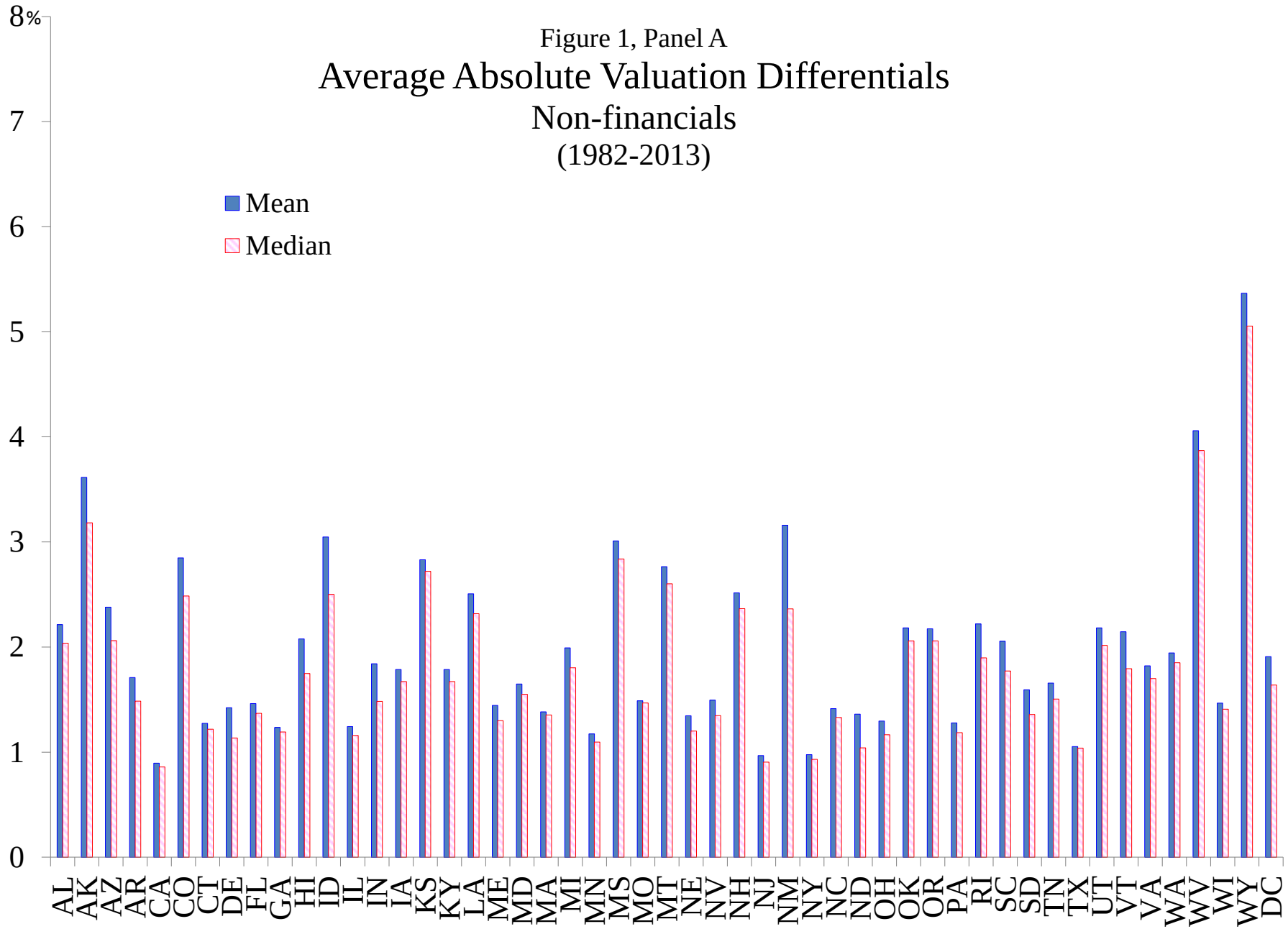

Figure 1, Panel B

Absolute U.S. Market Valuation Differentials

Non-financials

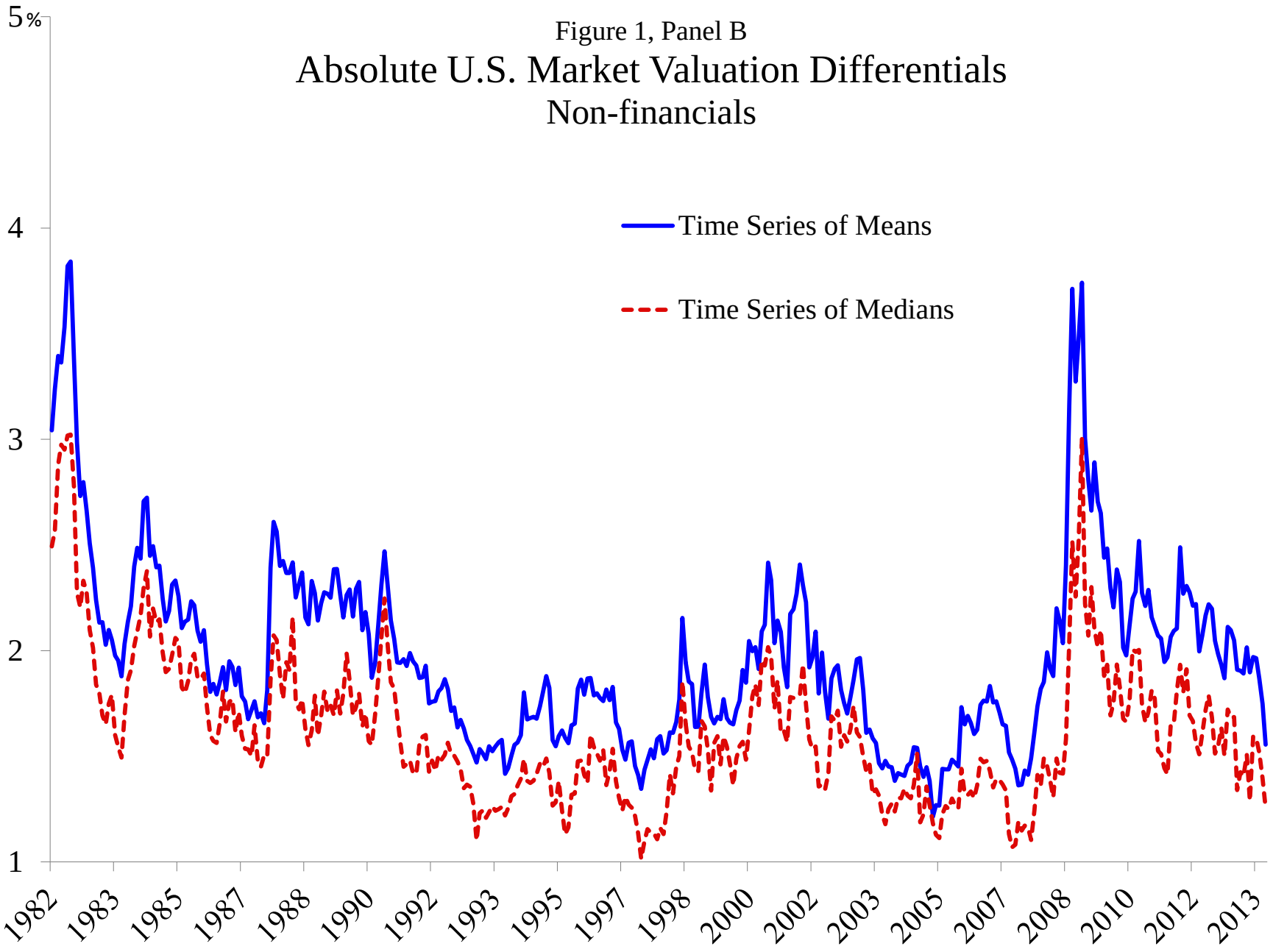

Table 1
Market Segmentation

	SEG by Headquarters 50 States plus D.C.		SEG by Headquarters 35 Largest States	
	I	II	III	IV
Constant	2.105	2.657	2.493	3.121
	0.153	*0.229*	*0.184*	*0.328*
Abs(Leverage Difference)	0.002	0.005	-0.013	-0.012
	0.004	*0.005*	*0.003*	*0.008*
Abs(Earnings Growth Volatility Difference)	0.007	0.011	0.006	0.013
	0.004	*0.003*	*0.003*	*0.004*
Abs(Return Volatility Difference)	0.186	0.190	0.171	0.165
	0.019	*0.019*	*0.021*	*0.035*
Abs(Sales Growth Difference)	0.001	-0.002	0.002	-0.003
	0.004	*0.004*	*0.004*	*0.006*
Ln(Number of Firms)	-0.259	-0.261	-0.304	-0.311
	0.024	*0.024*	*0.027*	*0.053*
Time Trend		-0.0017		-0.0018
		0.0005		*0.0003*
Adj. R^2	0.218	0.234	0.222	0.257
Number of State-Months	19,520	19,520	13,405	13,405

This table reports coefficient estimates and standard errors for linear regression models of segmentation. Segmentation is measured for non-financial firms from 1982-2013 for all U.S. states and the District of Columbia relative to the value-weighted average of the United States in columns I and II. Columns II and III show results for just the 35 largest states. Firms are categorized by state by their headquarters. All variables are defined in Appendix Table A1. All standard errors (in *italics*) are robust to heteroskedasticity and to correlation across states in a given month as well as across months for a given state.

Table 2
Segmentation Determinants
50 States plus D.C. by Headquarters

Panel A: Information and Behavioral Biases		**Panel B: Regulation**		**Panel C: Economic Conditions**	
Ln(Min Distance from CA, NY, TX)	-0.001 *0.004*	Interstate Banking Deregulation	-0.329 *0.135*	Abs(Ln(Income per Capita) Difference) [Real Ln Per Capita Real Income]	0.461 *0.188*
Abs(book equity/personal income Difference) [Hong et al.]	-0.432 *0.124*	Intrastate Banking Deregulation	-0.493 *0.051*	Abs(Unemployment Rate Difference)	0.054 *0.027*
Abs(Ln(Population Density) Difference) [Loughran and Schultz]	-0.018 *0.025*	Anti-takeover	0.100 *0.108*	Correlation between State Equity Return Index and Local Income Growth	-0.162 *0.046*
Abs(Analyst Coverage of the Firms within the State Difference)	0.004 *0.011*	Anti-takeover x Fraction of HQ firms not incorporated	-0.003 *0.146*	Baa-Aaa Spread	0.719 *0.066*
Abs(Proportion of Zero Daily Returns Difference) [Bekaert et al.]	0.033 *0.013*	Fraction of HQ firms not incorporated	0.166 *0.073*		
Abs(Ln(Long-Distance Minutes) Difference)	0.271 *0.212*	Abs(Union Coverage Difference)	0.027 *0.006*		
		Abs(Minimum Wage Difference)	0.002 *0.013*		
		Abs(Corporate Taxes Difference)	0.017 *0.010*		
Benchmark Controls	Yes		Yes		Yes
Adj. R^2	0.234		0.261		0.297
Number of State-Months	19,459		19,459		19,459

This table reports coefficient estimates and standard errors for linear regression models of segmentation. Segmentation is measured for non-financial firms from 1982-2013 for all U.S. states and the District of Columbia relative to the value-weighted average of the United States. Firms are classified by their headquarter state. All specifications include the following benchmark controls: Abs(Leverage Difference), Abs(Earnings Growth Volatility Difference), Abs(Return Volatility Difference), Abs(Sales Growth Difference), and Ln(Number of Firms). Panel A includes explanatory variables on locational biases, panel B includes explanatory variables on state-level regulation, and panel C includes other possible segmentation determinants. All variables are defined in Appendix Table A1. All standard errors (in *italics*) are robust to heteroskedasticity and to correlation across states in a given month as well as across months for a given state.

Table 3
Segmentation Determinants
35 Largest States by Headquarters

Panel A: Information and Behavioral Biases		**Panel B: Regulation**		**Panel C: Economic Conditions**	
Ln(Min Distance from CA, NY, TX)	0.004	Interstate Banking Deregulation	-0.574	Abs(Ln(Income per Capita) Difference) [Real Ln Per Capita Real Income]	-0.987
	0.004		*0.109*		*0.239*
Abs(book equity/personal income Difference) [Hong et al.]	-0.248	Intrastate Banking Deregulation	-0.368	Abs(Unemployment Rate Difference)	0.085
	0.086		*0.046*		*0.024*
Abs(Ln(Population Density) Difference) [Loughran and Schultz]	-0.058	Anti-takeover	0.092	Correlation between State Equity Return Index and Local Income Growth	-0.164
	0.022		*0.104*		*0.041*
Abs(Analyst Coverage of the Firms within the State Difference)	-0.027	Anti-takeover x Fraction of HQ firms not incorporated	-0.162	Baa-Aaa Spread	0.555
	0.013		*0.139*		*0.056*
Abs(Proportion of Zero Daily Returns Difference) [Bekaert et al.]	0.069	Fraction of HQ firms not incorporated	0.295		
	0.014		*0.063*		
Abs(Ln(Long-Distance Minutes) Difference)	0.051	Abs(Union Coverage Difference)	0.027		
	0.167		*0.005*		
		Abs(Minimum Wage Difference)	-0.001		
			0.015		
		Abs(Corporate Taxes Difference)	-0.013		
			0.007		
Benchmark Controls	Yes		Yes		Yes
Adj. R^2	0.248		0.307		0.322
Number of State-Months	13,440		13,440		13,440

This table reports coefficient estimates and standard errors for linear regression models of segmentation. Segmentation is measured for non-financial firms from 1982-2013 for the largest 35 U.S. states relative to the value-weighted average of the United States. Firms are classified by their headquarter state. All specifications include the following benchmark controls: Abs(Leverage Difference), Abs(Earnings Growth Volatility Difference), Abs(Return Volatility Difference), Abs(Sales Growth Difference), and Ln(Number of Firms). Panel A includes explanatory variables on locational biases, panel B includes explanatory variables on state-level regulation, and panel C includes other possible segmentation determinants. All variables are defined in Appendix Table A1. All standard errors (in *italics*) are robust to heteroskedasticity and to correlation across states in a given month as well as across months for a given state.

Table 4
Consolidated Segmentation Determinants

	All 50 States plus D.C. by Headquarters		35 Largest States by Headquarters	
Panel A	I	II	III	IV
Constant	0.888	2.008	1.767	2.694
	0.136	*0.146*	*0.163*	*0.180*
Abs(Leverage Difference)	0.001	0.000	-0.006	-0.006
	0.004	*0.004*	*0.004*	*0.004*
Abs(Earnings Growth Volatility Difference)	0.014	0.012	0.017	0.014
	0.003	*0.003*	*0.002*	*0.002*
Abs(Return Volatility Difference)	0.204	0.207	0.156	0.150
	0.020	*0.020*	*0.020*	*0.020*
Abs(Sales Growth Difference)	0.002	0.001	0.003	0.002
	0.004	*0.004*	*0.004*	*0.004*
Ln(Number of Firms)	-0.191	-0.196	-0.256	-0.278
	0.020	*0.023*	*0.021*	*0.026*
Abs(book equity/personal income Difference) [Hong et al.]	-0.318	-0.299	-0.316	-0.243
	0.075	*0.079*	*0.085*	*0.095*
Abs(Proportion of Zero Daily Returns Difference) [Bekaert et al.]	0.044	0.027	0.033	0.015
	0.009	*0.012*	*0.011*	*0.014*
Interstate Banking Deregulation	0.111	-0.234	-0.111	-0.414
	0.077	*0.130*	*0.089*	*0.121*
Intrastate Banking Deregulation	-0.331	-0.369	-0.290	-0.283
	0.052	*0.054*	*0.042*	*0.046*
Abs(Union Coverage Difference)	0.025	0.026	0.032	0.034
	0.005	*0.005*	*0.004*	*0.004*
Abs(Ln(Income per Capita) Difference) [Real Ln Per Capita Real Income]	0.331	0.360	-0.721	-0.750
	0.173	*0.176*	*0.241*	*0.242*
Abs(Unemployment Rate Difference)	0.034	0.065	0.050	0.078
	0.026	*0.029*	*0.023*	*0.026*
Correlation between State Equity Return Index and Local Income Growth	-0.148	-0.229	-0.139	-0.198
	0.039	*0.044*	*0.035*	*0.039*
Baa-Aaa Spread	0.696		0.499	
	0.059		*0.058*	
Benchmark Controls	Yes	Yes	Yes	Yes
Adj. R^2	0.323	0.283	0.359	0.323
Number of State-Months	19,459	19,459	13,440	13,440

Table 4, Panel B

	All 50 States plus D.C. by Headquarters		35 Largest States by Headquarters	
Variance Decomposition	I	II	III	IV
Information and Behavioral Biases	24.3%	23.2%	12.2%	6.8%
Regulation	7.8%	36.1%	29.2%	66.6%
Economic Conditions	67.9%	40.7%	58.5%	26.6%

This table reports linear regression models of segmentation. Panel A presents coefficient estimates and standard errors; each panel regression includes the benchmark controls from Table 1. Panel B presents the relative contribution of each determinant to the total explained variation (once the benchmark controls are already accounted for). Segmentation is measured for non-financial firms from 1982-2013 relative to the value-weighted average of the United States. Firms are classified by their headquarter state. In Panel A, we choose the plaussible determinants as the explanatory variables from Table 2 that are statistically significant. Columns I and II include all 50 U.S. states plus D.C., and colums III and IV include the largest 35 states. Column II and III exclude the Baa-Aaa spread. All variables are defined in Appendix Table A1. All standard errors (in *italics*) are robust to heteroskedasticity and to correlation across states in a given month as well as across months for a given state. In Panel B, variance decompositions are provided for each of the columns I-IV in Panel A. We group each of the explanatory variables into three groups based on market segmentation separate from our control variables: information and behavioral biases, regulation, and economic conditions.

Table 5
Bilateral Segmentation Determinants
50 States plus D.C. by Headquarters

Panel A: Information and Behavioral Biases		**Panel B: Regulation**		**Panel C: Regulation Alternative**		**Panel D: Economic Conditions**	
Abs(Ln(Min Distance from CA, NY, TX) Difference)	0.007	Interstate Banking Deregulation	-0.420	Interstate Banking Bilateral	-0.300	Abs(Ln(Income per Capita) Difference) [Real Ln Per Capita Real Income]	-0.390
	0.002		*0.046*		*0.046*		*0.038*
Abs(book equity/personal income Difference) [Hong et al.]	0.056	Intrastate Banking Deregulation	-0.401	Intrastate Banking Deregulation	-0.409	Abs(Unemployment Rate Difference)	0.061
	0.023		*0.029*		*0.029*		*0.007*
Abs(Ln(Population Density) Difference) [Loughran and Schultz]	-0.079	Anti-takeover	0.266	Anti-takeover	0.408	Abs(Correlation between State Equity Return Index and Local Income Growth Difference)	0.036
	0.005		*0.083*		*0.092*		*0.023*
Abs(Analyst Coverage of the Firms within the State Difference)	-0.005	Anti-takeover x Fraction of HQ firms not incorporated	-0.028	Anti-takeover x Fraction of HQ firms not incorporated	-0.097	Baa-Aaa Spread	1.080
	0.002		*0.093*		*0.093*		*0.047*
Abs(Proportion of Zero Daily Returns Difference) [Bekaert et al.]	0.034	Fraction of HQ firms not incorporated	0.142	Fraction of HQ firms not incorporated	0.150		
	0.004		*0.040*		*0.039*		
Abs(Ln(Long-Distance Minutes Difference))	0.124	Abs(Union Coverage Difference)	0.004	Abs(Union Coverage Difference)	0.004		
	0.038		*0.001*		*0.001*		
		Abs(Minimum Wage Differential)	0.008	Abs(Minimum Wage Differential)	0.007		
			0.004		*0.004*		
		Abs(Corporate Taxes Differential)	0.000	Abs(Corporate Taxes Differential)	0.000		
			0.002		*0.002*		
Benchmark Controls	Yes		Yes		Yes		Yes
Adj. R^2	0.054		0.073		0.073		0.116
Number of Pairs	1,259		1,259		1,259		1,259
Number of Pair-Months	431,944		434,119		434,119		426,402

This table reports coefficient estimates and standard errors for linear regression models of bilateral segmentation. Segmentation is measured for non-financial firms from 1982-2013 on a bilateral basis between each of the U.S. states and the District of Columbia. Firms are classified by their state of headquarters. All specifications include the following benchmark controls: Abs(Leverage Difference), Abs(Earnings Growth Volatility Difference), Abs(Return Volatility Difference), Abs(Sales Growth Difference), and Ln(Number of Firms). Panel A includes additional explanatory variables on locational biases, panel B includes explanatory variables on state-level regulation, panel C includes the same state-level regulatory variables but replaces interstate banking with a pure bilateral measure, and panel D includes other possible segmentation determinants. All variables are defined in Appendix Table A1. All standard errors (in *italics*) are robust to heteroskedasticity and to correlation across state-pair in a given month as well as across months for a given state-pair.

Table 6
Valuation Implications

	(I)		(II)		(III)		(IV)		(V)
Ln(Min Distance from CA, NY, TX) Difference	-0.011 *0.008*	Book equity/personal income Difference	0.740 *0.051*	Interstate Banking Deregulation Difference	-0.050 *0.049*	Union Coverage Difference	0.003 *0.006*	Ln(Income per Capita) Difference	-2.331 *0.211*
Ln(Long-Distance Minutes) Difference	-0.374 *0.032*	Ln(Population Density) Difference	1.083 *0.082*	Both Regulated (Interstate)	-0.011 *0.031*	Minimum Wage Difference	-0.038 *0.009*	Unemployment Rate Difference	-0.001 *0.009*
Analyst Coverage of the Firms within the State Difference	0.004 *0.003*			Intrastate Banking Deregulation Difference	0.330 *0.035*			Correlation between State Equity Return Index and Local Income Growth	-0.089 *0.024*
				Both Regulated (Intrastate)	-0.136 *0.022*				
Adj. R^2	0.074		0.190		0.186		0.185		0.187
Benchmark Controls	Yes		Yes		Yes		Yes		Yes
Pair Fixed Effects	No		Yes		Yes		Yes		Yes
Time Effects	Yes		Yes		Yes		Yes		Yes
Number of Pair-Months	463,240		463,240		463,240		463,240		463,240

This table reports coefficient estimates and standard errors for linear regression models of bilateral differences between state earnings yields for non-financial firms from 1982-2013 on a bilateral basis between each of the U.S. states and the District of Columbia. Firms are classified by their state of headquarters. All specifications include the following benchmark controls: Abs(Leverage Difference), Abs(Earnings Growth Volatility Difference), Abs(Return Volatility Difference), Abs(Sales Growth Difference), and Ln(Number of Firms). Each regression includes time fixed effects and fixed effects for each state-pair, except for the first one where minimun distance is employed (it is constant throughout the sample for each state-pair). All variables are defined in Appendix Table A1. All standard errors (in *italics*) are robust to heteroskedasticity and to correlation across state-pair in a given month as well as across months for a given state-pair.

Appendix Table 1
Variable Definitions

Variable	Description
Segmentation (*SEG*)	Average of the absolute difference between industry earnings yields (EY) in a given U.S. state and the U.S. average, weighted by the industry market capitalization (MCAP) in the given state. We calcuate the industry earnings yield in a given state as the MCAP weighted EY of all firms in that industry and state. We obtain firm-level EY at the end of each month by dividing earnings over the last four quarters (all accounting data are considered available with a delay of three months) by end of month MCAP. Negative earnings are set to zero. EY larger than one are set to missing. We employ the Fama French 30 industry classification. Each firms Fama French industry association is determined based on the firm's historical SIC code. We exclude firms in the financial industry (Fama French industries 29) and firms in industy "Other" (Fama French industry 30). Source: Compustat, CRSP, Ken French's web site.
Measure induced Controls	
Ln(Number of Firms)	Natural log of the total number of listed firms in a given state used in the construction of the segmentation measure. Source: Count based on Compustat and CRSP.
Abs (Leverage Difference)	Average of the absolute difference between industry leverage in a given U.S. state and either the state or the U.S. average, weighted by the industry market capitalization (MCAP) in the given state. We calcuate the industry leverage in a given state as the total asset weighted leverage of all firms in that industry and state used in the calculation of the industry EY in that state. We obtain firm-level leverage at the end of each month by dividing long term debt (DLTT) by total assets (AT), using the last available quarterly or annual data (all accounting data are considered available with a delay of three months). Source: Compustat.
Abs(Earnings Growth Volatility Difference)	Average of the absolute difference between industry log earnings growth volatility in a given U.S. state and the U.S. average, weighted by the industry market capitalization (MCAP) in the given state. We calculate industry log earnings growth volatility as the five-year standard deviation of quarterly log growth rates of positive 12-month industry earnings. We require at least eight quarters of data for the calculation. We winsorize industry log earnings growth at the first and 99th percentile. Industry earnings represent the sum of firm-level earnings of all firms in a given industry and state used in the calculation of industry EY in a given state. All accounting data are considered available with a delay of three months. Source: Compustat.
Abs(Return Volatility Difference)	Average of the absolute difference between industry log return volatility in a given U.S. state and the U.S. average, weighted by the industry market capitalization (MCAP) in the given state. We calculate industry log return volatility as the five-year standard deviation of monthly industry log retuns. We require at least 24 months of data for the calculation. We winsorize industry log returns at the first and 99th percentile. Industry returns represent the value weighted average return of all firms in a given industry and state used in the calculation of industry EY in a given state. Source: CRSP.

Variable	Description
Abs(Sales Growth Differential)	Average of the absolute difference between 5-year avearge annual industry sales growth in a given U.S. state and either the U.S. average, weighted by the industry market capitalization (MCAP) in the given state. We calcuate industry sales as the sum of annual firm-level sales (SALES) of all firms in that industry and state. We set negative firm-level sales values to missing. We winsorize annual industry sales growth rates at the first and 99th percentile and average industry sales growth rates over the past five years (requiring at least three years with non-missing data). Source: Compustat.
Regulation	
Interstate Banking Deregulation	An indicator that takes on one in the year (and all following years) in which the given state first entered into an interstate banking agreement with other states, allowing out of state banks to acquire in state incumbent banks, and zero otherwise. Source: Strahan (2003)
Intrastate Banking Deregulation	An indicator that takes on one in the year (and all following years) in which a given state first permitted branching by means of merger and acquisition (M&A) or unrestricted branching and zero otherwise. Source: Strahan (2003)
Abs(Union Coverage Difference)	The percentage of each state's nonagricultural wage and salary employees who are covered by a collective bargaining agreement from Hirsh and McPherson (2003) [http://www.unionstats.com/]. We take the absolute difference between a given U.S. state and the U.S. average. These are annual data covering our full sample.
Abs(Minimum Wage Difference)	Legal minimum wage data by state from the U.S. Department of Labor. We take the absolute difference between a given U.S. state and the U.S. average. These are annual data covering our full sample
Anti-takover	The anti-takover index, from Karpoff and Wittry (2014) is the 'first sign' date of the existence of five state-level statutes (by year) for each state related to control share acquisition, fair price, business combination, poison pill endorsement, and constituencies. Further details on each statute are provided in Bebchuk and Cohen (2003). The variable takes a 1 if none of the relevant statutes are in place, and a 0 otherwise. We also augment this with a measure of the percentage of headquartered firms in each state that are also incorporated in that state. This, then, serves as an interaction variable since state of incorporation is relevant for anti-takeover statutes, whereas the headquarter or state of activity is relevant for other regulatory issues.
Abs(Corporate Tax)	The state-level corporate taxation rate, following Heider and Ljungqvist (2014), obtained from the *The Book of the States* (various issues). We take the absolute difference between a given U.S. state and the U.S. average. These are bi-annual data covering our full sample.
Information and Behavioral Biases	
Ln(Min Distance from CA, NY, TX)	The log of the minimum distance between a state's capital and California, New York, or Texas (in thousands of kilometers). Source: Zip Code Database.
Abs(Book Equity/Personal Income Difference) [Hong et al.]	Absolute difference between the ratio of state level book equity over annual personal income in a given U.S. state and the U.S. average. State level book equity is the sum of firm-level annual book equity (CEQ) of all firms headquartered in a given state, including financial firms. We exclude firms with negative book equity. State level personal income is total personal income less dividend income for a given state. See Hong et al. (2008) for furhter details about this variable. Source: Compustat, Bureau of Economic Analysis.

Variable	Description
Abs(Ln(Long-Distance Minutes))	The primary data on long-distance minutes are cover fixed-line long-distance minutes (see the FCC's Statistical Trends in Telephony report - http://transition.fcc.gov/wcb/iatd/trends.html). Since we observe mobile phone diversion with fixed line long-distance minutes falling sharply after 2000, we augment the series with an estimate from 2000 of the number of minutes by state originating via mobile phones. We multiplying the FCC's figure for the number of mobile accounts per *state* per *year* by an estimate of the number of annual minutes per account. This figure is then scaled by their estimate (around 25-30%) of the percentage of mobile minutes that are inter-state and added to our fixed line long-distance minutes mentioned above. These figures are all provided in the FCC's report. We take the natural log of these collected minutes. We take the absolute difference between a given U.S. state and the U.S. average.
Abs(Ln(Population Density) Difference) [Loughran and Schultz]	Population density is from the U.S. Census and represents people per square mile. We take the natural log of this variable. We take the absolute difference between a given U.S. state and the U.S. average. These are annual data covering our full sample
Abs(Proportion of Zero Daily Returns Difference) [Bekaert et al.]	Average of the absolute difference between industry level fraction of zero daily returns in a given U.S. state and the U.S. average, weighted by the industry market capitalization (MCAP) in the given state. We calcuate the industry level fraction of zero daily returns in a given state as the MCAP weighted average fraction across all firms in that industry and state used in the calculation of the industry EY. We exclude firms with less than 200 daily observations per year. Source: CRSP.
Abs(Analyst Coverage of the Firms within the State Difference)	Average of the absolute difference between the industry average number of analysts per firm (weighted by MCAP) in a given U.S. state and the U.S. average, weighted by the industry market capitalization (MCAP) in the given state. We obtain information on the number of analysts for all firms used in the calculation of the the segmentation measure (SEG) and covered by IBES. Source: IBES.
Economic Conditions	
Abs(Ln(Income per Capita) Difference) [REAL LN PER CAPITA INCOME]	The natural logarithm of real per capita income for each U.S. state taken from the U.S. Bureau of Economic Analysis. We take the absolute difference between a given U.S. state and the U.S. average. These are annual data covering our full sample.
Abs(Unemployment Rate Difference)	The unemployment rate for each U.S. state taken from the U.S. Bureau of Labor Statistics' Local Area Unemployment Statistics Release. We take the absolute difference between a given U.S. state and the U.S. average. These are monthly data available from 1976.
Correlation between State Equity Return Index and Local Income Growth	
Baa-Aaa Spread	The yield spread between BAA and AAA rated corporate bonds from the St. Louis Federal Reserve Bank. These are monthly data covering our full sample.

This table defines all variables used in the empirical analysis.