

Securities Regulation, Household Equity Ownership, and Trust in the Stock Market

By Hans B. Christensen, Mark Maffett, and Lauren Vollon*

September 2018

Abstract: Using aggregate data from national accounts, we study whether strengthening and harmonizing securities regulation across the European Union increases household equity ownership. We find a significant increase in the proportion of liquid assets invested in equity, both when a household's own country adopts the regulation and when other countries adopt the regulation. To directly explore the mechanism through which households' willingness to directly invest in the equity market increases, we show that the effect of securities regulation is stronger in countries where trust is low and between countries where cultural biases are most pronounced.

Keywords: National accounts, households, equity ownership, trust, securities regulation.

JEL Classification: D03, G14, G18, G38, I18, J28, K22, K32, L71, L72, M41, M48

* Corresponding author. Mark Maffett (mark.maffett@chicagobooth.edu) University of Chicago Booth School of Business 5807 S. Woodlawn Avenue Chicago, IL 60615. We thank Mia Giuriato and Nina Linchenko for excellent research assistance. We appreciate helpful comments from an anonymous reviewer, Philip Bond, Steven Cappoen, Mariassunta Giannetti, Luigi Guiso, Rebecca Hann, Philipp Hartmann, Antonio Matas Mir, Jean-Marie Meier, Ronald Nelisse, Lakshmanan Shivakumar, Skylar DeTure, and workshop participants at Boston College, Harvard Business School, the University of Maryland, the University of Texas at Austin, and the 2018 FARS Annual Meeting. We thank Jean-Marie Meier for providing data on the entry-into-force dates of the directives. Christensen acknowledges financial support from the David G. Booth Faculty Fellowship and The University of Chicago Booth School of Business. Maffett acknowledges financial support from the Neubauer Family Faculty Fellowship and the University of Chicago Booth School of Business.

1. Introduction

The wealth that investors are willing to put into equity markets is determined (in part) by the perceived likelihood of expropriation by other market participants—that is, for investors to provide funds to firms, they need to be confident that they will see a return on their investment (Aghion et al. 2010). This is particularly true for households because of their outsider status and reliance on better-informed intermediaries (Guiso et al. 2008). For relatively unsophisticated household investors, weak investor protection and internationally fragmented regulations increase the risks and costs of investing in both domestic and foreign stock markets (Giannetti and Koskinen 2010; Giannetti and Wang 2016). A lack of trust in and cultural bias towards potential counterparties are also significant impediments to household equity ownership (Guiso et al. 2009). In this paper, we examine whether strengthening and harmonizing securities regulation can increase the aggregate proportion of liquid assets that households are willing to invest directly in exchange-listed shares and substitute for trust in the stock market.

Securities regulation, such as laws that define and prohibit market abuse, could increase a household's willingness to invest in stock markets both by providing a mechanism to punish those who abuse the market and by establishing fiduciary duties for intermediaries. However, mistrust can be culturally rooted, and it is unclear whether government intervention can overcome such deeply ingrained beliefs (Guiso et al. 2009). For instance, if household investors do not trust that regulators will fairly implement and enforce regulations, stronger securities laws are unlikely to have a meaningful impact. The frictions that deter household investment are even more pronounced in international transactions because of disparate regulations across countries (e.g., DeFond et al. 2011), foreign investors' relative information disadvantage (e.g., Leuz et al. 2008), and a lack of trust in market participants from different cultures (Guiso et al. 2009). Coordinated improvements in securities regulation across countries could reduce these frictions and make it

less costly to establish a well-diversified portfolio of domestic and foreign stocks, increasing households' willingness to invest their wealth in the stock market at home and abroad.

To provide evidence on the effect of regulation on household equity ownership, we study the effects of two internationally coordinated attempts to strengthen and harmonize securities law across the member states of the EU—the Market Abuse Directive (MAD) and the Markets in Financial Instruments Directive (MiFID) (collectively, the “Directives”). The Directives were implemented in each of the 31 member states of the European Economic Area (EEA). They are a key component of the European Commission’s Financial Services Action Plan to increase investor confidence in the financial markets.¹ MAD’s purpose is to ensure market integrity and equal treatment of market participants by defining and prohibiting insider trading and market manipulation. The primary goals of MiFID are to harmonize regulations, increase competition in the financial services sector, and enhance consumer protections in the financial services industry by ensuring that trades are handled in a fair and transparent fashion. Because MAD and MiFID aim to protect outside investors (such as the typical household), the Directives’ provisions could plausibly affect households’ willingness to directly invest in equities.

The way the Directives were implemented enhances our ability to isolate their effect on household equity ownership. Specifically, the political decision to adopt the Directives is made jointly at the EU level by all member states. After ratification, each member state is required to comply with the Directives within a window of two to three years. The timing of country-specific adoption depends largely on idiosyncratic aspects of countries’ legislative procedures, such as the constitutional requirements for passing laws and other pending legislation (Kalemli-Ozcan et al.

¹ Along with EU member countries, we also include Iceland, Liechtenstein, and Norway in our sample, countries which are not in the EU but belong to the EEA. We include these countries because they have agreed to adopt the EU capital market directives, among other things, in exchange for access to the EU’s single market. For simplicity, we refer to all countries in our sample as EU countries.

2010, 2013; Christensen et al. 2016; Meier 2017). The inflexible and relatively narrow adoption window, coupled with the bureaucratic national legislative processes, leaves little opportunity or incentive for political influence over the adoption timing. We use this (plausibly exogenous) variation in the country-specific adoption dates within the mandated EU compliance period to identify the effect of the Directives on household equity ownership.

Using data obtained from national accounts, we construct a novel country-quarter level measure of households' direct equity ownership. We measure equity ownership as the proportion of total household liquid assets directly invested in the stock market. In our primary analyses, we focus on direct equity ownership because it is likely more sensitive to households' perceptions of the fairness of the financial markets than other forms of equity ownership such as holdings through a pension or investment fund (Guiso et al. 2008).

Importantly, our measure of household equity ownership differs from the measures of stock-market participation commonly used in the household-finance literature. First, our measure does not distinguish between changes in investment at the extensive and intensive margins (i.e., the entry of new households versus the expansion of existing equity positions). Second, because the decisions of wealthy households disproportionately affect variation in our measure of equity ownership, our results are not necessarily indicative of the impact of regulation on the typical household. However, although we cannot speak to the effect on the typical household, we can provide evidence on whether (and how) securities regulation affects household investors' willingness to invest in the stock market in aggregate. To the extent that we can hold other determinants of investment constant, an increase in equity ownership after the implementation of the Directives suggests that households have greater confidence in the stock market.

Our identification strategy exploits the staggered implementation of the Directives to assess

changes in household equity ownership within the adopting country as well as spillover effects to other countries in the EU. To isolate changes in the number of shares owned (i.e., buying and selling activity) from price fluctuations, we control for household equity returns. We also control for other potential determinants of household equity ownership, including GDP growth, prior-period market returns (i.e., momentum), changes in unemployment rates, personal tax rates, and other contemporaneous EU regulatory changes. We include country and year-quarter fixed effects in our regression analyses. In this research design, identification comes from within-EU variation in the Directives' member-state-specific implementation dates; the fact that we identify the effects using only variation in the (staggered) entry-into-force dates allows us to control for the events that triggered the regulation at the EU level.

First, we examine the effect of the Directives on household equity ownership in the adopting country. We find that MAD (MiFID) adoption leads to an increase in household equity ownership of approximately 2 (1) percentage points of the households' total liquid assets, equivalent to approximately €1,150 (€430) per investing household. However, consistent with Christensen et al. (2016), the effect of MiFID is not statistically significant. This could be because MiFID has a small effect on ownership or because there is relatively little variation in the entry-into-force dates for MiFID. Next, we estimate the combined effect of the Directives by replacing the individual directive indicators with a count variable that takes the value of one when MAD is adopted and two when MiFID is adopted. Consistent with securities regulation increasing households' willingness to invest in the stock market, the joint effect of the Directives on household equity ownership is statistically and economically significant.

Second, we examine the cross-border spillover effects on household equity ownership in non-adopting countries when other EU countries implement the Directives. If these regulatory

changes reduce the frictions that create home bias (e.g., a lack of trust in foreigners) and make it easier for households to reduce their exposure to idiosyncratic risk by creating better-diversified portfolios, as more (and larger) EU countries adopt the Directives, households should be willing to place more of their wealth in the stock market—both domestically and abroad. Similarly to Meier (2017), we create a variable that captures the proportion of EU countries that have adopted the regulation over time, giving more weight to adoption by countries with relatively larger financial markets. Consistent with a significant effect of the coordinated improvement in regulation, for both MAD and MiFID we find that household equity ownership increases in non-adopting countries when other EU countries implement the Directives.

To more directly explore the mechanism through which households' willingness to directly invest in the equity market increases, we next provide evidence on whether the increase in equity ownership is (at least partly) explained by government intervention (and the corresponding rules and punishments offered by securities regulation) serving as a substitute for trust in other market participants. We partition our sample based on the median percent of European Values Survey ("EVS") respondents in a given country who believe that most people are trying to take advantage of them and find that the effect of strengthening domestic regulation on household ownership is significantly larger in countries where trust in others is low.

Households' willingness to invest in the equity market depends not only on how much they trust potential counterparties, but also on how much confidence they have in the government's ability to effectively implement regulation. To capture this idea, we use the EVS to construct a measure of the "differential trust" people have in the government as compared to other individuals. Using this alternative measure, we find even stronger evidence that domestic regulation can serve as a substitute for trust.

To examine whether harmonizing securities regulation across the EU substitutes for a lack of trust in market participants from other countries, we examine country-level changes in foreign investment by mutual funds. Unlike the national-accounts data, the fund-level data allows us to measure bilateral investment changes. However, two shortcomings of this approach are that changes in mutual fund holdings are unlikely to be driven solely by the preferences of households and that it cannot capture the proportion of liquid assets invested by households in equity markets. Consistent with prior research (e.g., Ferreira and Matos 2008; Giannetti and Koskinen 2010; DeFond et al. 2011) and a significant effect of securities regulation on foreign equity ownership, we find that when a country adopts the Directives, other EU countries' mutual fund holdings in the adopting country increase by 13.1% (per Directive). More importantly, using religious similarity as a proxy for bilateral trust (Guiso et al. 2009), we find that the effect of strengthening regulation on foreign equity ownership is significantly larger in countries where investors do not have a high level of trust in the residents of the investee country. This suggests that securities regulation can also mitigate cultural biases that may deter foreign portfolio investment.

Our paper contributes to the existing literature by showing that government intervention (in the form of strengthening and harmonizing securities regulation) can increase household equity ownership and substitute for a lack of trust in others. Prior research has shown (cross-sectionally) that countries with greater investor protection have higher levels of participation (Guiso et al. 2008; Giannetti and Koskinen 2010; Christelis et al. 2013), while distrust in others reduces participation (Guiso et al. 2008; Smith 2010; Giannetti and Wang 2016).² Although we focus on aggregate equity holdings as opposed to stock-market participation, our evidence nonetheless suggests that

² Giannetti and Koskinen (2010) separate investor protection into its public and private enforcement components and find that the association between investor protection and stock-market participation is primarily driven by investors' ability to privately enforce their own rights (i.e., through the court system). Our results suggest that public oversight is an important determinant of household equity ownership.

the association between regulation and stock-market participation could be explained by the fact that securities regulation increases household-investor confidence in the stock market and alleviates the negative effect of distrust on equity ownership. This explanation is consistent with both the theoretical prediction of Carlin et al. (2009) that regulation and trust can be substitutes in financial markets and the findings of Pinotti (2008) and Aghion et al. (2010) that individuals prefer greater state control when trust is low.

There is a growing literature in accounting on aggregate outcomes that examines whether micro-level accounting information predicts national accounts data such as aggregate investment, inflation, and GDP (e.g., Konchitchki 2011 and 2013; Konchitchki and Patatoukas 2014 and 2015; Patatoukas 2014; Shivakumar and Urcan 2017). Rather than predicting macroeconomic activity, we examine whether micro-level changes caused by securities regulation (e.g., increases in firm and broker disclosures) affect an aggregate outcome (i.e., household equity ownership) as measured by national accounting systems.

Prior research examines the economic consequences of the EU's recent expansion of securities regulation (including MAD and MiFID); the main takeaways from these papers are that EU-capital-market regulations have increased financial integration and business-cycle synchronization (Kalemli-Ozcan et al. 2010; 2013), improved liquidity (Cumming et al. 2011; Christensen et al. 2016), and increased external financing, employment, and investments (Meier 2017). Importantly, these papers do not speak to whether the Directives increase households' willingness to invest in the stock market, the cross-border spillover effects of foreign regulation on domestic investment, or whether securities regulation can substitute for trust. For instance, an increase in liquidity does not imply an increase in household equity ownership because liquidity-based transactions costs are (primarily) variable costs that affect all investors equally. Since, in the

short run, the number of shares traded in the stock market should not be affected by an increase in demand from households, costs that equally affect household and non-household investors need not change their relative ownership levels. Consistent with this conjecture, the estimated treatment effect of the Directives is largely unaffected when we control for stock-market liquidity.

2. EU Securities Regulation and Legislative Process

In this study, we examine the effects of EU initiatives that, for two reasons, are well suited for identifying the effect of strengthening and harmonizing securities regulation on household equity ownership. First, the EU legislative process governing the enactment of these initiatives alleviates concerns about the endogeneity of the timing of a regulation's adoption—a common concern in regulatory studies (Ball 1980; Mulherin 2007). Second, the initiatives directly target aspects of financial market regulation that are likely to have a first-order effect on households' perceptions of the fairness of these markets. In this section, we discuss each of these two features.

2.1 The Legislative Process in the EU

In the EU, the decision to enact new directives occurs at the supranational level and is separated from the implementation of the directives, which occurs at the national level several years later (Hix et al. 2007). For an EU directive to pass, it needs to go through the European Parliament (elected by the citizens of the EU) and the Council of Ministers (comprising one minister per member state). It is during this process, which can be lengthy, that political negotiations occur and national governments and lobbyists attempt to affect the directive. Once a directive is adopted by the EU, countries are given a deadline—typically two to three years—to implement the directive into national law.

This setting improves our ability to empirically isolate the factors that *cause* the new legislation from its subsequent effects. First, the political decision to implement the Directives

occurs at the EU level, with an adoption date that is common across all member states. The EU-level decision occurs well before the largely bureaucratic implementation process at the member-state level, where the timing is driven primarily by idiosyncratic aspects of the countries' legislative processes. Thus, we can estimate the treatment effect using only within-EU variation in the implementation timing while controlling for the factors that drive the EU adoption decision (which occurs at the same time for all member states) with year-quarter fixed effects.

Any remaining threat to identification would have to be correlated with both the entry-into-force dates and equity market ownership. However, because the EU sets a deadline of two to three years for implementation, national policymakers have limited discretion in deciding when they implement the Directives. Before the implementation deadline, countries need to establish the Directives' required changes, draft the legislation, establish parliamentary committees, and schedule the votes required by national constitutions. Christensen et al. (2016) find that on average, it takes about one year from when the drafts of the new laws are available online until they enter into force. For unrelated shocks to line up with the entry-into-force dates, lawmakers would have to start the legislative process at least one year before the shock occurs. It seems highly unlikely that lawmakers would have the ability (or incentives) to arrange this timing, even if they respond to local economic shocks or pressures by lobbyists in choosing when to initiate the national legislative process. Thus, based on the institutional details of our setting and the observed timing of the treatment effect, we are able to test for (and ultimately rule out) many of the common concerns with studies on the effect of regulation (see Section 4.1.1).

2.2 *EU Securities Regulations*

Over the past two decades, the EU has undertaken a significant effort to improve and harmonize the regulation of financial markets across its member states. These efforts have led to

numerous financial market directives; the most important are the four “Lamfalussy” directives: the Market Abuse Directive (MAD), the Prospectus Directive (PROSP), the Transparency Directive (TPD), and the Markets in Financial Instruments Directive (MiFID). We focus on MAD and MiFID because these two directives target consumer protection directly. While the TPD and PROSP directives could also increase the credibility of financial markets, the link to households is less direct.³

MAD was passed by the EU legislature in January 2003 and entered into force in the member countries from 2004 to 2007. Table 1 Column (1) presents the country-specific entry-into-force dates for MAD. MAD’s purpose is to ensure market integrity and the equal treatment of participants in EU securities markets by defining and prohibiting insider trading and market manipulation. Among other things, MAD provides a common definition of an insider, requires listed firms to establish and maintain insider lists, and increases insiders’ required disclosures for transactions in their own firms’ securities. MAD also establishes transparency standards requiring that people who recommend investments disclose their relevant interests and that each member state set up an authority with supervisory and investigative powers responsible for monitoring insider trading and market manipulation. MAD further requires increased cooperation among national supervisory authorities and stronger penalties for market abuse. The threat of trading against a party with inside information or ulterior motives is a significant concern for an outside investor; the focus of MAD on regulatory actions intended to restrict this type of trading could significantly increase households’ willingness to invest in the stock market.

³ PROSP pertains primarily to the preparation of prospectuses for public securities offerings by issuers and only applies to primary market trading—a relatively limited subset of total trading in the stock market. TPD focuses on enhancing corporate disclosures by establishing new requirements and strengthening the enforcement of existing requirements for periodic financial reports. While these directives likely enhance the credibility of corporate disclosures, they focus on improving transparency and are not directly aimed at enhancing retail investor confidence. Nevertheless, we control for the adoption of both PROSP and TPD in our empirical analyses.

MiFID was passed by the EU legislature in April 2004 and entered into force in the member countries from 2007 to 2008.⁴ The short implementation period reflects the fact that parts of MiFID became law in all EU member states immediately after it was passed at the EU-level (it is what the EU calls a “regulation” as opposed to a “directive”). However, certain parts of MiFID were passed as directives requiring that each country individually implement the rules. We use the dates of this later implementation in the study (Meier 2017). The objective of the directive is to increase competition among financial-services firms by giving them the ability to provide services to customers in other EU member states. To ensure comparable consumer protection standards among brokers, MiFID requires that a broker evaluate client suitability for different categories of investment products and take all reasonable steps to ensure that trades are executed in a fair and transparent fashion. MiFID also requires that brokers explicitly ask individual investors about their prior knowledge of and expertise in investing, inform individual investors about potential conflicts of interest, and outline the requirements for marketing materials directed at individual investors. Because MiFID focuses on consumer protection in investment advisory services, it also has the potential to increase investor confidence in financial markets and bolster household equity ownership. MiFID also includes a “passporting” provision that allows EU brokers to offer services to individuals in foreign EU countries while only being subject to domestic public oversight. The passporting provision likely increases cross-border competition for retail investors’ business.

One potential concern with this setting is whether households were likely to be aware of these regulatory changes. However, given the publicly observable nature of the regulatory changes required by each directive, households need not have been aware of the specifics of the Directives

⁴ We only disclose the country-specific MiFID adoption years because we obtained the country-specific MiFID adoption dates from Jean-Marie Meier with the agreement that we would not disclose the exact dates in the paper. These dates will be publicly available upon the publication of Meier (2017).

to notice their impact. For instance, MAD’s requirements include enhanced corporate disclosures for insiders, broker conflict-of-interest disclosures, and the designation of a government agency to oversee compliance—regulatory changes that are easily visible to investors. Similarly, many of MiFID’s requirements, such as an increase in the transparency of quoted offer prices, the details of executed trades, and the requirement to inform individual investors of potential conflicts of interests, are also publicly visible. Finally, one objective of the Directives (particularly MiFID) is to reduce the cost to financial-services firms of providing services to foreign households (e.g., the firms no longer have to comply with different regulations in each country). The reduction in the barriers to providing cross-border services could increase the number of financial firms (e.g., brokerages), which is also directly observable.

To further support the plausibility of households’ awareness of the regulatory changes, we conduct a search of the media coverage of the Directives in the EU (see Appendix A for a more detailed discussion). This analysis indicates that the Directives were covered extensively by the European financial press and suggests that (at least) some households were likely aware of the implementation. Specifically, Appendix A Table A1 shows that MAD was mentioned over 1,200 times across all news sources covered by Factiva (and in nearly 100 articles in the top 20 European newspapers by circulation). MiFID was mentioned over 15,000 times across all news sources (and in 1,600 articles in the top 20 European newspapers). Also consistent with a broad awareness of the directives and the timing of their enactment, there is a visible spike in Google searches for the Directives around their respective implementation dates (see Appendix A Figure A1).

3. Measuring Household Equity Ownership

A lack of data has hampered research on household investment decisions. While most studies that examine stock-market participation rely on household survey data, outside the U.S.,

such data is only available infrequently and for relatively small samples of households (see Campbell 2006 for a review).⁵ An innovation of our study is that we use data from the balance sheets of national accounts to study households and their financial decisions. In this section, we discuss the national accounts data used, its advantages and disadvantages, and how we construct our measure of household equity ownership.

3.1 *National Accounts Data*

National accounts provide aggregate information on a country's economic activities across the different sectors of the economy (including financial and non-financial corporations, the government, households, and non-profit institutions). Theoretically, national accounts record every transaction in the economy using a double-entry bookkeeping system. The financial transactional data, which is of specific interest in our study, is collected from financial intermediaries (such as banks and other financial institutions) and recorded at fair value.

In the EU, each member state compiles their national accounts using the European System of Accounts (ESA) 2010 methodology.⁶ The national statistical office from each member state is responsible for compiling national accounts data on a quarterly basis. We are interested in data from the financial accounts that record, by type of financial instrument, the changes in liquid financial assets. Specifically, our analyses include five types of financial instruments: listed shares, investment funds, currency, transferable debt, and short-term debt. Listed shares, the primary focus

⁵ Prior studies have also used: brokerage account data (e.g., Scularbaum et al. 1978; Barber and Odean 2000) or government tax records (e.g., Blume and Friend 1975 & 1978; Kopczuk and Saez 2004). Internationally, prior research has obtained data from government-centralized share registers available in some countries (Grinblatt and Keloharju 2000 & 2001; Calvet et al. 2007). While these data sources are highly accurate, they do not sample from the entire population, do not cover all relevant financial assets, or are only available in a few countries. These limitations prevent us from using these data in this study.

⁶ ESA2010 replaced the former reporting framework, ESA95, in September 2014. As of the time of our study, not all European countries have transitioned to the ESA2010 reporting standards. However, because the impact of the change in standards on the financial accounts of interest in our study is minimal, we use ESA95 data for countries where the full ESA2010 data is not available. Furthermore, we are unaware of any aspects of MAD, MiFID, or other Lamfalussy Directives that would have affected the calculation of the values of the financial instruments used in our study.

of our analysis, are equity securities listed on an exchange that are held directly by a household. Notably, listed shares exclude household investments in equities through an intermediary, such as a mutual or exchange-traded fund.⁷ We provide more detailed definitions for each of the four remaining components in Appendix B.

Across the EU, countries employ a variety of data-collection methods. In many countries, the national statistical offices receive (on a quarterly basis) data on all financial transactions across the entire universe of domestic financial intermediaries. Since these countries have granular transactional data on each individual and entity in the domestic economy, they are able to construct highly reliable statistics on household investments. In countries where it is not possible to get detailed financial transactional data, the national statistical offices use quarterly surveys of financial intermediaries as well as other regulatory and census data to estimate the investment positions of households. While member states' national statistical offices have some discretion in how they gather the data, all offices must adhere to the common ESA2010 standards, which enhances the comparability of the data across countries.

3.2 *Constructing the Household Equity Ownership Measure*

Our measure of household equity ownership, *Equity Ownership*, is calculated using national accounts data from Eurostat and the ECB's Statistical Data Warehouse. We define *Equity Ownership* as the ratio of total household investment in listed shares (i.e., direct ownership in publicly traded equity) to total household liquid assets. We define liquid assets as the sum of currency, transferrable deposits, short-term debt securities, listed shares, and holdings in investment funds. We use only direct equity ownership in the numerator because it is the asset class that is likely to be the most sensitive to households' perceptions of the fairness of the financial

⁷ We separately examine changes in equity ownership within investment funds in Section IA2 of the Internet Appendix.

markets. We exclude investment funds in the numerator because more than 70% of investment fund assets are held in non-equity investments (e.g., fixed income, money market, or real estate securities). These non-equity investments are likely an important source of funds for any increase in direct equity ownership. However, if securities regulation also affects indirect household investment in equity through investment funds, including investment funds in the denominator could affect the interpretation of our results (we explore this issue further in the Internet Appendix Sections IA1, IA2, and IA3 and conclude that likely biases our estimates downwards).

We restrict our sample to countries with national accounts data and at least one observation available before the entry-into-force date of MAD. These filters reduce our sample to the 22 countries shown in Table 1.⁸ Our sample period begins in the first quarter of 2000 and ends in the fourth quarter of 2013—four years prior (subsequent) to the first (last) adoption date. However, not all countries have data available for the early part of the sample period (Table 1 Column (3) indicates the first quarter that data are available for each country). When available for the full time series, we use national-accounts data prepared under ESA2010; if not, we use ESA95-based data (Table 1 Column (4) indicates the standards used for each country).

Because the decisions of wealthy households disproportionately affect variation in our measure of aggregate equity ownership, our results are not necessarily indicative of the impact of regulation on equity ownership for the typical household. However, although we cannot speak to the effect on the typical household, we can nonetheless provide evidence on whether (and how) securities regulation affects household investors' willingness to invest in the stock market in aggregate. Our measure is well suited for addressing this question because: 1) it is available in a comparable form on a quarterly basis for a large number of countries; and 2) wealthy individuals

⁸ Austria, Bulgaria, Cyprus, Iceland, Ireland, Liechtenstein, Netherlands, and Romania have missing or incomplete national accounts data. Croatia joined the EU in the final year of our sample period (in July 2013).

are likely to respond more quickly to changes in regulation because they are likely to more actively manage their investment portfolios and work through an agent subject to the Directives (e.g., a stock broker). To the extent that we can hold other determinants of household investment constant, an increase in equity ownership subsequent to the implementation of the Directives suggests households have greater confidence in the stock market.⁹

4. The Effect of Securities Regulation on Household Equity Ownership

Our empirical strategy for assessing whether strengthening and harmonizing securities regulation increases the aggregate proportion of liquid assets that households are willing to invest directly in exchange-listed shares relies on the fact that the Directives were implemented in all EU member states, but the country-specific entry-into-force dates vary by member state. We use a difference-in-differences (DiD) framework and a panel dataset with quarterly country-level observations of household equity ownership; countries that have yet to implement the Directives (or had implemented the Directives in an earlier period) serve as the benchmark.¹⁰ The baseline model, suppressing country and quarter subscripts, is:

$$\begin{aligned}
 \text{Equity Ownership} = & \beta_1 \text{MAD Domestic} (\text{MiFID Domestic}) \\
 & + \beta_2 \text{Controls} + \sum \beta_i \text{Fixed Effects} + \varepsilon
 \end{aligned}
 \tag{1}$$

The dependent variable is *Equity Ownership* as defined in Section 3.2. *MAD Domestic* and *MiFID Domestic* are binary indicator variables coded as one beginning in the quarter in which the directive comes into force, and zero otherwise. We also examine the combined effect of MAD and MiFID

⁹ In the Internet Appendix (Section IA4), we provide evidence that the levels of household equity ownership and stock-market participation, although conceptually different, are positively correlated (Pearson correlation of 0.63). However, the correlation in levels does not necessarily imply a similar correlation in changes, which is the focus of our study.

¹⁰ An important assumption is that the control group is not also affected by the treatment (i.e., the stable unit treatment value assumption, “SUTVA”). This assumption is unlikely to hold in our setting because we expect that foreign households are also affected by the adoption of the Directives in other countries (e.g., through a reduction in home bias). This effect biases against finding an impact of the Directives. We assess the magnitude of this bias in Table 4 by explicitly controlling for the effect of domestic adoption on foreign households.

using the sum of the two indicators, *SecReg Domestic*.

We include controls for other potential determinants of household equity ownership including *GDP Growth*, *Household Equity Returns*, *Momentum*, changes in the unemployment rate (*Change in Unemployment*), and *Tax Rates*.¹¹ When economic growth rates decrease or the unemployment rate rises, households are more likely to experience a negative shock to their return from human capital and are less likely to place their liquid assets in the equity market (e.g., Bodie et al. 1992; Viceira 2001). Changes in the level of equity ownership could be driven either by purchases of new shares or by increases in the value of existing positions. Willingness to purchase additional shares is likely a more direct indicator of an increase in household confidence in the equity market (although the decision not to reallocate appreciated shares to other asset classes could also be indicative of an increase in confidence). Including household-equity returns controls for share-price appreciation during the quarter and helps to separate the portion of the change in ownership attributable to new share purchases.¹² Prior research shows that momentum affects retail investor trading (Jegadeesh and Titman 1991). Grinblatt and Keloharju (2000) provide evidence that individual investors are net buyers of stocks with weak future performance. Additionally, individual investors exhibit a tendency to sell winning rather than loser stocks, a phenomenon known as the disposition effect (Jegadeesh and Titman 1991). Including momentum allows us to control for these behavioral investor traits of individual investors. The personal income tax rate

¹¹ In Section IA5 of the Internet Appendix, we report results controlling for liquidity. While our sample size is slightly smaller for this analysis because some countries lack liquidity data, controlling for liquidity has little effect on the estimated treatment effect of the Directives.

¹² *Household Equity Returns* are calculated using a household-portfolio specific measure from the national accounts. Because the exact timing of portfolio changes is unknown, this adjustment is measured with some error. Thus, we replace extreme (more than three standard deviations from the mean) or missing values of *Household Equity Return* with country-specific stock-market returns. As an alternative to including *Household Equity Returns* as a control variable, in Internet Appendix Section IA6, we report results where we directly adjust *Equity Ownership* for changes in equity values using the national-accounts-based adjustment factor. Results are very similar in this alternative specification. Results are also very similar if we use changes in a country's stock-market index to control for share-price appreciation (untabulated).

faced by investors is also likely to affect their willingness to invest in equities (Cohn et al. 1975; Barber and Odean 2011).¹³ We provide detailed data definitions in Appendix B.

Table 2 presents descriptive statistics for *Equity Ownership* and each of the continuous control variables. Households in the median country-quarter invest 14% of their total liquid assets directly in the stock market. The median country-quarter has *GDP Growth* of 0.6%, a *Household Equity Return* of 1.4%, *Momentum* [i.e., *Stock Market Return_{t-1}*] of 2.1%, no *Change in Unemployment*, and a *Tax Rate* of 20%.

We also include controls for the two other Lamfalussy Directives, *TPD* and *PROSP*, which, as discussed in Section 2, could possibly affect equity ownership but are less directly related to households' willingness to invest in the stock market. In addition, we include fixed effects for country and year-quarter. The country fixed effects eliminate any static country-level determinants of equity ownership. The year-quarter fixed effects control for trends in and shocks to equity ownership that are common to all EU member states in a given quarter (e.g., shocks leading to the adoption of the Directives at the EU level), and, hence, the effects of *MAD Domestic* and *MiFID Domestic* are identified based solely on within-EU variation in the entry-into-force dates. We cluster standard errors at the country-year level.¹⁴

Our identification strategy for estimating the effect of the Directives on *Equity Ownership*

¹³ The household finance literature finds that the following factors significantly affect household stock-market participation: wealth, momentum, tax rates, education, financial sophistication, and marital status (see Cohn et al. 1975; Campbell 2006; Barber and Odean 2011). We directly control for proxies for wealth, momentum, and tax rates. We do not include controls for education, financial sophistication, and marital status, which are likely slow-moving and therefore are unlikely to be correlated with entry-into-force dates. Additionally, they would (in part) be captured by including country fixed effects.

¹⁴ We do not cluster standard errors by country because, given there are only 22 countries in our sample, this approach is likely to overstate or bias the standard errors. Specifically, there are only 22 countries included in the analysis, and However, clustering by country-year could understate the standard errors. Therefore, to assess the reasonableness of clustering by country-year, we also calculate standard errors using a Monte Carlo approach where we randomly select adoption dates for each country and assess significance by calculating the fraction of counterfactual treatment effects that exceed our actual estimated treatment effect. Using this method, the statistical significance of our results is higher than reported in the paper (untabulated).

relies on the following institutional features: 1) that the political decision to adopt the Directives is made at the EU level; 2) that the deadline for member states to comply with the Directives is relatively short (two to three years); and 3) that the member states' legislative procedures for implementing the Directives are somewhat inflexible (see Section 2.1). These institutional features alleviate concerns about reverse causality and endogenous implementation timing (e.g., Kalemli-Ozcan et al. 2010, 2013; Christensen et al. 2016; Meier 2017). For instance, reverse causality could be an issue if policy makers timed the implementation of the Directives in response to changes in households' equity ownership. For this to occur, given the time it takes for a member-state to implement a directive, the change in equity ownership would have to occur approximately one year prior to the Directives' entry-into-force dates, which is our treatment date (we examine this possibility in Section 4.1.1 and find no supporting evidence).

Contemporaneous events that cause both the regulation and the increase in household equity ownership are another potential concern. However, given that regulation is typically triggered by events that would be expected to *decrease* investor confidence (such as fraud or a corporate scandal as in Giannetti and Wang 2016 or fraud indicators as in Brazel et al. 2015), we view this as an unlikely explanation. Moreover, for such an event to explain our results, each member state would have to experience a separate shock within the two-to-three-year adoption window and, given that it takes on average about a year to implement the Directives, these shocks would have to affect equity ownership well into the future. As this sequence of events seems unlikely (and we provide empirical evidence in Section 4.1.1 that is inconsistent with this explanation), we think it is plausible that the variation in the adoption timing of the Directives is exogenous with respect to changes in household equity ownership.

A drawback to identifying the effect of the Directives using only variation in the entry-

into-force dates is that any delay in households' investment responses will bias our estimated treatment effect downwards. While it is not obvious that trust in the stock market can be built quickly, we believe that a relatively fast response is plausible. Specifically, we propose that government regulation can increase household equity ownership by *substituting* for trust in the stock market. Households' confidence in the government's ability to enforce the law (or lack thereof) is built over many years of experience. Thus, if investors have an established confidence in the government, we do not think it is unrealistic that they would respond relatively quickly to an increase in government oversight of the stock market. For instance, if market abuse results in a prison sentence and households are confident that the government will fairly enforce this regulation, they are likely more willing to transact with people they do not trust. In addition, unlike stock-market participation, household equity ownership is likely driven by the choices of wealthy individuals who, because they are more likely to actively manage their portfolios and work through an agent subject to the Directives (e.g., a stock broker), are more sensitive to changes in regulation.

In addition to assessing changes in household equity ownership in the adopting country, we also examine whether there are regulatory spillover effects from the implementation of the Directives on households in other countries. If these regulatory changes reduce the frictions that give rise to home bias, households should be willing to place more of their wealth in the equity market. To capture the effect of foreign adoption, for both MAD and MiFID, we create a variable similar to one used by Meier (2017) that increases with the number of other EU countries that adopt the Directives over time—*MAD Foreign* and *MiFID Foreign*, respectively.

To capture the importance of the potential spillover effects, we weight each country's adoption by the adopting country's market capitalization relative to the potentially affected foreign country's market capitalization (both of which are measured in 2003 prior to the first MAD entry-

into-force date—see Table 1 Column (5)). Accordingly, these variables capture the importance of a single country’s adoption for households in non-adopting countries (maximum values of *MAD Foreign* and *MiFID Foreign* are reported in Columns (6) and (7) of Table 1, respectively).

For this analysis, we replace *MAD Domestic* (*MiFID Domestic*) with *MAD Foreign* (*MiFID Foreign*) in Eq. (1). We also examine the combined effects of *MAD Foreign* and *MiFID Foreign* using the sum of the two variables, *SecReg Foreign*.

In Figure 1, we use Germany and the Czech Republic to illustrate the time-series and cross-country variation in *MAD Foreign*. The first vertical line on the graph indicates Germany’s adoption of MAD in 2004 Q4; there is no change in *MAD Foreign* for Germany (which is the only country to adopt MAD in this quarter). There is, however, an increase for the Czech Republic. The second vertical line on the graph indicates when the UK (along with several other countries) adopted MAD in 2005 Q3. Here, *MAD Foreign* increases more for the Czech Republic than for Germany because the Czech Republic has a much smaller market capitalization than Germany and so the countries adopting MAD create a relatively larger increase in the investable shares for Czech households. When the Czech Republic adopts MAD in 2006 Q1 as indicated by the third vertical line, there is no change in *MAD Foreign* for the Czech Republic (which is the only country to adopt MAD in this quarter). There is, however, a small (relative to the increase for the Czech Republic in 2004 Q4 when Germany adopts MAD) increase in *MAD Foreign* for Germany.

4.1. *The Effect of Domestic Securities Regulation on Household Equity Ownership*

We present results for the estimated average effect of *MAD Domestic*, *MiFID Domestic*, and the combined *SecReg Domestic* measure on household equity ownership in Table 3. The coefficients on *GDP Growth*, *Household Equity Return*, *Momentum*, *Change in Unemployment*, and *Tax Rates* all have the expected signs. We find no significant effect of *TPD* or *PROSP*, which

is consistent with our predictions in Section 2 (i.e., that these directives are less likely to significantly affect households' confidence in the financial markets).

In Column (1), the coefficient on *MAD Domestic* is positive (0.021) and significant at the 5% level. The estimated coefficient implies that following the adoption of MAD, households in the adopting country increase the proportion of their liquid assets invested in equities by 2 percentage points, which is equivalent to approximately €115 per household. Under the assumption that there is no change in the participation rate, this estimate translates into approximately €1,150 for an investing household.¹⁵ In Column (2), the coefficient on *MiFID Domestic* is positive, but statistically insignificant. One potential explanation for the relatively weaker effects of MiFID (other than that MiFID actually has little impact on equity ownership) is that there is relatively little variation in the adoption dates across countries.¹⁶ In Column (3), the combined effect of *MAD Domestic* and *MiFID Domestic*, as captured by the coefficient on *SecReg Domestic*, is positive, statistically significant, and indicates an increase in household equity ownership of approximately €95 per household (€930 per investing household) for each directive.

One potential concern with the results reported in Columns (1) to (3) is that our control variables are unable to perfectly capture macroeconomic fluctuations and that our estimated treatment effects could be biased as a consequence. To assess how the imperfect controls for macroeconomic fluctuations affect the estimated treatment effect, in Column (4), we exclude the five macroeconomic control variables. Assuming that our control variables are correlated with macroeconomic fluctuations, which seems highly likely, a comparison of the change in the

¹⁵ This estimate is based on an average participation rate of 0.15 for our sample countries from the 2005 Eurobarometer Survey.

¹⁶ This finding is consistent with Christensen et al. (2016), who, for one test, rely on variation in MiFID adoption dates and find that MiFID has a positive, but insignificant, effect on stock-market liquidity. Alternatively, Cumming et al. (2011) find a significant effect of MiFID on liquidity using a control sample of firms from non-MiFID adopting countries (rather than using variation in the adoption dates among MiFID adopting countries).

estimated treatment effect with controls (i.e., Column 3) to the estimated treatment effect without controls (i.e., Column 4) allows us to gauge the extent and direction of any potential bias. In Column (4), the estimated treatment effect is almost identical to the estimated treatment effect in Column (3) and, if anything, is slightly smaller. This suggests that macroeconomic fluctuations are unlikely to explain our results.

Overall, the estimates for the average effects of the Directives presented in Table 3 are consistent with stronger securities regulation increasing household equity ownership.

4.1.1. Assessing Identification Assumptions

Our identification strategy relies on the validity of the parallel-trends assumption. As argued above, the fact that the Directives' adoption dates are likely driven largely by the idiosyncratic aspects of countries' legislative implementation processes mitigates endogeneity concerns. Nonetheless, to provide empirical evidence to support this assumption, we examine the counterfactual treatment effects in event time for *MAD Domestic* and *MiFID Domestic*. If the parallel-trends assumption is valid, we expect the counterfactual treatment effects in the pre-adoption periods to be close to zero and relatively sharp around the true adoption dates. We map out these effects by replacing the single *MAD Domestic* (*MiFID Domestic*) variable with separate interactions between *MAD Domestic* (*MiFID Domestic*) and indicators for each year prior to and following the MAD (MiFID) implementation date. We exclude the indicator for the year immediately before adoption (i.e., this period becomes the benchmark against which the treatment effects in all other periods are compared).

We depict these results in Figure 2 for both *MAD Domestic* and *MiFID Domestic*. For *MAD Domestic*, the counter-factual treatment effects in the pre-MAD period are close to zero and statistically indistinguishable from the benchmark year, $t-1$. Following the actual adoption date at

year $t=0$, the treatment effects become positive and statistically significantly different from the benchmark year; in most years at the 5% level. For *MiFID Domestic*, in the three years prior to adoption ($t-4$ to $t-2$), the counter-factual treatment effects are close to zero and statistically indistinguishable from the benchmark year, $t-1$. However, consistent with the findings in Table 3, the treatment effects in the post-MiFID adoption period are positive but not statistically different from the benchmark period. Overall, these findings provide support for the parallel-trends assumption and, for *MAD Domestic*, also indicate that the increase in equity ownership occurs relatively quickly after the implementation and gradually increases over time. This gradual increase in the magnitude of the treatment effect suggests that the average estimated treatment effects in Table 3 are biased downwards. Importantly, as we discuss above, the relatively fast response of household equity ownership to the Directives does not necessarily imply that trust in the stock market changes during this horizon. Rather, our conjecture is that securities regulation substitutes for trust in others, and thus the observed response is consistent with households having an established confidence in the government's ability to enforce the new laws.

Furthermore, Figure 2 shows a pattern in the estimated counterfactual treatment effects that is inconsistent with reverse causality and endogenous member-state implementation timing (see Section 2.1). That is, both of these alternative explanations require that the estimated treatment effect occur prior to the entry-into-force dates of the Directives whereas we find no evidence of differential changes in *Equity Ownership* in the pre-implementation period.

4.2. *The Effect of Foreign Securities Regulation on Household Equity Ownership*

In Table 4, we present results for the estimated average effect of the foreign adoption of MAD and MiFID—i.e., the effect of the Directives' implementation in one country on households in other countries. In Column (1), the coefficient on *MAD Foreign* is positive (0.006) and

statistically significant at the 5% level. In terms of economic significance, for the country with the smallest (largest) market capitalization in our sample, Latvia (UK), the estimated coefficient implies an increase in *MAD Foreign* from zero to the maximum value leads to an increase in *Equity Ownership* of 4.9 percentage points (0.1 percentage points).¹⁷ Though the magnitude of the effect is smaller than for the domestic adoption of the Directives in most countries, it is large enough to be economically meaningful for countries with small financial markets.

Results for *MiFID Foreign* and the combined *SecReg Foreign* measures in Columns (2) and (3), respectively, are similar in sign, significance, and economic magnitude to *MAD Foreign*. In Column (4), we include *SecReg Domestic* and find that the magnitude and significance of *SecReg Foreign* are virtually unchanged. In addition, we also find that the coefficient on *SecReg Domestic* is approximately the same as in Table 3 Column (3), which suggests that the downward bias in the estimated treatment effect of domestic adoption because of the spillover effect on foreign households (which are the control group in Table 3) is small.

In Column (5), we again assess the extent to which imperfect controls for macroeconomic fluctuations could affect our estimated treatment effects. Similarly to the results for domestic securities regulation in Table 3, in Column (5) of Table 4, we find that the estimated treatment effects without macroeconomic controls are slightly smaller than those with the controls in Column (4), suggesting that macroeconomic fluctuations are unlikely to explain our results.

Overall, consistent with a significant regulatory-spillover effect and a reduction in home bias, the results presented in Table 4 indicate that household equity ownership increases in non-adopting countries when other countries adopt the Directives. These findings are consistent with coordinated improvements in securities regulation across countries increasing households'

¹⁷ Calculated by multiplying the maximum *MAD Foreign* for Latvia (UK) of 8.28 (0.13) with the coefficient on *MAD Foreign* of 0.006.

willingness to place more of their wealth in the equity market. However, given the structure of the national accounts data, we are unable to assess the extent to which this result is driven by an increase in domestic versus foreign investment (we return to this issue in Section 5.2).

5. Can Securities Regulation Substitute for a Lack of Trust?

In this section, we examine, both domestically and abroad, whether the observed relationship between securities regulation and household equity ownership varies with households' average level of trust in others. Our hypothesis is that securities regulation increases households' willingness to invest in equities (at least in part) by substituting for a lack of trust in others. That is, if regulation can serve as a substitute for trust by providing a mechanism to punish someone who abuses the market, we expect stronger securities regulation will lead to a larger increase in equity ownership in countries where trust in others is low. However, mistrust can be pervasive and could extend to a country's institutions. Thus, it is unclear whether government intervention is meaningful if citizens also do not trust the government (Guiso et al. 2009). To examine this possibility, we partition countries based on the difference between how much individuals trust the government versus how much they trust other citizens—we expect that the effect of the Directives will be stronger where trust in the government relative to trust in other individuals is higher.

5.1 Securities Regulation and the Effect of Trust on Domestic Equity Ownership

First, to investigate the role of trust domestically (i.e., for the country implementing the regulation), we use a country-specific measure of general trust in others and examine cross-sectional variation in the relationship between *SecReg Domestic* and *Equity Ownership*. We base our measure of trust on responses to the EVS question, “Do you think most people try to take advantage of you?” To capture how much people trust the government relative to their fellow citizens, we define “differential trust” as the difference between respondents' answers to the EVS

questions “How much confidence do you have in the government” and “Do you think most people try to take advantage of you.”

In Table 5 Panel A, we report *Trust Score* by country, where *Trust Score* is the average of all EVS survey responses in a country and where larger values indicate a higher level of trust (see Appendix B for details). *Trust Score* is lowest for Greece and Lithuania and highest for Denmark and Norway. For this analysis, we create two indicator variables, *High Trust* and *Low Trust*, based on the median country in our sample. In Table 5 Panel B, we report *Trust Differential* by country, where larger values of *Trust Differential* indicate a greater level of trust in the government relative to other individuals. *Trust Differential* is lowest for Malta and Slovakia and highest for the U.K and Denmark.¹⁸

Table 5 Panel C presents regression results. In both columns, we include *Year-quarter* × *Trust Score* (*Trust Differential*) fixed effects that allow the trends in household equity ownership to vary by *Trust Score* (*Trust Differential*). For brevity, we report results only for the combined *SecReg* measure. In Column (1), the coefficient on the interaction of *Low Trust* and *SecReg Domestic* is positive (0.024) and statistically significantly larger (p-value 0.002) than the coefficient on the interaction for *High Trust* (which is positive, but not statistically significant). This is consistent with securities regulation having a stronger effect on household equity ownership when trust in others is low. In Column (2), the coefficient on the interaction between *SecReg Domestic* and *High Trust Differential* is also positive (0.028) and statistically significantly larger than the *Low Trust Differential* interaction. Moreover, the coefficient on *High Trust Differential* is larger than the coefficient on *Low Trust* (i.e., 0.028 versus 0.024), suggesting that the Directives

¹⁸ While there is some overlap between the *Low Trust* and *High Trust Differential* countries, the set is not the same. In Finland, Luxembourg, and Sweden, *High Trust* = 1 and *High Trust Differential* = 0. In Hungary, Italy, and Poland, *High Trust* = 0 and *High Trust Differential* = 1.

have a (slightly) larger impact in countries where residents trust their governments more than they trust their fellow citizens (although the difference is not statistically significant).

5.2 *Securities Regulation and the Effect of Bilateral Trust on Foreign Equity Ownership*

To investigate how trust affects the extent to which domestic securities regulation affects foreign equity ownership, we examine country-level changes in foreign investment by mutual funds. Our prior analyses indicate that the adoption of securities regulation abroad increases equity ownership. However, a shortcoming of the national-accounts-based equity ownership data is that we cannot separately identify households' foreign equity holdings, which we expect to increase after the adoption of the Directives. The mutual fund ownership data, however, do allow us to directly assess the effect of the Directives on investment in specific foreign countries.¹⁹

More importantly, bilateral investment data allows us to examine how trust in the residents of other countries affects the relationship between regulation and foreign equity ownership. Guiso et al. (2009) show that the extent of bilateral trust, as captured by historical conflicts and by religious and genetic similarity, affects the level of trade between countries. Similar to our prediction for the domestic effect of trust, it is also possible that regulation can mitigate the lack of trust and cultural biases that limit cross-border trade—i.e., we expect that regulation increases foreign equity ownership more when the investing country has a low level of trust in the residents of the adopting country.

We examine how the Directives affect foreign equity ownership using mutual fund holdings data from Factset and use a DiD research design, similar to Eq. (1), where the model is:

¹⁹ The mutual fund data does have two important disadvantages that make this data unsuitable for our primary analyses of household equity ownership. First, changes in mutual fund holdings are unlikely to be driven solely by the preferences of households (e.g., because other sectors besides households invest in mutual funds and mutual fund managers have some discretion over the allocation of invested funds). Second, we cannot measure households' other liquid assets and are unable to assess the proportion of their total liquid assets that households invest in the stock market (i.e., the focus of our main analysis).

$$\begin{aligned} \ln(\text{Investments} / \text{GDP})_{i,j,t} = & \beta_1 \text{SecReg Investee Country}_{j,t} \\ & + \beta_2 \text{Controls}_{j,t} + \sum \beta_i \text{Fixed Effects} + \varepsilon \end{aligned} \quad (2)$$

The dependent variable, $\ln(\text{Investments}/\text{GDP})_{i,j,t}$, is calculated by aggregating fund ownership to the country-pair level each quarter (i.e., the total investments of mutual funds in investor country i in investee country j in quarter t). To adjust for differences in the size of the outflow countries, we scale by the investor country's GDP and take the natural log of the resulting ratio. *SecReg Investee Country* is a variable that switches from zero to one beginning in the quarter when MAD becomes effective in the investee country and from one to two beginning in the quarter when MiFID also becomes effective. We include fixed effects for each country-pair and fund country-quarter. We include the same set of investee country control variables as in Eq. (1) with the exception of *Tax Rate*, which is subsumed by the fund-quarter fixed effects, and *Household Equity Return*, which we replace with *Stock Market Return* to better control for the portfolio returns of mutual funds. We cluster standard errors by country-pair-year.

Table 6 Panel A presents descriptive statistics and sample details. The mutual fund ownership data allows us to extend our sample to investee firms from 28 EU member states and investors from all 31 EU member countries.²⁰ Descriptive statistics for *Investments* and *GDP* indicate that mutual funds in the median country-quarter invest 0.05% of GDP in each of the other EU member states. Median *Stock Market Return* is about 2% and the median of both *GDP Growth* and *Change in Unemployment* are similar to those reported in Table 2. In Panel A, we also list the number of observations by investee country.

We present results for the estimated average effect of *SecReg Investee Country* in Table 6 Panel B. In Column (1), the coefficient on *SecReg Investee Country* is positive (0.157) and

²⁰ Croatia, Romania, and Lichtenstein are excluded from the analysis because of missing MAD or MiFID dates.

significant at the 1% level. The estimated coefficient on *SecReg Investee Country* implies that following the adoption of each directive, the holdings of other EU countries' mutual funds in the adopting country increases on average by about 17%. This result is consistent with the findings in Table 4 that household equity ownership (i.e., the sum of domestic and foreign equity ownership) increases after foreign adoption of the Directives—the difference here is that we can isolate the increase in ownership of foreign equity.

Next, we examine whether in the context of cross-border investment, securities regulation is a substitute for trust in residents of another country. Following Guiso et al. (2009), we use the empirical probability that two randomly chosen individuals from two countries will share the same religion as a proxy for bilateral trust.²¹ We obtain survey data on religion from the EVS on whether someone considers themselves religious, and if so, whether they identify as Buddhist, Hindu, Jewish, Muslim, Orthodox, Protestant, Roman Catholic, non-religious, or other. We define religious similarity, *Religious Similarity*, as the sum (across religion categories) of the fraction of respondents that report adherence to a religion in country A multiplied by the same fraction in country B. Table 6 Panel A provides descriptive statistics. For the median country pair in our sample, an individual has an approximately 27% chance of randomly encountering a person of the same religion in another EU country. Similar to the analysis in Table 5, we create an indicator variable, *High Religious Similarity*, based on the median country-pair and include an additional set of fixed effects which allow the trends in the level of foreign investment to vary based on religious similarity.

In Table 6 Panel B Column (2), the coefficient on the interaction of *SecReg Investee*

²¹ Guiso et al. (2009) also consider several other proxies for bilateral trust, including genetic and somatic similarity and the extent of historical military conflict between countries. However, these proxies are not available for several EU countries so we do not consider them in our analysis.

Country and *High Religious Similarity* is negative (-0.064) and statistically significant at the 10% level, suggesting that the effect of strengthening regulation on foreign equity ownership is weaker in countries with a high degree of religious similarity. One concern is that religious similarity is likely correlated with the geographic distance between countries and that distance is an important determinant of investment (i.e., home bias). To ensure that our results are not simply attributable to stronger effects of regulation between geographically distant countries, in Table 6 Panel B Column (3), we include a control for the interaction between *SecReg Investee Country* and geographic distance, *Close distance*. *Close distance* is an indicator variable equal to one if, for a given country-pair, the distance between the most populated cities in each country is below the sample median. Controlling for distance, the coefficient on the interaction of *SecReg Investee Country* and *High Religious Similarity* remains negative (-0.077) and is statistically significant at the 5% level.

Overall, these results indicate that the effect of regulation on foreign equity ownership is significantly stronger in countries where the residents of the investor country have a low level of trust in the residents of the investee country, which suggests that securities regulation can also substitute for trust in foreign portfolio investment. However, it is important to note that many institutional variables are correlated at the country level, so it is difficult to unambiguously attribute the observed cross-country variation to trust per se.

6. Conclusion

For households to invest their wealth in the stock market, they need to believe that markets are fair. Securities regulation that enhances consumer protection and punishes those who abuse the market is one mechanism through which governments can solidify the belief that markets operate fairly. In addition to benefitting from regulatory improvements in their own country, households

could also benefit from improvements in regulation in other countries. In recent years, policy makers around the world have sought to strengthen and harmonize securities regulation in an effort to increase investor confidence in the financial markets. Yet, there is little existing evidence on the effects of such changes in securities regulation on household equity ownership, and, in particular, on whether regulation can substitute for trust in the stock market. To provide evidence on these issues, we examine changes in equity ownership around two recent regulatory changes in the EU using a novel measure of household equity ownership based on national accounts.

Our identification strategy exploits the fact that for plausibly exogenous reasons such as the idiosyncrasies of countries' national legislative procedures, EU countries implement these regulations at different points in time. We find significant increases in equity ownership both when a household's own country adopts the Directives and when other countries adopt the Directives. Partitioning our sample based on the level of trust a country's residents have in their fellow citizens, we find that the effect of strengthening domestic regulation on equity ownership is significantly larger in countries where trust in others is low. We find a similar but slightly stronger effect when we partition on trust in the government relative to trust in other individuals. Using data on foreign portfolio investment, we further show that the adoption of the Directives leads to an increase in foreign investment—particularly when there is a low level of trust between the residents of the investing country and the residents of the country that adopts the Directive.

Overall, our findings suggest that changes in securities regulation can increase household equity ownership and that the adoption of regulation in one country can affect the equity ownership of households in other countries. Our results also suggest that regulation can serve as a substitute for trust by providing a mechanism to discipline parties who abuse the market. In addition, we show that national accounts provide timely, meaningful data that can be used to identify the

aggregate economic effects of the micro-level changes caused by securities regulation.

An important caveat to our analysis is that our measure of equity ownership does not allow us to distinguish between the entry of new households into the equity market from the expansion of households' existing equity positions. Thus, variation in our measures of equity ownership is likely disproportionately affected by the decisions of wealthy households, and our results are not necessarily indicative of the likely impact of regulation on equity ownership for the typical household. However, although we cannot speak to the effect on the typical household, we nonetheless provide evidence on whether (and how) securities regulation affects aggregate household investment in the stock market.

References

- Aghion, P., Algan, Y., Cahuc, P., Shleifer, A. 2010. Regulation and Distrust. *Quarterly Journal of Economics* 125, 1015-49.
- Altonji, J.G., Elder T.E., Taber C.R. 2005. Selection on Observed and Unobserved Variables: Assessing the Effectiveness of Catholic Schools. *Journal of Political Economy* 113, 151-184.
- Ball, R. 1980. Discussion of Accounting for Research and Development Costs: The Impact on Research and Development Expenditures. *Journal of Accounting Research* 18, 27-37.
- Barber, B., Odean, T. 2000. Trading is Hazardous to Your Wealth: The Common Stock Investment Performance of Individual Investors. *The Journal of Finance* 55, 773-806.
- Barber, B., Odean, T. 2013. The Behavior of Individual Investors. *Handbook of the Economics of Finance* Vol. 2, 1533-1570.o,1
- Blume, M., Friend, I. 1975. The Asset Structure of Individual Portfolios and Some Implications for Utility Functions. *The Journal of Finance* 30, 585-603.
- Blume, M.E and Friend, I. 1978 *The Changing Role of the Individual Investor: A Twentieth Century Fund Report*. Wiley, New York, NY.
- Bodie, Z., Merton, R.C., Samuelson, W.F. 1992. Labor Supply Flexibility and Portfolio Choice in a Life Cycle Model. National Bureau of Economic Research, Cambridge.
- Brazel, J., Jones, K., Thayer, J., Warne, R., 2015. Understanding Investor Perceptions of Financial Statement Fraud and their use of Red Flags: Evidence from the Field. *Review of Accounting Studies* 20, 1373-1406.
- Calvet, L., Campbell, J.Y., Sodini, P. 2007. Down or Out: Assessing the Welfare Costs of Household Investment Mistakes. *Journal of Political Economy* 115, 707-47.
- Campbell, J. 2006. Household Finance. *Journal of Finance* 61, 1553-1604.
- Carlin, B.I., Dorobantu, F., Viswanathan, S. 2009. Public Trust, the Law, and Financial Investment. *Journal of Financial Economics* 92, 321-41.
- Christelis, D., Georgarakos, D., Haliassos, M. 2013. Differences in Portfolios across Countries: Economic Environment versus Household Characteristics. *The Review of Economics and Statistics* 95, 220-236.
- Christensen, H., Hail, L., Leuz, C. 2016. Capital-Market Effects of Securities Regulation: Prior Conditions, Implementation, and Enforcement. *Review of Financial Studies* 29, 2885-2924.
- Cohn, R.A., Lewellen, W.G., Lease, R.C., Schlarbaum G.S. 1975. Individual Investor Risk Aversion and Investment Portfolio Composition. *Journal of Finance* 30, 605-620.
- Cumming, D., Johan, S., Li, D. 2011. Exchange Trading Rules and Stock Market Liquidity. *Journal of Financial Economics* 99, 651-71.
- DeFond, M., Hu, X., Hung, M., Li, S. 2011. The Impact of Mandatory IFRS Adoption on Foreign Mutual Fund Ownership: The Role of Comparability. *Journal of Accounting and Economics* 51, 240-258.
- Ferreira, M., Matos, P. 2008. The Colors of Investors' Money: The Role of Institutional Investors around the World. *Journal of Financial Economics* 88, 499-533.
- Giannetti, M., Koskinen, Y. 2010. Investor Protection, Equity Returns, and Financial Globalization. *The Journal of Financial and Quantitative Analysis* 45, 135-168.
- Giannetti, M., Wang, T.Y. 2016. Corporate Scandals and Household Stock Market Participation. *The Journal of Finance* 71, 2591-2636.
- Grinblatt, M., Keloharju, M. 2000. The Investment Behavior and Performance of Various Investor Types: A Study of Finland's Unique Data Set. *Journal of Financial Economics* 55, 43-67.

- Grinblatt, M., Keloharju, M. 2001. How Distance, Language, and Culture Influence Stockholdings and Trades. *The Journal of Finance* 56, 1053-1073.
- Guiso, L., Sapienza, P., Zingales, L. 2008. Trusting the Stock Market. *Journal of Finance* 63, 2557–2600.
- Guiso, L. Sapienza, P., Zingales, L. 2009. Cultural Biases in Economic Exchange. *The Quarterly Journal of Economics* 124, 1095-1131.
- Hix, S., Noury, A., Roland, G. 2007. *Democratic Politics in the European Parliament*. Cambridge University Press, Cambridge.
- Jegadeesh, N., Titman, S. 1993. Returns to Buying Winners and Selling Losers: Implication for Stock Market Efficiency. *Journal of Finance* 48, 65-91.
- Kalemli-Ozcan, S., Papaioannou, E., J. 2010. What Lies Beneath the Euro’s Effect on Financial Integration? Currency Risk, Legal Harmonization or Trade. *Journal of International Economics* 81, 75–88.
- Kalemli-Ozcan, S., Papaioannou, E., Peydró, J. 2013. Financial Regulation, Financial Globalization, and the Synchronization of Economic Activity. *The Journal of Finance* 68, 1179-1228.
- Ko, K. 2017. Economics Note: Investor Confidence. US Securities and Exchange Commission Working paper.
- Konchitchki, Y. 2011. Inflation and Nominal Financial Reporting: Implications for Performance and Stock Prices. *The Accounting Review* 86, 1045-1085.
- Konchitchki, Y. 2013. Accounting and the Macroeconomy: The case of aggregate price-level effects on Individual Stocks. *Financial Analysts Journal* 69, 40-54.
- Konchitchki, Y., Patatoukas, P. 2014. Accounting Earnings and Gross Domestic Products. *Journal of Accounting and Economics* 57, 76-88.
- Konchitchki, Y. Patatoukas, P. 2015. Accounting and the Macroeconomy: Accounting Quality at the Macro Level. Working paper.
- Kopczuk, W., Saez, E. 2004. Top Wealth Shares in the United States, 1916-2000: Evidence from Estate Tax Returns. *National Tax Journal* 57, 445-487.
- Lewis, K. 1999. Trying to Explain Home Bias in Equities and Consumption. *Journal of Economic Literature* 37, 571-608.
- Leuz, C., Lins, K.V., Warnock F.E. 2008. Do Foreigners Invest Less in Poorly Governed Firms? *The Review of Financial Studies*, 22, 3245-3285.
- Leuz, C., Wysocki, P.D. 2016. The Economics of Disclosure and Financial Reporting Regulation: Evidence and Suggestions for Future Research. *Journal of Accounting Research* 54, 525-622.
- Linnainmaa, J., Melzer, B., Previtero, A., Foerster, S., 2018. Financial Advisors and Risk-Taking. Working paper.
- Mankiw, N. G., Zeldes, S.P. 1991. The Consumption of Stockholders and Nonstockholders. *Journal of Financial Economics* 29, 97–112.
- Meier, J.M. 2017. Regulatory Integration of International Capital Markets. Working paper.
- Mulherin, J. 2007. Measuring the Costs and Benefits of Regulation: Conceptual Issues in Securities Markets. *Journal of Corporate Finance* 13, 421–37.
- Oster, E. 2017. Unobservable Selection and Coefficient Stability: Theory and Evidence. *Journal of Business & Economic Statistics*, 1-18.
- Patatoukas P. 2014. Detecting News in Aggregate Accounting Earnings: Implications for Stock Market Valuation. *Review of Accountings Studies* 19, 134-160.
- Pinotti, P. 2008. Trust, Honesty and Regulations. MRPA working paper 7740.

- Poterba, J., Samwick, A.A. 1995. Stock Ownership Patterns, Stock Market Fluctuations, and Consumption. *Brookings Papers on Economic Activity* 2, 295–372.
- Rajan, R., Zingales, L. 2003. The Great Reversals: The Politics of Financial Development in the Twentieth Century. *The Journal of Financial Economics* 69, 5-50.
- Scularbaum, G., Lewellen, W., Lease, R. 1978. The Common-Stock-Portfolio Performance Record of Individual Investors: 1964-1970. *Journal of Finance* 33, 429-441.
- Shivakumar, S., Urcan, O., 2017. Why Does Aggregate Earnings Growth Reflect Information about Future Inflation? *The Accounting Review*, 247-276.
- Smith, S., 2010. Confidence and Trading Aggressiveness of Naïve Investors: Effects of Information Quantity and Consistency. *Review of Accounting Studies* 15, 295-316.
- Viceira, L. 2001. Optimal Portfolio Choice for Long-Horizon Investors with Nontradable Labor Income. *The Journal of Finance* 56, 433-470.
- Vissing-Jørgensen, A. 2002. Towards an Explanation of Household Portfolio Choice Heterogeneity: Nonfinancial Income and Participation Cost Structures. NBER working paper 8884.

Appendix A: Public Awareness of the Directives

In this Appendix, we discuss the results of two additional analyses designed to assess whether it is likely that households are aware of the implementation of MAD and MiFID.

In Table A1, we report results from a Factiva search for the number of media (electronic and print) articles discussing MAD and MiFID. Specifically, we search for the terms “Market Abuse Directive” and “MiFID” in English one year prior (subsequent) to the earliest (latest) member-state implementation date for each directive and report both the total number of articles and the number of articles from the 20 most widely circulated newspapers in the EU mentioning these terms. This analysis indicates that the Directives were covered extensively by the European financial press and suggests that (at least) some households were likely aware of their implementation. MAD was mentioned over 1,200 times across all news sources covered by Factiva (and in nearly 100 articles in the top 20 European newspapers by circulation). MiFID was mentioned over 15,000 times across all news sources (and in 1,600 articles in the top 20 European newspapers).

An important caveat is that this approach likely understates the extent of media coverage because newspapers can report on the provisions of the Directives without specifically mentioning the “Market Abuse Directive” or “MiFID” and because articles might mention only the non-English names of the Directives. These issues are particularly pronounced for MAD, where, for obvious reasons, we cannot search using the directive’s acronym.

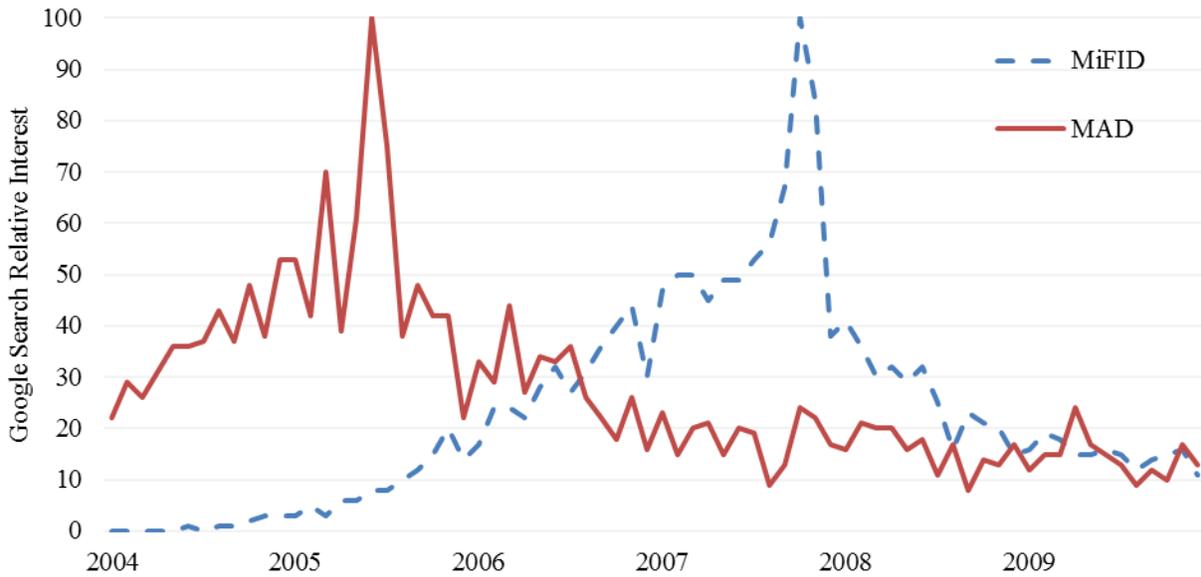
In Figure A1, we report the results from a Google-Trends plot of the relative search frequency for the terms “Market Abuse Directive” and “MiFID”. Also consistent with a broad awareness of the directives and the timing of their implementation, there is a visible spike in Google searches for the Directives around their respective implementation dates.

Table A1: Media Coverage of MiFID and MAD around the Entry-into-Force Dates

	MAD	MiFID
Search term	Market Abuse Directive	MiFID or Markets in Financial Instruments Directive
Search period	04/01/2003 to 01/01/2008	11/01/2006 to 10/21/2010
Total number of articles in any news source	1,230	15,451
<i>Top 20 European newspapers (by circulation):</i>		
Financial Times (U.K.)	64	1,108
Corriere (Italy)	0	105
La Repubblica (Italy)	0	102
Die Welt (Germany)	0	59
Süddeutsche Zeitung (Germany)	0	55
Gazeta Wyborcza & Wyborcza.pl (Poland)	0	42
The Independent (U.K.)	3	38
The Telegraph (U.K.)	14	38
El Mundo (Spain)	0	33
El Pais (Spain)	0	33
Le Figaro (France)	2	15
The Guardian (U.K.)	11	13
Daily Mail (U.K.)	3	7
Die Zeit (Germany)	0	1
The Sun (U.K.)	0	1
The Daily Express (U.K.)	2	0
Total	99	1,650

Notes: This table presents the “Total number of articles in any news source” and the number of articles for the “Top 20 European newspapers (by circulation)” that mentioned “Market Abuse Directive” in the period between 04/01/2003 and 01/01/2008, and that mentioned “MiFID” or “Markets in Financial Instruments Directive” between 11/01/2006 and 10/21/2010. Data is from Factiva.

Figure A1: MAD and MiFID Google Search Activity



Notes: This figure presents the global search interest for the terms “Market Abuse Directive” and “MiFID” relative to the highest point on the chart over the period 2004-2010. A value of 100 is the peak popularity for the search term. Data are downloaded from the Google Trends website.

Appendix B: Variable Definitions

<i>Equity Ownership</i>	The ratio of the value of total household investment in listed shares (i.e., direct ownership in publicly traded equity) to the value of total household liquid assets for a particular country-quarter. Liquid assets include: currency, transferable deposits, short-term debt securities, listed shares, and holdings in investment funds.
Components of Equity Ownership:	
<i>Listed Shares</i>	Listed shares are equity securities listed on an exchange. An exchange may be a recognized stock exchange or any other secondary market. Listed shares are also referred to as quoted shares. The existence of quoted prices of shares listed on an exchange means that current market prices are usually readily available. (Definition ESA2010)
<i>Investment fund shares or units</i>	Investment fund shares are shares of an investment fund if the fund has a corporate structure. They are considered units if the fund is a trust. Investment funds are collective undertakings by which investors pool funds for investment in financial and/or non-financial assets. Investment funds are also called mutual funds, unit trusts, investment trusts, and undertakings for collective investments in transferable securities (UCITS); they may be open-ended, semi-open or closed-end funds. (Definition ESA2010)
<i>Currency</i>	Currency is notes and coins that are issued or approved by monetary authorities. (ESA2010)
<i>Transferable deposits</i>	Transferable deposits are exchangeable for currency on demand, at par, and are directly usable for making payments by check, draft, giro order, direct debit/credit, or other direct payment facilities, without penalty or restriction. (ESA2010)
<i>Short-term debt securities</i>	Debt securities with an original maturity of one year or less and debt securities repayable on the demand of the creditor. (ESA2010)
<i>Fund Equity Ownership</i>	The ratio of the value of equity in equity-based investment funds to the total asset value of the investment fund for a particular country-quarter.
<i>Ln(Investments/GDP)</i>	The natural log of the ratio of aggregate mutual fund investment from investor country i (in billions of USD) in investee country j in quarter t scaled by the GDP (in billions of USD) of the investor country in quarter t . Mutual fund ownership data is from the Factset Ownership database.
<i>MAD Domestic</i>	An indicator variable that switches from 0 to 1 for a country in the quarter of MAD adoption.
<i>MAD Foreign</i>	An index variable indicating for each country-quarter the number of foreign countries that have adopted MAD scaled by the adopting country's relative market capitalization, divided by 100.
	$MAD\ Foreign_{it} = \left(\sum_{\substack{j=1 \\ i \neq j}}^{n=28} [MAD\ Domestic_{jt} \times \frac{\ln(\text{Market Cap.}_j)}{\ln(\text{Market Cap.}_i)}] \right) / 100$
	where i indexes household country, j indexes the MAD adopting country, and t indexes the year-quarter. We include all 31 EU countries except Croatia, which did not join the EU until 2013 (after our sample period), and Liechtenstein, where CESR disputes proper MAD adoption and thus there is no clear adoption date.
<i>MiFID Domestic</i>	An indicator variable that switches from 0 to 1 for a country in the quarter of MiFID adoption.
<i>MiFID Foreign</i>	An index variable indicating for each country-quarter the number of foreign countries that have adopted MiFID scaled by the adopting country's relative market capitalization. Calculated analogously to <i>MAD Foreign</i> .
<i>SecReg Domestic</i>	The sum of <i>MAD Domestic</i> and <i>MiFID Domestic</i> .
<i>SecReg Foreign</i>	The sum of <i>MAD Foreign</i> and <i>MiFID Foreign</i> .
<i>SecReg Investee Country</i>	A variable that switches from zero to one beginning in the quarter in which MAD

becomes effective in an investee country and from one to two beginning in the quarter in which MiFID also becomes effective.

GDP

The seasonal- and calendar-adjusted GDP based on chain linked volumes (2010), in millions of euro. Data are downloaded from Eurostat. Due to missing data, we use the unadjusted GDP (in millions of euro) based on chain linked volumes (2010) for Slovakia.

GDP Growth

The quarterly percentage change in GDP as defined above.

Household Equity Return

The quarterly change in valuation of the households' equity holdings in a country calculated as

$$\text{Household Equity Return}_{i,t} = \frac{\text{revaluation}_{i,t}}{\frac{1}{2}[(\text{listed shares}_{i,t-1} + \text{revaluation}_{i,t})]}$$

where i indexes household country and t indexes the year-quarter. *Revaluation* is the value adjustment of the household equity holdings at the end of each quarter due to fluctuations in the individual stock prices. Listed shares are revalued at the end of the quarter to incorporate stock price fluctuations. Transactions of listed shares throughout the quarter are recorded at market price at the time of sale. *Listed shares* are the total value of a country's household investment in listed shares at the end of the quarter. In the calculation above, the numerator is the *revaluation* amount for country i 's listed shares in period t . The denominator approximates the value of listed shares at the end of quarter t before adjusting for market price fluctuations, and is calculated as the midpoint between the total amount of listed shares for country i in period t and the total amount of listed shares for country i in the previous period, $t-1$, adjusted for the *revaluation* for country i in the current period. Financial sector accounts data are downloaded from the ECB's Statistical Data Warehouse. We replace missing and extreme values (more than three standard deviations from the mean) with *Stock Market Returns*, as defined below. In addition, we replace *Household Equity Returns* with *Stock Market Returns* for Slovakia, because the revaluation data has numerous zero values for that country.

Stock Market Return

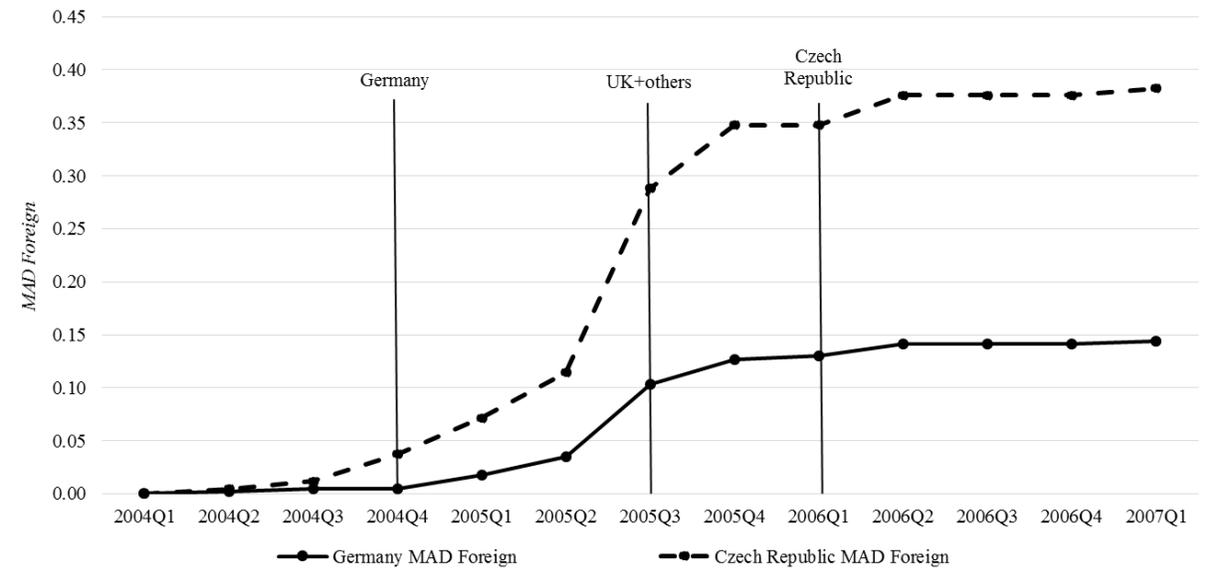
The quarterly percentage change in a country's stock-market index from the Global Financial Data database. The market indices used for each country are:

Austria	Austria Wiener Boerse kammer Share Index (WBKI)
Belgium	Brussels All-Share Price Index (BSPTD)
Bulgaria	Bulgaria SE SOFIX Index (SOFIXD)
Cyprus	FTSE/Cyprus SE-20 (CYFTD)
Czech Republic	Prague SE PX Index (PXD)
Denmark	OMX Copenhagen All-Share Price Index (OMXCPID)
Estonia	OMX Tallin (OMXT)
Finland	OMX Helsinki All-Share Price Index (OMXHPID)
France	Paris CAC-40 Index (FCHID)
Germany	Germany DAX Price Index (GDAXIPD)
Greece	Athens SE General Index (ATGD)
Hungary	Vienna OETEB Hungary Traded Index (HTLD)
Iceland	OMX Iceland All-Share Price Index (OMXIPID)
Ireland	Ireland ISEQ Overall Price Index (ISEQD)
Italy	Banca Commerciale Italiana Index (BCIID)
Latvia	OMX Riga (OMXR)
Lithuania	OMX Vilnius (OMXV)
Luxembourg	Luxembourg SE LUXX Index (LUXXD)
Malta	Malta SE Index (MLTSED)
Netherlands	Netherlands All-Share Price Index (AAXD)
Norway	Oslo SE All-Share Index (OSEAXD)
Poland	Vienna OETEB Poland Traded Index (PTLD)
Portugal	Oporto PSI-20 Index (PSI20D)

	Slovakia	Bratislava SE SAX Index (SAXD)
	Slovenia	Slovenia SE SBITOP Blue Chip Index (SBITOPD)
	Spain	Madrid SE IBEX-35 (IBEXD)
	Sweden	OMX Stockholm All-Share Price Index (OMXSPID)
	UK	UK FTSE All-Share Index (FTASD).
<i>Momentum</i>	The one-period lag of the <i>Stock Market Return</i> , defined as above.	
<i>Change in Unemployment</i>	The quarterly percentage change in the seasonally-adjusted unemployment rates (as a percentage of the active population), from the Eurostat Unemployment - EU Labor Force Survey (EU-LFS) adjusted series, including harmonized long-term unemployment.	
<i>Tax Rate</i>	The net top statutory rate to be paid on dividend income at the shareholder level, taking into account all types of reliefs and gross-up provisions at the shareholder level. Data are collected from the OECD except for Malta, Cyprus, and Bulgaria, which are not included in the OECD database. For Malta, Cyprus, and Bulgaria, we use the more general tax category of taxes on income, profits, capital gains levied on the actual or presumptive net income of individuals, profits of corporations and enterprises, and on capital gains (whether realized or not) on land, securities, and other assets. These data are downloaded from Eurostat.	
<i>Market Cap.</i>	The market capitalization of each country in the year 2003 (prior to the first MAD entry-into-force date) in billions of US dollars, downloaded from the World Federation of Exchanges database.	
<i>Trust EVS</i>	The percentage of households in a country that agreed with the statement "Most people can be trusted" from the European Values Survey conducted between 2008 and 2010 as in Guiso et al. (2008).	
<i>Trust Score</i>	The average country response score of the European Values Survey (conducted between 2008 and 2010) on the question: "Do you think most people try to take advantage of you (10 point scale)? 1=people take advantage of me, 10=most people try to be fair)".	
<i>Trust Differential</i>	The difference between the average country response score of the European Values Survey (conducted from 2008 to 2010) on the question: "Confidence: The Government? 1=A great deal, 2=Quite a lot, 3=Not very much, 4=None at all" and the average country response score of the European Values Survey (conducted from 2008 to 2010) on the question: "Do you think most people try to take advantage of you (10 point scale)? 1=people take advantage of me, 10=most people try to be fair)", rescaled to a 4-point scale (where a score of 1 translates to a new score of 4, a score of 2, 3, or 4 translates to a new score of 3, a score of 5, 6, or 7 translates to a new score of 2, and a score of 8, 9, or 10 translates to a new score of 1).	
<i>High Trust</i>	An indicator variable based on a country's <i>Trust Score</i> that equals one for countries with a <i>Trust Score</i> above the sample median and zero for countries below the sample median.	
<i>High Trust Differential</i>	An indicator variable based on a country's <i>Trust Differential Score</i> that equals one for countries with a <i>Trust Differential Score</i> above the sample median and zero for countries below the sample median.	
<i>Religious Similarity</i>	A bilateral measure of the empirical probability that two randomly chosen individuals from two different countries will share the same religion, calculated (following Guiso et al. 2009) as the sum, across religion categories, of the fraction of respondents that report adherence to a particular religion in country A multiplied by the same fraction in country B. Survey data on religion are from the European Values Survey conducted between 2008 and 2010, which reports whether someone considers themselves religious, and if so, whether they identify as Buddhist, Hindu, Jewish, Muslim, Orthodox, Protestant, Roman Catholic, non-religious, or Other. Other, Free Church/Non-Denominational Church, and respondents who claimed to be religious but listed no denomination were counted as "Other."	
<i>High Religious Similarity</i>	An indicator variable based on a country-pair's <i>Religious Similarity</i> that equals one for country-pairs with a <i>Religious Similarity</i> above the sample median and zero for country-pairs below the sample median.	

<i>Distance</i>	The distance in 1,000 kilometers between the most populous cities for a given country pair. Distance data are from the Center for Prospective Studies and International Information (CEPII).
<i>Close distance</i>	An indicator variable based on a country-pair's <i>Distance</i> that equals one for country-pairs above the sample median and zero for country-pairs below the sample median.

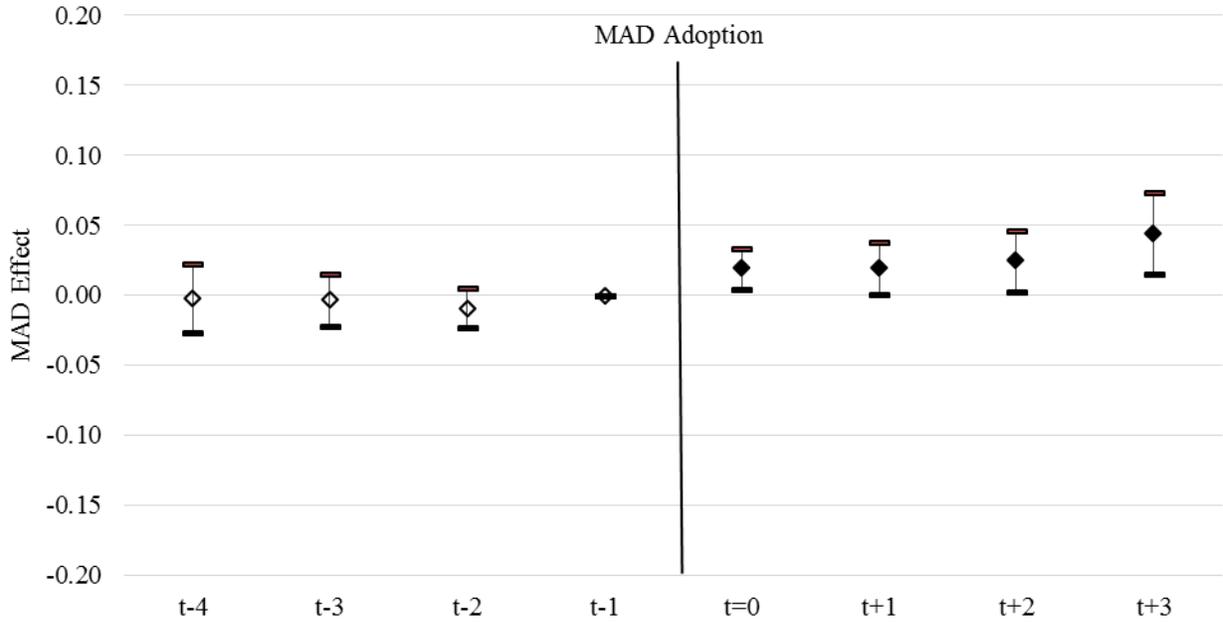
Figure 1: MAD Foreign for Germany and the Czech Republic



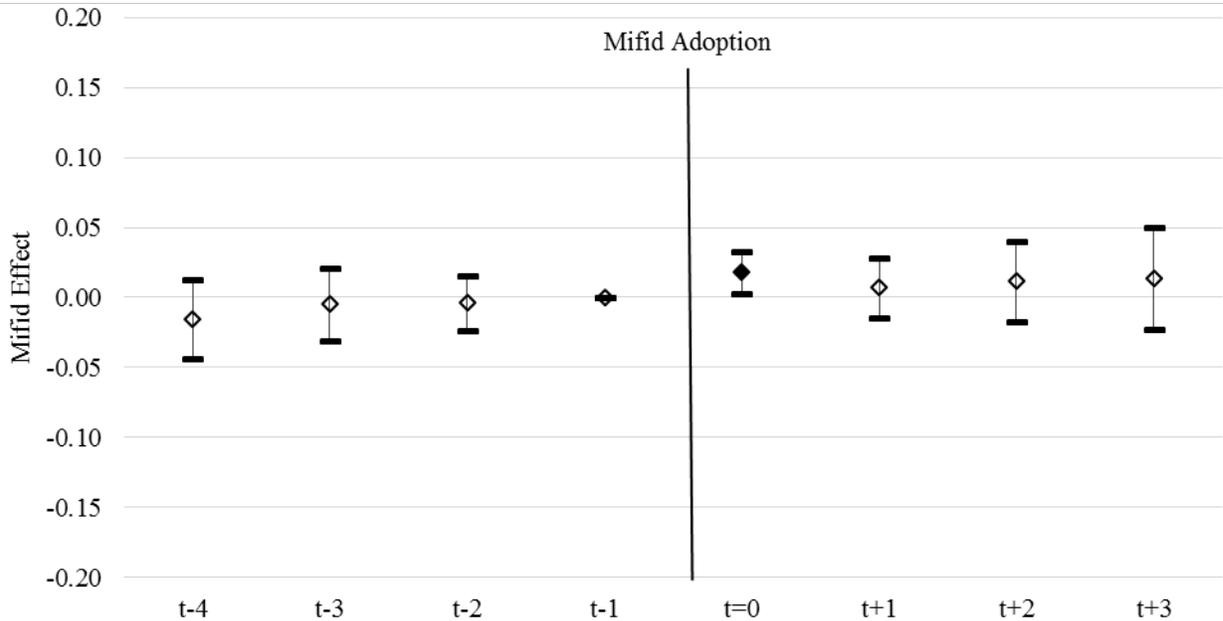
Notes: This figure presents the MAD Foreign variable for Germany and the Czech Republic in the period between 2004Q1 (the quarter before the first MAD adoption) and 2007Q1. All variables are defined in Appendix B.

Figure 2: Pattern of the Counterfactual Treatment Effects

Panel A: Counterfactual Treatment Effects *MAD Domestic*



Panel B: Counterfactual Treatment Effects *MiFID Domestic*



Notes: This figure maps the pattern in the annual, counter-factual treatment effects for *MAD Domestic* (*MiFID Domestic*) in Panel A (B) with two-tailed 95% confidence intervals based on standard errors clustered at the country-year level. The solid squares indicate that the coefficient is significantly different from the benchmark year ($t-1$) at the 95% confidence level.

Table 1: Entry-into-force Dates and Data Availability

	Entry-into-force Dates		Data Availability		Foreign Regulation Variables		
	MAD	MiFID	First quarter	Standards	<i>Market Cap.</i> (\$bln.) 2003	Max <i>MAD</i> <i>Foreign</i>	Max <i>MiFID</i> <i>Foreign</i>
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Belgium	2005 Q3	2007	2000 Q1	ESA2010	174	0.20	0.20
Czech Republic	2006 Q1	2008	2004 Q1	ESA95	16	0.39	0.39
Denmark	2005 Q2	2007	2000 Q1	ESA95	122	0.22	0.22
Estonia	2005 Q1	2007	2003 Q1	ESA95	4	0.81	0.81
Finland	2005 Q3	2007	2000 Q1	ESA2010	170	0.20	0.20
France	2005 Q3	2007	2000 Q1	ESA2010	1,356	0.14	0.14
Germany	2004 Q4	2007	2000 Q1	ESA2010	1,079	0.15	0.15
Greece	2005 Q3	2007	2000 Q1	ESA95	107	0.22	0.23
Hungary	2005 Q3	2007	2000 Q1	ESA2010	17	0.38	0.38
Italy	2005 Q2	2007	2000 Q1	ESA95	615	0.16	0.16
Latvia	2005 Q3	2008	2004 Q1	ESA2010	1	8.28	8.32
Lithuania	2004 Q2	2008	2004 Q1	ESA2010	4	0.86	0.86
Luxembourg	2006 Q2	2007	2002 Q1	ESA2010	37	0.29	0.29
Malta	2005 Q2	2007	2004 Q1	ESA2010	2	1.76	1.77
Norway	2005 Q3	2007	2000 Q1	ESA2010	96	0.23	0.23
Poland	2005 Q4	2009	2003 Q4	ESA2010	37	0.29	0.29
Portugal	2006 Q2	2007	2000 Q1	ESA2010	58	0.26	0.26
Slovakia	2005 Q1	2007	2004 Q1	ESA95	53	0.26	0.27
Slovenia	2004 Q3	2007	2004 Q1	ESA2010	7	0.55	0.55
Spain	2005 Q4	2007	2000 Q1	ESA2010	726	0.16	0.16
Sweden	2005 Q3	2007	2000 Q1	ESA2010	290	0.18	0.18
UK	2005 Q3	2007	2000 Q1	ESA2010	2,426	0.13	0.13

Notes: This table displays the MAD (Column 1) entry-into-force dates for each EU country in our sample. MiFID entry-into-force dates in Column (2) only include the implementation year because we obtained these dates from Jean-Marie Meier with the agreement that we would not disclose the exact dates in the paper. Columns (3) and (4) provide information regarding data availability, including the period of the first available observation and the applicable standard for each country in our sample, respectively. Columns (5)-(7) provide statistics for the components of the foreign regulation variables: Column (5) reports *Market Cap.* in 2013 denoted in billions of US dollars; in Columns (6) and Column (7), we specify the maximum *MAD Foreign* measure and the maximum *MiFID Foreign* measure for each country in our sample. All variables are defined in Appendix B.

Table 2: Descriptive Statistics

Observations N=1,098	Mean	Standard deviation	1st Percentile	Median	99th Percentile
<i>Equity Ownership</i>	0.144	0.094	0.000	0.137	0.389
<i>GDP Growth</i>	0.005	0.014	-0.039	0.006	0.042
<i>Household Equity Return</i>	-0.001	0.156	-0.532	0.014	0.370
<i>Momentum</i>	0.013	0.124	-0.300	0.021	0.315
<i>Change in Unemployment</i>	0.004	0.060	-0.122	0.000	0.225
<i>Tax Rate</i>	0.196	0.012	0.000	0.200	0.430

Notes: This table reports summary statistics for *Equity Ownership* and our five continuous control variables. The sample period is from 2000 to 2013. All variables are defined in Appendix B.

Table 3: The Effect of Domestic Securities Regulation on Household Equity Ownership

<i>Equity Ownership</i> as Dependent Variable	<i>MAD Domestic</i>	<i>MiFID Domestic</i>	<i>SecReg Domestic</i>	<i>SecReg Domestic</i>
	(1)	(2)	(3)	(4)
Treatment Effects of Domestic Regulation:				
<i>MAD Domestic</i>	0.021** (2.40)	—	—	—
<i>MiFID Domestic</i>		0.008 (0.95)	—	—
<i>SecReg Domestic</i>	—	—	0.017** (2.49)	0.016** (2.28)
Control Variables:				
<i>GDP Growth</i>	0.139 (1.41)	0.156 (1.57)	0.148 (1.50)	—
<i>Household Equity Return</i>	0.021*** (3.01)	0.021*** (2.95)	0.021*** (3.00)	—
<i>Momentum</i>	0.009 (0.39)	0.012 (0.53)	0.009 (0.42)	—
<i>Change in Unemployment</i>	-0.045** (-2.37)	-0.047** (-2.41)	-0.048** (-2.48)	—
<i>Tax Rate</i>	-0.001** (-2.07)	-0.001** (-2.00)	-0.001** (-2.06)	—
<i>TPD</i>	-0.004 (-0.57)	-0.006 (-0.88)	-0.006 (-0.99)	-0.007 (-1.09)
<i>PROSP</i>	-0.006 (-0.80)	-0.003 (-0.45)	-0.005 (-0.76)	-0.006 (-0.91)
Fixed Effects:				
<i>Country</i>	Yes	Yes	Yes	Yes
<i>Year-quarter</i>	Yes	Yes	Yes	Yes
Observations	1,098	1,098	1,098	1,098
Adjusted R-squared	0.907	0.906	0.907	0.904

Notes: This table reports results from our analysis of the effect of *MAD Domestic*, *MiFID Domestic*, and *SecReg Domestic* on *Equity Ownership* using OLS regressions. The sample period is from 2000 to 2013. All variables are defined in Appendix B. T-statistics, reported in parentheses, are based on standard errors clustered at the country-year level. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels (two-tailed), respectively.

Table 4: The Effect of Foreign Securities Regulation on Household Equity Ownership

<i>Equity Ownership</i> as Dependent Variable	<i>MAD Foreign</i>	<i>MiFID Foreign</i>	<i>SecReg Foreign</i>	<i>SecReg Foreign & SecReg Domestic</i>	<i>SecReg Foreign & SecReg Domestic</i>
	(1)	(2)	(3)	(4)	(5)
Treatment Effects of Foreign Regulation:					
<i>MAD Foreign</i>	0.006** (2.48)	—	—	—	—
<i>MiFID Foreign</i>	—	0.008*** (6.89)	—	—	—
<i>SecReg Foreign</i>	—	—	0.004*** (3.66)	0.005*** (3.57)	0.004*** (3.41)
Control Variables:					
<i>SecReg Domestic</i>	—	—	—	0.017** (2.46)	0.016** (2.24)
<i>GDP Growth</i>	0.175* (1.76)	0.235** (2.36)	0.218** (2.21)	0.214** (2.16)	—
<i>Household Equity Return</i>	0.019** (2.49)	0.019** (2.44)	0.019** (2.46)	0.019** (2.49)	—
<i>Momentum</i>	0.012 (0.55)	0.010 (0.46)	0.011 (0.50)	0.009 (0.39)	—
<i>Change in Unemployment</i>	-0.046** (-2.42)	-0.048** (-2.59)	-0.047** (-2.53)	-0.050*** (-2.65)	—
<i>Tax Rate</i>	-0.001** (-2.03)	-0.001** (-2.23)	-0.001** (-2.17)	-0.001** (-2.23)	—
<i>TPD</i>	-0.005 (-0.80)	-0.004 (-0.69)	-0.005 (-0.77)	-0.007 (-1.05)	-0.007 (-1.13)
<i>PROSP</i>	-0.004 (-0.49)	-0.001 (-0.17)	-0.002 (-0.32)	-0.004 (-0.64)	-0.005 (-0.80)
Fixed Effects:					
<i>Country</i>	Yes	Yes	Yes	Yes	Yes
<i>Year-quarter</i>	Yes	Yes	Yes	Yes	Yes
Observations	1,098	1,098	1,098	1,098	1,098
Adjusted R-squared	0.907	0.910	0.909	0.910	0.906

Notes: This table reports results from our analysis of the effect of *MAD Foreign*, *MiFID Foreign*, and *SecReg Foreign* on *Equity Ownership* using OLS regressions. The sample period is from 2000 to 2013. All variables are defined in Appendix B. T-statistics, reported in parentheses, are based on standard errors clustered at the country-year level. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels (two-tailed), respectively.

Table 5: Securities Regulation, Trust in Others, and Household Equity OwnershipPanel A: *Trust Score* by Country

Country	<i>Trust Score</i>	<i>High Trust</i>	Country	<i>Trust Score</i>	<i>High Trust</i>
Belgium	6.11	1	Lithuania	4.92	0
Czech Republic	5.13	0	Luxembourg	6.09	1
Denmark	8.02	1	Malta	5.01	0
Estonia	6.01	1	Norway	7.19	1
Finland	6.26	1	Poland	5.42	0
France	6.05	1	Portugal	4.96	0
Germany	5.92	1	Slovakia	4.95	0
Greece	4.12	0	Slovenia	5.53	0
Hungary	5.19	0	Spain	5.33	0
Italy	5.37	0	Sweden	7.07	1
Latvia	5.92	1	UK	6.12	1

Panel B: *Trust Differential* by Country

Country	<i>Trust Differential</i>	<i>High Trust Differential</i>	Country	<i>Trust Differential</i>	<i>High Trust Differential</i>
Belgium	0.89	1	Lithuania	0.31	0
Czech Republic	0.60	0	Luxembourg	0.23	0
Denmark	1.05	1	Malta	-0.03	0
Estonia	0.74	1	Norway	1.00	1
Finland	0.63	0	Poland	0.71	1
France	0.90	1	Portugal	0.52	0
Germany	0.76	1	Slovakia	0.04	0
Greece	0.38	0	Slovenia	0.39	0
Hungary	0.84	1	Spain	0.43	0
Italy	0.64	1	Sweden	0.61	0
Latvia	0.98	1	UK	1.07	1

Notes: Table 5 Panel A reports *Trust Score* and *High Trust* for each country in the sample. Panel B reports *Trust Differential* and *High Trust Differential* for each country in the sample. All variables are defined in Appendix B.

Table 5 continuedPanel C: Effect of *SecReg Domestic* Conditional on *Trust Score* and *Trust Differential*

<i>Equity Ownership</i> as Dependent Variable	Conditional on <i>Trust Score</i> (1)	Conditional on <i>Trust Differential</i> (2)
Treatment Effects of Domestic Regulation:		
<i>High Trust</i>	0.007 (0.93)	
<i>Low Trust</i>	0.024*** (3.28)	
<i>High Trust Differential</i>		0.028*** (3.19)
<i>Low Trust Differential</i>		0.011 (1.48)
Test High = Low (p-value):		
Domestic Regulation	0.002	0.002
Control Variables:		
<i>GDP Growth</i>	0.044 (0.47)	0.025 (0.28)
<i>Household Equity Return</i>	0.025*** (4.03)	0.025*** (3.94)
<i>Momentum</i>	0.021 (1.14)	0.011 (0.60)
<i>Change in Unemployment</i>	-0.052*** (-2.61)	-0.051*** (-2.69)
<i>Tax Rate</i>	-0.001*** (-2.74)	-0.001** (-2.11)
<i>TPD</i>	-0.005 (-0.76)	-0.008 (-1.15)
<i>PROSP</i>	-0.008 (-1.22)	-0.006 (-0.89)
Fixed Effects:		
<i>Country</i>	Yes	Yes
<i>Year-quarter</i>	Yes	Yes
<i>Year-quarter</i> × <i>Trust Score</i> (<i>Trust Differential</i>)	Yes	Yes
Observations	1,098	1,098
Adjusted R-squared	0.920	0.921

Notes: Table 5 Panel C reports results from our analysis on the effect of *SecReg Domestic* conditional on the average trust of households in a country (Column 1) and on the average trust differential between trust in government and trust in people of households in a country (Column 2) using OLS regressions. The sample period is from 2000 to 2013. All variables are defined in Appendix B. T-statistics, reported in parentheses, are based on standard errors clustered at the country-year level. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels (two-tailed), respectively.

Table 6: Securities Regulation, Religious Similarity, and Foreign Equity Investments

Panel A: Descriptive Statistics

	Mean	Standard deviation	1st Percentile	Median	99th Percentile
Components of dependent variable:					
<i>Total Investment (B. USD)</i>	0.600	1.920	0.000	0.040	9.930
<i>GDP investee country (B. USD)</i>	195.150	241.080	2.460	84.540	922.300
Control variables:					
<i>GDP Growth</i>	0.000	0.010	-0.040	0.000	0.030
<i>Stock Market Return</i>	0.010	0.130	-0.340	0.020	0.310
<i>Change in Unemployment</i>	0.010	0.060	-0.120	0.000	0.200
<i>Distance</i>	1.320	0.720	0.170	1.240	3.220
Partitioning variables:					
<i>Religious Similarity</i>	26.940	19.660	0.840	26.990	75.320

Investee Country	Observations
Austria	1,163
Belgium	1,078
Bulgaria	534
Cyprus	881
Czech Republic	1,080
Denmark	1,063
Estonia	591
Finland	1,103
France	1,195
Germany	1,226
Greece	1,072
Hungary	1,098
Iceland	161
Ireland	1,109
Italy	1,139
Latvia	288
Lithuania	439
Luxembourg	1,126
Malta	346
Netherlands	1,225
Norway	1,070
Poland	1,123
Portugal	977
Slovak Republic	274
Slovenia	602
Spain	1,147
Sweden	1,150
United Kingdom	1,264

Notes: Table 6 Panel A reports summary statistics for the individual components of the dependent variable $\ln(\text{Investments}/\text{GDP})$, control variables, and partitioning variables used in Table 6 Panel B, as well as the number of observations by investee country. The sample period is from 2000 to 2015. All variables are defined in Appendix B.

Table 6 continued**Panel B: Effect of Securities Regulation on Foreign Equity Holdings Conditional on Bilateral Religious Similarity**

<i>Ln(Investments/GDP)</i> as Dependent Variable	SecReg	SecReg Conditionally on Religious similarity	SecReg Conditionally on Religious similarity and distance
	(1)	(2)	(3)
Treatment Effects of Regulation in Inflow country:			
<i>SecReg Investee Country</i>	0.157*** (2.94)	0.181*** (3.10)	0.140** (2.35)
Incremental Effect of Religious Similarity:			
<i>SecReg Investee Country x High Religious Similarity</i>	—	-0.064* (-1.70)	-0.077** (-2.03)
Control Variables (Investee Country):			
<i>GDP Growth</i>	3.335*** (5.92)	3.358*** (6.09)	3.303*** (5.98)
<i>Stock Market Return</i>	-0.187* (-1.90)	-0.213** (-2.19)	-0.216** (-2.22)
<i>Momentum</i>	0.194* (1.89)	0.140 (1.39)	0.138 (1.36)
<i>Change in Unemployment</i>	-0.502*** (-3.18)	-0.490*** (-3.18)	-0.469*** (-3.05)
<i>TPD</i>	-0.002 (-0.04)	-0.051 (-1.14)	-0.048 (-1.06)
<i>PROSP</i>	0.008 (0.12)	-0.013 (-0.20)	-0.005 (-0.08)
<i>SecReg Investee Country x Close distance</i>	—	—	0.096*** (3.55)
Fixed Effects:			
Country-pair	Yes	Yes	Yes
Fund Country-year-quarter	Yes	Yes	Yes
Year-quarter x Religious Similarity	No	Yes	Yes
Observations (country-pairs)	25,524	25,524	25,524
Adjusted R-squared	0.890	0.891	0.892

Notes: Table 6 Panel B reports results from our analysis of the effect of *SecReg Investee Country* conditional on the religious similarity between country-pairs using OLS regressions. The sample period is from 2000 to 2015. All variables are defined in Appendix B. In Columns (2) and (3), we use *Religious Similarity* as a partitioning variable. T-statistics, reported in parentheses, are based on standard errors clustered at the country-pair-year level. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels (two-tailed), respectively.

Internet Appendix to:
**Securities Regulation, Household Equity Ownership, and Trust in
the Stock Market**

By HANS B. CHRISTENSEN, MARK MAFFETT AND LAUREN VOLLON

This appendix provides the supplemental analysis reported but not tabulated in the manuscript.

Contents:

Section IA1: The Effect of Regulation on Components of the Denominator of *Equity Ownership*

Section IA2: The Effect of Regulation on Investment Funds' Asset Allocations

Section IA3: Scaling Listed Shares by GDP rather than Liquid Assets

Section IA4: Household Stock-Market Participation and *Equity Ownership*

Section IA5: Controlling for Liquidity

Section IA6: Adjusting *Equity Ownership* for Changes in Share Prices

Section IA1: The Effect of Regulation on Components of the Denominator of *Equity Ownership*

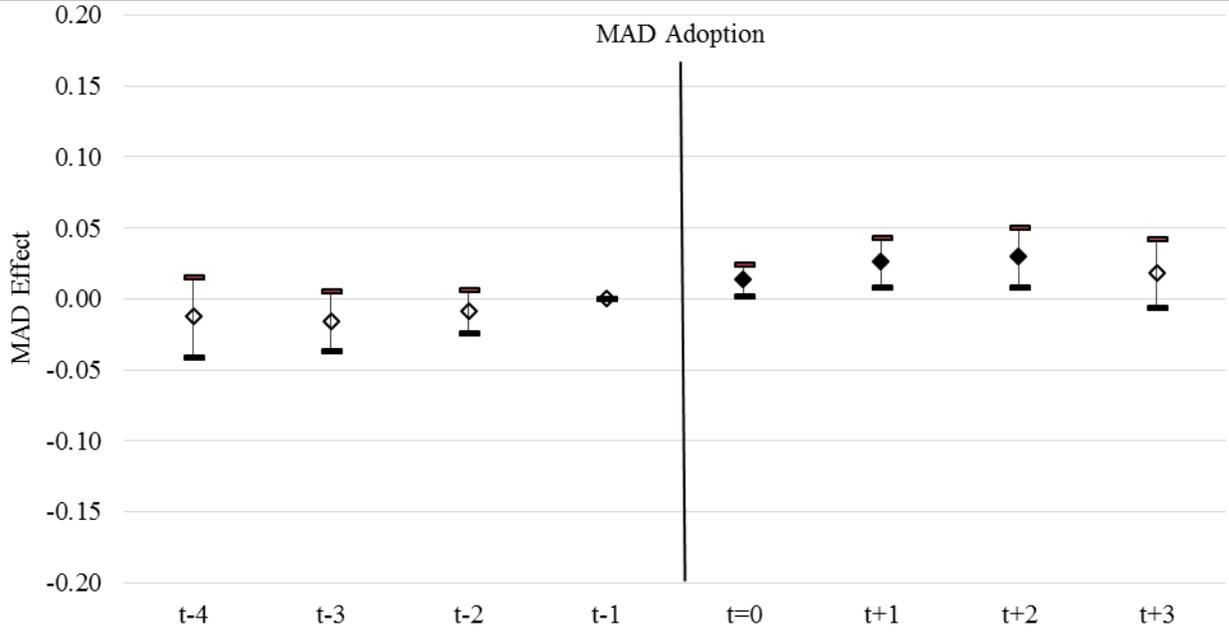
A potential issue with our measure of household equity ownership is that we include five liquid asset types in the denominator and it is unclear from the analysis in the manuscript whether these components also respond to securities regulation. The five liquid asset types are: currency, transferable deposits, short-term debt securities, listed shares, and holdings in investment funds. In this Section, we map out the effect over our sample period for the four liquid asset types besides listed shares around MAD adoption; each time, we scale the value of the asset type by total liquid assets (we map out the effect on listed shares to total liquid assets in Figure 2 in the manuscript).²²

Figure IA1 reports the results. There is a small increase in currency holding, no visible change in transferable deposits and short-term debt, and a decrease in investment fund holdings. This descriptive evidence suggests that households replace investment fund holdings with direct equity holdings. We examine the change in investment fund holdings further in the next section of this Internet Appendix.

²² We focus on MAD because the effect of domestic securities regulation on household equity ownership is strongest for MAD (see Section 4 of the manuscript).

Figure IA1: Pattern of the Counterfactual Treatment Effects for Components of the Denominator for *Equity Ownership*

Panel A: Currency



Panel B: Transferable Deposits

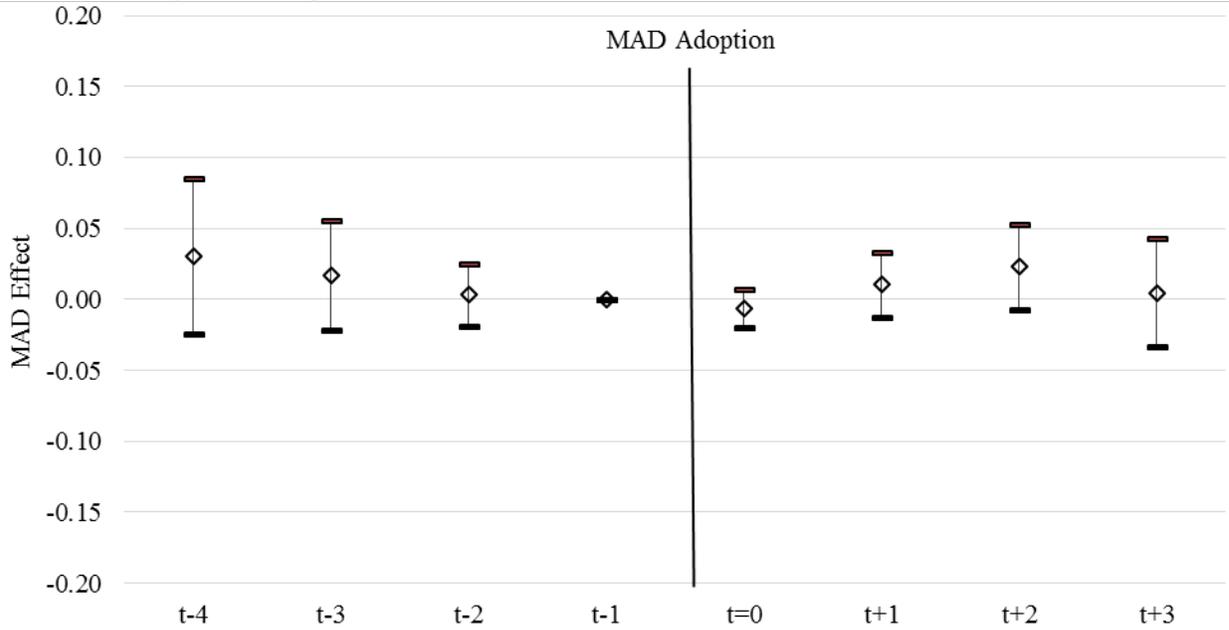
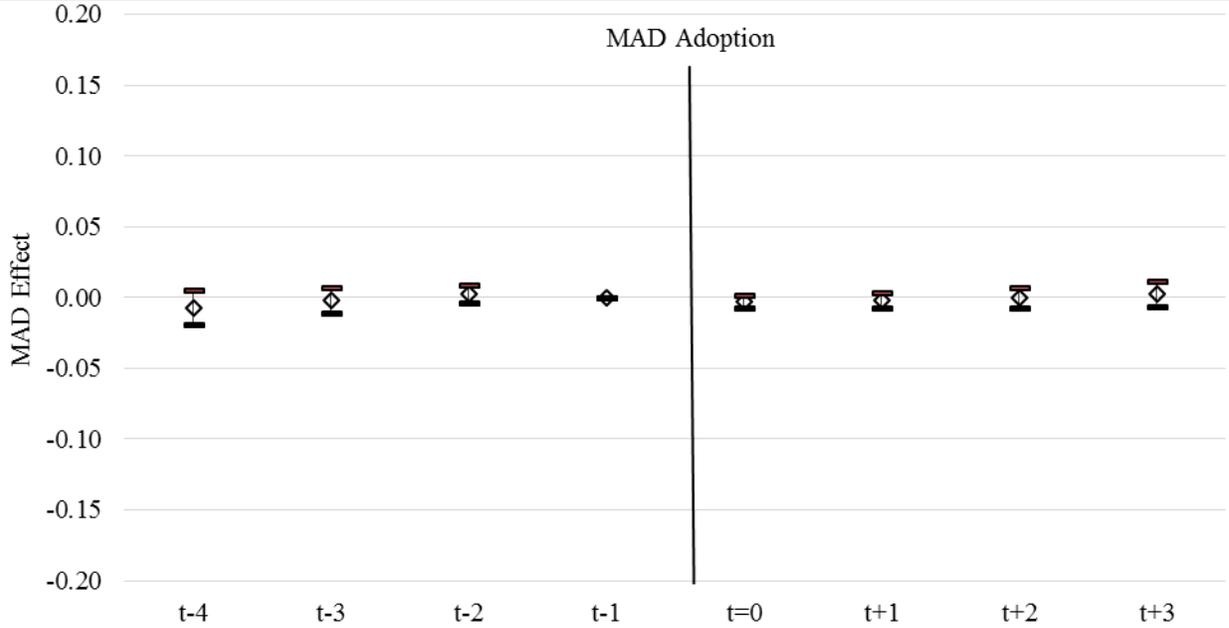
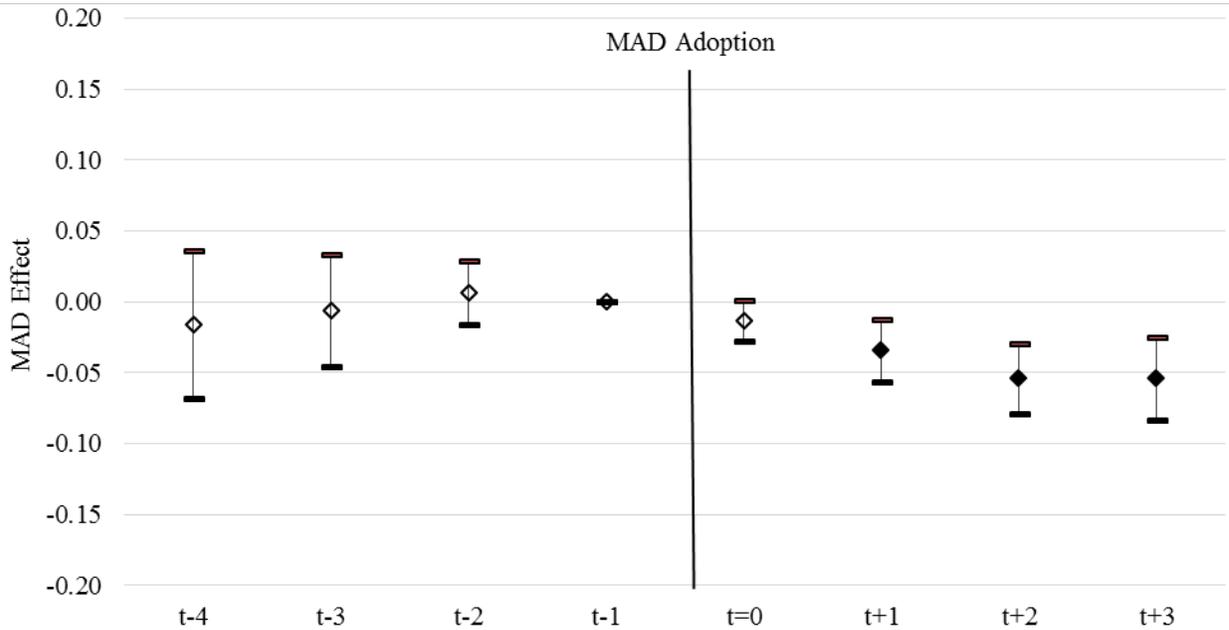


Figure IA1 continued

Panel C: Short-term Debt



Panel D: Investment Funds



Notes: These figures map the pattern in the annual, counter-factual treatment effects for *MAD Domestic* for the four non-listed shares components of the denominator with two-tailed 95% confidence intervals based on standard errors clustered at the country-year level. The solid squares indicate that the coefficient is significantly different from the benchmark year ($t-1$) at the 95% confidence level.

Section IA2: The Effect of Regulation on Investment Funds' Asset Allocations

An issue with our measure of household equity ownership is that we include assets held in investment funds in the denominator. We choose to include investment funds in the denominator because our analysis of the composition of the funds' holdings (using national accounts data) indicates that the majority of the assets in investment funds (more than 70%) are non-equity-market investments (e.g., money-market funds, bond funds, real-estate trusts). When a household increases its direct investment in the equity market, these other non-equity-market investment classes are likely to be an important source of funds. However, one implication of this research design choice is that we may underestimate the effect of regulation on equity ownership if households reallocate their investments (through investment funds) from fixed income to equity funds. Alternatively, we may be overestimating the effect if households shift from indirect equity investments through investment funds to direct equity holdings. While the latter is not inconsistent with an increase in households' willingness to invest directly in equity, such a shift does not represent an overall increase in household equity ownership.

To address this issue, we use national accounts data on the aggregated balance sheet of European investment funds to examine whether these investment funds' holdings of equities changed around the securities-regulation implementation dates. In this analysis, we cannot distinguish between funds held by households and other sectors (e.g., pension funds, university endowments), but since in most countries households are likely the largest investor group in investment funds, this analysis should be indicative of whether including investment funds in the denominator biases for or against our findings. In this analysis, we replace *Equity Ownership* in Eq. (1) with the fraction of investment fund assets invested in equity for a particular country-quarter, *Fund Equity Ownership*. The sample size here is smaller than in the main analysis because

data on investment fund holdings are not available for the UK or Norway.

Table IA2 reports the results for each of our foreign and domestic regulation variables.²³ Across each of the five specifications, with the exception of *MiFID Domestic* in Column (2), the results suggest that the fraction of investment funds' equity holdings increased in response to the regulations (the coefficient on *MiFID Domestic* is also insignificant in the main analysis). The consistency of these results with our main analyses indicates that investment funds' equity holdings also increase in response to regulation, which suggests that by including equity-based investment funds in the denominator of our *Equity Ownership* measure, we may be underestimating the treatment effect in the main analysis.

²³ In this analysis, we replace the *Household Equity Return* control variable with *Stock Market Return* so that the variable is more closely aligned with the portfolio returns of investment funds.

Table IA2: The Effect of Securities Regulation on Investment Funds' Asset Allocations

<i>Fund Equity Investment</i> as dep. variable	Domestic Regulation		Foreign Regulation		Domestic/Foreign
	MAD (1)	MiFID (2)	MAD (3)	MiFID (4)	SecReg (5)
Treatment Effects of Domestic Regulation:					
<i>MAD Domestic</i>	0.117** (2.32)	—	—	—	—
<i>MiFID Domestic</i>	—	-0.025 (-0.87)	—	—	—
Treatment Effects of Foreign Regulation:					
<i>MAD Foreign</i>	—	—	0.034*** (4.59)	—	—
<i>MiFID Foreign</i>	—	—	—	0.028*** (4.07)	—
Treatment Effects of SecReg Variables:					
<i>SecReg Domestic</i>	—	—	—	—	0.068* (1.79)
<i>SecReg Foreign</i>	—	—	—	—	0.019*** (4.84)
Control Variables:					
<i>GDP Growth</i>	0.290 (0.79)	0.360 (1.00)	0.606* (1.78)	0.910*** (2.90)	0.873*** (2.67)
<i>Stock Market Return</i>	0.024 (0.53)	0.020 (0.43)	0.039 (0.85)	0.031 (0.70)	0.037 (0.90)
<i>Momentum</i>	0.011 (0.22)	0.018 (0.34)	0.025 (0.49)	0.012 (0.23)	0.014 (0.30)
<i>Change in Unemployment</i>	-0.145* (-1.86)	-0.135 (-1.63)	-0.145* (-1.80)	-0.162* (-1.93)	-0.177** (-2.06)
<i>Tax Rate</i>	-0.003*** (-2.67)	-0.003** (-2.53)	-0.003*** (-3.27)	-0.003*** (-4.00)	-0.003*** (-4.04)
<i>TPD</i>	0.007 (0.29)	0.007 (0.27)	-0.003 (-0.13)	0.006 (0.25)	-0.009 (-0.34)
<i>PROSP</i>	0.044** (2.28)	0.054*** (3.49)	0.052*** (3.12)	0.064*** (4.23)	0.053*** (3.56)
Fixed Effects:					
<i>Country</i>	Yes	Yes	Yes	Yes	Yes
<i>Year-quarter</i>	Yes	Yes	Yes	Yes	Yes
Observations	760	760	760	760	760
Adjusted R-squared	0.841	0.832	0.844	0.850	0.855

Notes: This table reports results from our analysis of the effect of our securities regulation measures on investment funds' asset allocations using OLS regressions. The sample period is from 2000 to 2013. All variables are defined in Appendix B. T-statistics, reported in parentheses, are based on standard errors clustered at the country-year level. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels (two-tailed), respectively.

Section IA3: Scaling Listed Shares by GDP rather than Liquid Assets

In the main analysis tabulated in the manuscript, we measure household equity ownership as the proportion of household liquid assets invested directly in listed shares. As a robustness test, in this section, we scale listed shares owned by households by GDP. We collect GDP from the Eurostat database. In Table IA3, we report the results. The results are broadly consistent with the results reported in Table 3 of the manuscript, suggesting that the main results are not driven by changes in the denominator.

Table IA3: The Effect of Domestic Securities Regulation on Listed Shares/GDP

<i>Listed Shares/GDP</i> as dep. variable	Domestic Regulation		Foreign Regulation		Domestic/Foreign
	MAD (1)	MiFID (2)	MAD (3)	MiFID (4)	SecReg (5)
Treatment Effects of Domestic Regulation:					
<i>MAD Domestic</i>	0.024** (2.05)	—	—	—	—
<i>MiFID Domestic</i>	—	0.011 (0.49)	—	—	—
Treatment Effects of Foreign Regulation:					
<i>MAD Foreign</i>	—	—	0.002 (0.48)	—	—
<i>MiFID Foreign</i>	—	—	—	0.012*** (3.04)	—
Treatment Effects of SecReg Variables:					
<i>SecReg Domestic</i>	—	—	—	—	0.021* (1.85)
<i>SecReg Foreign</i>	—	—	—	—	0.006* (1.68)
Control Variables:					
<i>GDP Growth</i>	0.437 (1.15)	0.457 (1.20)	0.462 (1.20)	0.579 (1.46)	0.529 (1.35)
<i>Household Equity Return</i>	0.038 (1.07)	0.038 (1.05)	0.038 (1.05)	0.037 (1.03)	0.037 (1.05)
<i>Momentum</i>	-0.011 (-0.11)	-0.008 (-0.07)	-0.008 (-0.07)	-0.010 (-0.10)	-0.012 (-0.11)
<i>Change in Unemployment</i>	-0.007 (-0.12)	-0.009 (-0.16)	-0.007 (-0.13)	-0.012 (-0.21)	-0.012 (-0.22)
<i>Tax Rate</i>	-0.003* (-1.80)	-0.003* (-1.78)	-0.003* (-1.79)	-0.003* (-1.85)	-0.003* (-1.84)
<i>TPD</i>	-0.010 (-0.55)	-0.013 (-0.67)	-0.011 (-0.62)	-0.011 (-0.59)	-0.014 (-0.74)
<i>PROSP</i>	-0.007 (-0.51)	-0.005 (-0.32)	-0.005 (-0.33)	-0.002 (-0.11)	-0.006 (-0.42)
Fixed Effects:					
<i>Country</i>	Yes	Yes	Yes	Yes	Yes
<i>Year-quarter</i>	Yes	Yes	Yes	Yes	Yes
Observations	1,098	1,098	1,098	1,098	1,098
Adjusted R-squared	0.828	0.828	0.828	0.829	0.828

Notes: This table reports results from our analysis of the effect of *MAD Domestic*, *MiFID Domestic*, and *SecReg Domestic* on *Listed Shares/GDP* using OLS regressions. The sample period is from 2000 to 2013. All variables are defined in Appendix B. All regressions include country and year-quarter fixed effects. T-statistics, reported in parentheses, are based on standard errors clustered at the country-year level. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels (two-tailed), respectively.

Section IA4: Household Stock-Market Participation and *Equity Ownership*

We conduct two descriptive analyses to assess whether our national-accounts-based measure of households' equity ownership shares common features with previously used stock-market participation measures. First, we assess the correlation between *Equity Ownership* and a Eurobarometer-survey-based measure of market participation similar to those used in prior studies (e.g., Guiso et al. 2008). Table IA4 Columns (1) and (2) present *Equity Ownership* and the Eurobarometer survey-based participation measure, respectively, by country for the first quarter of 2005. Consistent with our national-accounts-based measure of equity ownership capturing a somewhat similar construct to the survey-based participation measure, the two have a statistically significant positive Pearson (Spearman) correlation of 0.63 (0.64).

Second, we examine whether *Equity Ownership* exhibits a similar association with trust as in Guiso et al. (2008) using survey-based participation measures. Table IA4 Columns (3) and (4) present the average *Equity Ownership* and the European Values Survey (“EVS”) measure of trust by country from 2008 to 2010 (the period the survey was conducted).²⁴ Consistent with Guiso et al. (2008), we find that our national-accounts-based equity-ownership measure is significantly positively associated with trust—with a Pearson (Spearman) correlation of 0.49 (0.38). Overall, the consistency and strength of the correlations provides some evidence that *Equity Ownership* (although conceptually distinct) captures somewhat similar variation in household investment decisions as do survey-based measures of market participation.

Importantly, the descriptive evidence reported in this section is based on levels of household equity ownership and participation rates, whereas the analysis in the manuscript is based on changes in equity ownership around the Directives. A correlation between levels do not

²⁴ For consistency with Guiso et al. (2008), we use the fraction of survey respondents who answered question V23 of the EVS by saying that “most people can be trusted” to measure trust.

necessarily imply a correlation in changes, and it is therefore not clear that the results in the manuscript imply that stock-market participation increases around the Directives. If we could also examine how the Directives affect stock-market participation, we could draw broader inferences for our EU sample. However, data on stock-market participation are not available frequently enough to perform such an analysis.

Table IA4: Household Stock-Market Participation and *Equity Ownership*

	Equity Ownership & Survey Market Participation		Equity Ownership & Trust	
	<i>Equity Ownership</i> National Accounts (2005 Q1) (1)	<i>Market Participation</i> Eurobarometer Survey (2005 Q1) (2)	<i>Equity Ownership</i> National Accounts (2008-2010) (3)	<i>Trust EVS</i> (Guiso et al. 2008) (2008-2010) (4)
Belgium	0.20	0.18	0.16	0.35
Czech Republic	0.02	0.03	0.02	0.30
Denmark	0.16	0.30	0.14	0.76
Estonia	0.07	0.04	0.04	0.33
Finland	0.34	0.18	0.31	0.65
France	0.22	0.09	0.18	0.27
Germany	0.14	0.10	0.12	0.39
Greece	0.14	0.04	0.10	0.21
Hungary	0.05	0.01	0.06	0.21
Italy	0.07	0.06	0.07	0.31
Latvia	0.00	0.02	0.00	0.26
Lithuania	0.21	0.02	0.11	0.30
Luxembourg	0.08	0.17	0.06	0.31
Malta	0.18	0.11	0.23	0.22
Norway	0.18	—	0.15	0.75
Poland	0.11	0.02	0.11	0.28
Portugal	0.11	0.03	0.12	0.17
Slovakia	0.00	0.03	0.00	0.13
Slovenia	0.23	0.24	0.21	0.24
Spain	0.22	0.05	0.15	0.34
Sweden	0.32	0.40	0.25	0.71
UK	0.17	0.19	0.11	0.40
Pearson Correlation		0.63***		0.49**
Spearman Correlation		0.64***		0.38*

Notes: This table reports results from a comparison of our national-accounts-based measure of *Equity Ownership* and stock-market participation. In Columns (1) and (2), the sample period for the correlation between our *Equity Ownership* measure and the Eurobarometer measure is Q1 of 2005, the period that the Eurobarometer survey was conducted. In Columns (3) and (4), the sample period for the correlation between our *Equity Ownership* measure and *Trust EVS* is 2008-2010, the period the EVS survey was conducted. Hence, we calculate average *Equity Ownership* over this period for each country. All variables are defined in Appendix B. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels (two-tailed), respectively.

Section IA5: Controlling for Liquidity

In the main analysis tabulated in the manuscript, we do not control for liquidity changes. Prior research documents evidence consistent with the EU capital market directives increasing liquidity (Cumming et al. 2011; Christensen et al. 2016). In this section, we report results controlling for the fraction of zero-return trading days defined as the average proportion of zero return trading days to total trading days for a given country and quarter (*Zero Returns*). We use *Zero Returns* rather than other liquidity proxies because the measure is available for more country-quarters than any other commonly used liquidity proxy (Christensen et al. 2016).

Table IA5 reports the results controlling for *Zero Returns* and, for the sample where *Zero Returns* are available, without controlling for *Zero Returns*. The association between *Equity Ownership* and *Zero Returns* is negative (i.e., households are more likely to increase their equity holdings when liquidity is high). More importantly, we find that controlling for liquidity has almost no effect on the estimated treatment effects, which is inconsistent with liquidity being a correlated omitted variable explaining the results reported in the manuscript.

Note that even though we use the liquidity proxy with the highest availability, including *Zero Returns* as a control variable still reduces the sample by approximately 20% relative to the main results reported in the manuscript. Because we find no evidence that the omission of a liquidity control variable biases the estimated treatment effect and including it reduces the sample substantially, we do not include a liquidity control variable in our main analysis reported in the manuscript.

Table IA5: The Effect of Domestic Securities Regulation on *Equity Ownership* Controlling for Liquidity

<i>Equity Ownership</i> as Dependent Variable	Domestic Regulation				Foreign Regulation				Domestic/Foreign	
	MAD	MAD	MiFID	MiFID	MAD	MAD	MiFID	MiFID	SecReg	SecReg
	No. Liq. Cntr.	Liq. Cntr.	No. Liq. Cntr.	Liq. Cntr.	No. Liq. Cntr.	Liq. Cntr.	No. Liq. Cntr.	Liq. Cntr.	No. Liq. Cntr.	Liq. Cntr.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Treatment Effects of Domestic Regulation:										
<i>MAD Domestic</i>	0.020*	0.018*	—	—	—	—	—	—	—	—
	(1.89)	(1.74)								
<i>MiFID Domestic</i>	—	—	0.006	0.008	—	—	—	—	—	—
			(0.80)	(0.99)						
Treatment Effects of Foreign Regulation:										
<i>MAD Foreign</i>	—	—	—	—	0.005**	0.006**	—	—	—	—
					(2.15)	(2.31)				
<i>MiFID Foreign</i>	—	—	—	—	—	—	0.008***	0.009***	—	—
							(6.21)	(6.56)		
Treatment Effects of SecReg Variables:										
<i>SecReg Domestic</i>	—	—	—	—	—	—	—	—	0.015*	0.014*
									(1.90)	(1.86)
<i>SecReg Foreign</i>	—	—	—	—	—	—	—	—	0.005***	0.005***
									(3.30)	(3.48)
Control Variables:										
<i>Zero Returns</i>	—	-0.040**	—	-0.042**	—	-0.045**	—	-0.051***	—	-0.049***
		(-2.34)		(-2.43)		(-2.59)		(-2.91)		(-2.83)
<i>GDP Growth</i>	0.107	0.081	0.121	0.094	0.142	0.115	0.215*	0.192*	0.190*	0.167
	(0.98)	(0.78)	(1.11)	(0.90)	(1.30)	(1.11)	(1.97)	(1.87)	(1.75)	(1.63)
<i>Stock Market Return</i>	0.020***	0.021***	0.020***	0.021***	0.020***	0.021***	0.020**	0.020***	0.020**	0.020***
	(2.68)	(2.91)	(2.66)	(2.89)	(2.66)	(2.90)	(2.57)	(2.82)	(2.58)	(2.84)
<i>Momentum</i>	0.000	-0.002	0.004	0.001	0.004	0.001	0.001	-0.003	-0.000	-0.004
	(0.02)	(-0.09)	(0.17)	(0.03)	(0.18)	(0.03)	(0.06)	(-0.13)	(-0.01)	(-0.18)
<i>Change in Unemployment</i>	-0.025	-0.018	-0.026	-0.020	-0.025	-0.018	-0.030	-0.022	-0.031	-0.023
	(-1.17)	(-0.90)	(-1.19)	(-0.93)	(-1.19)	(-0.89)	(-1.41)	(-1.10)	(-1.45)	(-1.15)
<i>Tax Rate</i>	-0.001***	-0.001***	-0.001***	-0.001***	-0.001***	-0.001***	-0.002***	-0.002***	-0.002***	-0.002***
	(-3.00)	(-3.09)	(-3.03)	(-3.12)	(-3.11)	(-3.21)	(-3.40)	(-3.56)	(-3.28)	(-3.42)
<i>TPD</i>	-0.010	-0.009	-0.012*	-0.011*	-0.011*	-0.010	-0.011*	-0.009	-0.013**	-0.011*
	(-1.62)	(-1.43)	(-1.83)	(-1.73)	(-1.80)	(-1.61)	(-1.74)	(-1.50)	(-2.07)	(-1.87)
<i>PROSP</i>	-0.003	-0.004	0.000	-0.001	-0.000	-0.002	0.002	0.001	-0.002	-0.004
	(-0.51)	(-0.68)	(0.03)	(-0.21)	(-0.04)	(-0.31)	(0.34)	(0.11)	(-0.33)	(-0.58)
Fixed Effects:										
<i>Country</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>Year-quarter</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	878	878	878	878	878	878	878	878	878	878
Adjusted R-squared	0.921	0.923	0.920	0.922	0.921	0.923	0.924	0.927	0.924	0.927

Notes: This table reports results from our analysis of the effect of our securities regulation measures on *Equity Ownership* using OLS regressions. In even (odd) numbered columns we (do not) control for *Zero returns*. The sample period is from 2000 to 2013. *Zero Returns* is defined as the median proportion of zero return days in a quarter by country. All other variables are defined in Appendix B. All regressions include country and year-quarter fixed effects. T-statistics, reported in parentheses, are based on standard errors clustered at the country-year level. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels (two-tailed), respectively.

Section IA6: Adjusting *Equity Ownership* for Changes in Share Prices

To provide further assurance that our results are not attributable to stock price appreciation, we repeat our primary analyses using an equity ownership measure where we directly subtract changes in share price appreciation from listed shares (*Adjusted Equity Ownership*).

To construct our *Adjusted Equity Ownership* measure, we subtract the revaluation amount for a particular country-quarter (i.e. the value adjustment of the household equity holdings at the end of each quarter due to fluctuations in the individual stock prices) from the listed shares in the corresponding country-quarter. We divide this adjusted measure for listed shares by the value of total household liquid assets (excluding the revaluation amount) using data from the ECB's Statistical Data Warehouse and Eurostat.

The estimated treatment effects for this analysis (tabulated below) are consistent with our main analyses.

Table IA6: The Effect of Domestic Securities Regulation on Equity Ownership Adjusted for Changes in Share Prices

<i>Adjusted Equity Ownership</i> as dep. variable	Domestic Regulation		Foreign Regulation		Domestic/Foreign
	MAD (1)	MiFID (2)	MAD (3)	MiFID (4)	SecReg (5)
Treatment Effects of Domestic Regulation:					
<i>MAD Domestic</i>	0.020** (2.56)	—	—	—	—
<i>MiFID Domestic</i>	—	0.007 (0.75)	—	—	—
Treatment Effects of Foreign Regulation:					
<i>MAD Foreign</i>	—	—	0.006** (2.37)	—	—
<i>MiFID Foreign</i>	—	—	—	0.007*** (5.76)	—
Treatment Effects of SecReg Variables:					
<i>SecReg Domestic</i>	—	—	—	—	0.017** (2.53)
<i>SecReg Foreign</i>	—	—	—	—	0.004*** (3.51)
Control Variables:					
<i>GDP Growth</i>	0.084 (0.84)	0.100 (0.98)	0.118 (1.18)	0.171* (1.71)	0.155 (1.56)
<i>Momentum</i>	0.004 (0.17)	0.007 (0.30)	0.008 (0.34)	0.006 (0.26)	0.005 (0.20)
<i>Change in Unemployment</i>	-0.052** (-2.47)	-0.054** (-2.54)	-0.053** (-2.53)	-0.055*** (-2.61)	-0.057*** (-2.68)
<i>Tax Rate</i>	-0.001** (-2.04)	-0.001** (-1.97)	-0.001** (-2.00)	-0.001** (-2.17)	-0.001** (-2.18)
<i>TPD</i>	0.002 (0.22)	-0.000 (-0.06)	0.000 (0.04)	0.001 (0.15)	-0.001 (-0.18)
<i>PROSP</i>	-0.003 (-0.35)	-0.000 (-0.04)	-0.001 (-0.07)	0.002 (0.23)	-0.001 (-0.18)
Fixed Effects:					
<i>Country</i>	Yes	Yes	Yes	Yes	Yes
<i>Year-quarter</i>	Yes	Yes	Yes	Yes	Yes
Observations	1,091	1,091	1,091	1,091	1,091
Adjusted R-squared	0.894	0.893	0.894	0.896	0.896

Notes: This table reports results from our analysis of the effect of *MAD Domestic*, *MiFID Domestic*, and *SecReg Domestic* on $[Listed\ Shares-Adjustment]/[Liquid\ Assets-Adjustment]$ using OLS regressions. *Adjustment* is defined as the value adjustment of the household equity holdings at the end of each quarter due to fluctuations in the individual stock prices. The sample period is from 2000 to 2013. All other variables are defined in Appendix B. T-statistics, reported in parentheses, are based on standard errors clustered at the country-year level. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels (two-tailed), respectively.