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This paper examines the effects on equity home bias of two mechanisms adopted by Euronext when it was formed by the merger of four European countries' stock exchanges in 2002. The two structural mechanisms are the integration of trading platforms across the four predecessor exchanges and the creation of named segments of the integrated exchange on which firms could voluntarily list by precommitting to enhanced disclosure and transparency. Employing a difference-in-differences research design using other European Union companies as a control group, we document that the integration of the Euronext market was associated with a reduction in home bias for firms listed on the named segments of the Euronext exchange, but not for the nonsegment Euronext firms. Our results suggest that the reduction in transaction costs from the integration of the trading platforms did not make the nonsegment Euronext firms more attractive to the specific investors for whom the transaction costs were reduced. On the other hand, the decrease in information costs due to the precommitments to enhanced transparency made the segment firms more attractive to all categories of foreign investors, consistent with the information costs hypothesis.

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1. Introduction

Global financial markets are consolidating across national borders, with mergers involving U.S. and European exchanges such as the merger between the New York Stock Exchange (NYSE) and Euronext, the London Stock Exchange and the Milan Stock Exchange, and NASDAQ and Sweden's OMX. One of the goals of global stock exchange mergers is to create a consolidated trading platform that makes listed firms more available to an expanded investor clientele, thus providing larger pools of liquidity.[1] Given

that the integration of global capital markets has the potential to reduce cross-border investment barriers, it provides a setting to examine the different explanations of the home bias phenomenon.

In this paper, we study the effects on equity home bias of two mechanisms adopted by Euronext when it was formed by the merger of four European countries' stock exchanges in 2002. Home bias refers to the phenomenon that investors everywhere tend to overinvest in domestic securities and underinvest in foreign securities relative to optimal global portfolio diversification, and has been observed in many contexts and time periods.[2] Although there are many explanations of home bias, two of the most likely are the costs of accessing trading opportunities and unfamiliarity with the mechanics of transacting in foreign firms (transaction costs hypothesis), and lack of familiarity with and the costs of accessing and interpreting information about foreign firms (information costs

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[1] See Federal Reserve Bank of New York (2002) for discussion of the goals and benefits of stock exchange consolidation in Europe, particularly liquidity and reduced fragmentation. Cross-border stock exchange mergers may or may not result in an integrated trading platform. It is the integration of trading platforms that makes securities more available to investors from the domiciles of all of the merged exchanges. The integration of trading platforms is desirable to maximize liquidity, and was achieved shortly after the formation of Euronext, but has not been achieved for other cross-border mergers, such as that between the NYSE and Euronext. One disadvantage of more integration following cross-border stock exchange mergers would be a few monolithic stock exchanges' entrenchment in monopoly positions.

[2] See French and Poterba (1991), Kang and Stulz (1997), Ahearne et al. (2004), Bradshaw et al. (2004), Covrig et al. (2007), Yu (2010), and Leuz et al. (2010), among others.

hypothesis). The two structural mechanisms to mitigate home bias we investigate in this paper are the integration of trading platforms across the four predecessor exchanges and the creation of named segments of the integrated exchange on which firms could voluntarily list by precommitting to enhanced disclosure and transparency. Whereas the integration of the trading platforms reduced trading, clearing, and settlement costs in particular for foreign investors, the segment creation provided a mechanism by which firms could precommit to enhanced transparency. Having both features in one setting allows us to distinguish the relative strength of the two main hypotheses in explaining the home bias puzzle, a distinction that the existing research has not been able to achieve.

The transaction costs hypothesis attributes home bias to the existence of market frictions, which make it costly for investors to buy and sell foreign stocks. Transaction costs in general include trading commissions and implicit impact costs due to liquidity. Although prior research suggests that transaction costs are of secondary importance in explaining equity home bias, we argue that the Euronext merger provides a more compelling setting to identify the effects of transaction costs. The merger of the four stock exchanges and the subsequent integration of the trading platforms made firms from each country readily available to investors from all four countries through a single marketplace. As suggested in Euronext's 2002 annual report, the integration of trading platforms provided market participants with the benefit of a market that is much wider, more liquid, and more efficient, and with lower transaction costs. Of particular relevance for our research questions, the reduction in transaction costs as a result of the Euronext merger is likely more prominent for foreign investors relative to domestic investors. According to a European Commission document quoted in *The Economist* (2006), *cross-border* trading commissions in Europe were very high: buying and selling shares in another European Union (EU) country could cost up to six times more than dealing at home. A large part of these costs was due to the fragmentation of trading, clearing, and settlement services that still persisted in Western Europe even after the adoption of a common currency in 1999 (Licht 1998). The integration of trading platforms, clearing services, and settlement houses as a result of the Euronext merger was likely to greatly reduce transaction costs in particular for foreign investors. If transaction costs explain home bias, we predict that the reduction in transaction costs due to the integrated trading platform will be associated with reduced home bias for firms traded on Euronext after the merger. The attenuation of home bias should be particularly reflected in increased foreign relative to domestic ownership for companies

traded on Euronext by foreign investors from the other countries with stock exchanges involved in the merger (the Netherlands, Belgium, Portugal, and France).

On the other hand, the information costs hypothesis predicts that the reduction in home bias for firms traded on Euronext after the merger is a function of the information quality of these firms and the degree of uncertainty of foreign investors about the information quality. Although Euronext made a first step toward the integration of de jure reporting, disclosure, and trading regulation, the common and jurisdiction-specific regulations were enforced by each country individually, creating potential unevenness in the de facto regulation. Therefore, to achieve more consistent regulation of at least some firms from the markets in each country, Euronext established two named segments of the integrated stock market on which firms could choose to list by precommitting themselves to enhanced financial reporting quality and corporate governance. This mechanism of voluntary precommitment to transparency, if credible to investors, is a solution to the problem of regulating integrated global capital markets (Grundfest 1990, Leuz 2010, Federal Reserve Bank of New York 2002). The two named segments were NextEconomy (for firms from high-tech industries) and NextPrime (for firms from more traditional sectors). Pownall et al. (2013) present evidence that listing on the named segments provided firms with a bonding alternative to cross-listing on other U.S. and European exchanges. Segment firms increased their disclosure and financial reporting quality relative to their practices prior to joining the named segments and relative to firms that did not choose to join the segments. Pownall et al. (2013) also find that segment firms had increased trading liquidity relative to their experience prior to joining the segments and also relative to nonsegment Euronext-listed firms. These empirical regularities suggest reduced costs of accessing, processing, and interpreting information about the segment firms' financial position and performance, which should be more beneficial for foreign investors because they are usually at an information disadvantage compared to domestic investors. Therefore, if information costs are a credible explanation for home bias, we will observe reduced home bias for the segment firms, driven by increases in foreign ownership by investors from all over the world as opposed to only foreign investors from the four countries with national exchanges involved in the Euronext merger.

Using a database that reports firm-level holdings of mutual funds from around the world, we conduct empirical tests on a sample of 9,035 firm-year observations (2,214 unique firms) from 16 EU countries during the period 2000–2004. This period begins after

the introduction of the euro in 1999 and ends before the EU mandatory International Financial Reporting Standards (IFRS) adoption in 2005, thus avoiding potentially confounding events that would make interpretation of our results ambiguous.[3] We compare changes in foreign and domestic mutual fund ownership of Euronext-traded firms with concurrent changes in foreign and domestic ownership of other EU companies to isolate the effects of the integration of the Euronext market from the effects of other developments in the EU financial and political regime taking place concurrently. For these comparisons we use a sample of publicly traded EU firms with data available from Worldscope and Datastream as a control group.

Briefly, we find that the integration of the Euronext market is associated with a reduction in home bias for firms listed on the named segments of the Euronext exchange, but not for the nonsegment Euronext firms. We interpret this as suggesting that the reduction in trading costs from the integration of trading platforms did not make the nonsegment Euronext firms more attractive to the specific investors for whom the transaction costs were reduced. Although there is no diminution of home bias for nonsegment firms, we document significant increases in all categories of foreign holdings relative to domestic holdings for Euronext segment firms. We interpret this as suggesting that the decrease in information costs due to the precommitment to enhanced transparency made the segment firms more attractive to all categories of foreign investors.[4]

One major concern in our analysis is that the investment decisions of foreign mutual funds might not be independent of firms' decisions to list on a named segment and that our results might be influenced by selection bias. Although it is difficult to identify a valid instrument to address the selection bias in our context, we believe that the exogenous variation created by the quasi-experimental setting of the Euronext merger, combined with our difference-in-differences research design, provides a solution to the self-selection problem.[5] To increase the confidence in the difference-in-difference estimators, we follow the

suggestion in Roberts and Whited (2012) to employ matching as a robustness check. Our empirical results on segment firms are robust after employing propensity score matching to select a sample of non-Euronext firms and a sample of nonsegment Euronext firms using firm characteristics that the literature suggests are associated with attractiveness to foreign investors, as well as industry and country-of-origin dummies. In addition, we explore various alternative ways of addressing the self-selection issue, and our results are robust to controlling for free-float and firm fixed effects, to using different proxies for home bias, and to conducting a change analysis (Larcker and Rusticus 2010). Thus, although we cannot completely rule out the potential effects of self-selection on our findings, we feel that the overall consistency of the results increases our confidence in these findings.

Our paper makes the following contributions. First, our paper sheds more light on the home bias puzzle by exploiting the unique empirical setting of the integration of the Euronext market. As mentioned earlier, the two structural mechanisms adopted by Euronext, the integration of the trading platforms and the creation of the named segments, permit us to distinguish the relative strength of the transaction costs hypothesis and the information costs hypothesis in explaining the home bias puzzle. Furthermore, the difference-in-differences design allows us to control for behavioral biases posited in prior literature as an alternative explanation for home bias (see Beneish and Yohn 2008). Collectively, our empirical evidence suggests that the reduction in home bias for Euronext-listed firms after the integration is more consistent with the information costs hypothesis.

Second, our study is the first to examine the "real" investment consequences of the integration of global capital markets. These results are important in light of the ongoing consolidation of global stock exchanges. Integrating the trading platforms of stock exchanges from different countries has the potential to create ever larger pools of liquidity, especially in the presence of a mechanism such as the Euronext-named segments that allows firms to commit to more transparency and higher reporting standards than those effectively imposed by their home countries. The enhanced disclosure and transparency supported by the segmentation mechanism also have the potential to reduce home bias and allow foreign investors to garner more of the benefits of international diversification.

Third, our research provides evidence that the benefits of "bonding" by voluntarily submitting to a more rigorous disclosure and monitoring regime extend to contexts other than cross-listing in the United States as called for in Karolyi (2012, pp. 541–542). The bonding hypothesis has been tested extensively for cases

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[3] This time period also ends prior to the effective date for the requirement for the segment firms to adopt IFRS under their commitment agreements.

[4] Although our results are consistent with the information costs hypothesis generally, we are unable to completely disentangle the specific sources of transparency, that is, whether it is due to a decrease in information processing costs, uncertainty about future cash flows, or uncertainty about the quality of financial reporting (see Beneish and Yohn 2008).

[5] See Larcker and Rusticus (2010) and Roberts and Whited (2012) for detailed discussion on how to address the endogeneity/self-selection issues.

in which non-U.S. firms become listed in the United States to subject themselves to U.S. securities regulation and the Securities and Exchange Commission, to protect domestic minority shareholders against the possibility of being expropriated by powerful insiders. We show that Euronext segment firms voluntarily subjecting themselves to the enhanced transparency, disclosure, and monitoring became more attractive investments to foreign mutual funds. Our empirical evidence complements Miller (1999) in showing that firms can "bond" to enhanced disclosure, transparency, and monitoring without incurring the substantial costs of a U.S. official stock exchange listing (Level II and III American Depositary Receipt programs), which establishes the generalizability of the bonding hypothesis. Participants in Euronext (securities and exchange officials, firms, and investors) have different incentives and characteristics than U.S. capital market participants and non-U.S. cross-listed firms. Therefore, bonding is not a U.S.-specific concept, but extends to other securities markets and firms.

2. Euronext Background, Literature Review, and Hypotheses Development

2.1. Euronext Background[6]
The Euronext equity market, Europe's second largest, was formed between 2000 and 2002 by the merger, demutualization, and initial public offering of the exchanges in Amsterdam, Brussels, Paris, and Lisbon. All Euronext equities listed in the four countries are traded through the Nouveau Système de Cotation, settled by Euroclear, and cleared by Clearnet, which allows all Euronext members, regardless of their location, to access all securities listed on Euronext. The centralized, order-driven trading system, along with the central clearing and settlement systems, settles transactions on a net basis to guarantee performance (Poser 2001).

Euronext and regulators in the individual jurisdictions have harmonized their rules and regulations over the years to produce two Euronext Rulebooks: Rulebook I contains harmonized rules that are contractual agreements among the market participants of Euronext, and the four versions of Rulebook II contain the remaining rules of the individual markets that have not been harmonized. The coverage of Rulebook I has gradually increased from harmonized membership, trading, and enforcement rules in the early periods to a common set of listing qualifications and disclosure requirements governing listed companies in later periods. Today, a Euronext-listed company complies with the unified listing requirements as specified in Rulebook I, and after admission, with the ongoing financial reporting requirements of its home member state.

Euronext created two market segments—NextEconomy and NextPrime—for two reasons: (1) to meet the needs of investors seeking greater transparency and liquidity and (2) to allow companies to increase their visibility and appeal by precommitting to enhanced governance, disclosure, and financial reporting quality. NextEconomy and NextPrime did not replace any existing regulated market, but were in addition to being listed on one of the four national Euronext exchanges. Euronext-listed companies joined the segments voluntarily by signing commitment agreements to comply with a series of enhanced and standardized financial reporting, investor relations, and corporate governance practices.[7] Once firms signed the commitment agreements, Euronext featured the segment firms on a specific section of the exchange's website including detailed corporate and financial information, initiated advertising campaigns and road shows, and included coverage of the segment firms in investor guidebooks.

As of December 31, 2001, NextPrime listed 107 companies and NextEconomy listed 93 companies, with market capitalization of €65.18 billion (Euronext N.V. 2001). Over the years the segments existed (2002 through 2007), Euronext dropped firms from the segments for cause and added more firms at their petition.[8] Given Euronext's goal of capturing liquidity in EU firms' shares, it is not surprising that few firms were actually dropped for cause.

Although there is surprisingly little research investigating cross-border stock exchange mergers, this

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[6] Much of the descriptive material in §2.1 was gathered from the Euronext N.V. annual reports of 2001 through 2008. For additional description of the Euronext market and its two segments, see Euronext Product Information on the NYSE Euronext website at http://www.euronext.com/editorial/wide/editorial-2667-EN.html?selectedMep=2&idInstrument=15427&isinCode=NL0000251304 (accessed October 2009). See also Pownall et al. (2013).

[7] The commitment agreements' main requirements were to (1) publish quarterly financial reports beginning in 2004, (2) adopt international accounting standards beginning in 2004, (3) publish financial documents in English beginning in 2002, (4) schedule meetings for analysts, (5) describe corporate governance policy in the annual report, (6) schedule regular publications and meetings, and (7) publish key financial data on their websites.

[8] See archived weekly notices of removals and additions on the NYSE Euronext website (http://www.euronext.com). On October 23, 2007, Euronext announced the discontinuation of the NextEconomy and NextPrime segments. The reason given for the elimination of the segments was that the EU Transparency Directive's requirements for enhanced transparency and disclosure for all publicly traded firms in the EU duplicated most of the requirements of the commitment agreements. See Christensen et al. (2011) for a description of the Transparency Directive and the cross-country variation in its effects. Our sample period ends in 2004, and thus the Transparency Directive does not have an impact on our results.

topic has received more recent research attention in the context of the Euronext merger. Nielsson (2009) examines changes in liquidity following the Euronext merger and finds that liquidity benefits are not evenly distributed across firms, but are instead limited to large firms and firms that operate internationally. In contrast, Pownall et al. (2013) offer a new approach by considering differences in the presentation and transparency of financial information and in regulatory environments. They document an increase in liquidity related to improved disclosure and accounting quality only for segment firms after the formation of Euronext. Our paper extends and complements the empirical evidence of Pownall et al. (2013). Collectively, these two papers provide novel empirical evidence on the economic consequences of global stock exchange mergers and have important implications for global capital market regulation.

2.2. Home Bias—Literature Review and Hypotheses Development

According to the precepts of finance theory, the optimal proportion of domestic assets in an average investor's portfolio should be approximately equal to the share of the domestic market in global market capitalization. For example, in 2009 a U.S. investor should have invested 31.6% of her money in U.S. stocks, because the U.S. equity market during that year represented 31.6% of the world equity market capitalization.[9] In reality, domestic assets make up a disproportionately large share of the average investor's asset holdings: records from Bank of New York Mellon show that U.S. equities accounted for 81.1% of U.S. investors' equity portfolio in 2009. This lack of international portfolio diversification is commonly referred to as equity home bias. Despite extensive research over the past few decades, it continues to puzzle economists and finance researchers (Amadi 2004).

One of the main and earliest hypotheses attempting to explain home bias is the transaction costs hypothesis. This hypothesis attributes home bias to the existence of market frictions, which make it costly for investors to acquire foreign assets. Several papers document empirical results in support of this hypothesis. Martin and Rey (2004) develop a model in which

the demand for foreign assets changes with transaction costs in a nonlinear fashion, and they conclude that it is possible for a small increase in transaction costs to cause a larger increase in home bias. Balli et al. (2010) find that following the introduction of the euro in 1999, investors in the eurozone replaced home bias with Eurobias or overweighting of euro-denominated assets, partly because of the elimination of exchange rate risk.

On the other hand, a number of papers cast doubt on the validity of transaction costs in explaining home bias. Lewis (1999) suggests that an implicit assumption of this hypothesis is that investment costs are larger than the possible diversification benefits, and estimates that in the case of international diversification, investors stand to gain between 20% and 100% of their lifetime consumption depending on their level of risk aversion. Consequently, the costs needed to divert investors from international diversification seem prohibitively high. More importantly, many authors suggest that some of the market frictions cited by the transaction costs hypothesis such as restriction of foreign exchange transactions and withholding taxes have been reduced over time (French and Poterba 1991, Cooper and Kaplanis 1994).

We believe that the formation of the Euronext exchange provides a powerful setting to investigate the effects of transaction costs on home bias due to the considerable fragmentation of the exchanges, clearing services, and settlement houses in Europe at the time of the Euronext merger. In the period before the Euronext merger, the United States had three national and five regional exchanges, whereas 35 stock exchanges operated in Western Europe to service roughly the same population and territory (Licht 1998). The effect of this fragmentation was twofold. First, it prevented European exchanges from taking advantage of the economies of scale in trade processing, which they could have realized if they were sufficiently large (Malkamäki 1999). Both local and foreign investors suffered from the overpricing of trading services and the lack of investment in better information technology infrastructure. Second, the fragmentation of exchanges made cross-border trading more costly within the EU. Investment banks and brokers involved in cross-border transactions had to incur significant costs to access and maintain connections with a variety of trading systems (McAndrews and Stefanadis 2002). As mentioned in the introduction, a European Commission document quoted in *The Economist* (2006) reports that cross-border trading commissions in Europe were very high compared to trading in domestic securities. Thus, the creation of a single trading platform had the potential to bring significant reduction in trading costs for investors overall, with foreign investors standing to benefit more.

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[9] See World Federation of Exchanges (2009). We focus on equity home bias although equity investments are only part of a typical investor's portfolio. Other investment types like debt instruments, real estate, human capital, etc., may be distributed differently than equity investments. Likewise, U.S. investors may take equity stakes in multinational corporations and therefore indirectly in those multinationals' foreign subsidiaries. However, the gap between predicted and actual investments in U.S. equity security portfolios is too large to be explained by varying investments across asset classes or indirect investments through multinational companies' equities.

At the time of the Euronext merger, a similar issue existed with both settlement procedures and clearing houses across Europe. McAndrews and Stefanadis (2002) document that during the early 2000s the costs of clearing and settlement for domestic transactions in Europe were about nine times higher than those in the United States, whereas the costs for cross-border transactions were 46 times higher. Schmiedel and Schönenberger (2005) suggest that the Euronext merger was a main driving force behind the reduction in the fragmentation of settlement and clearing services in the period 1999–2004. The reduction started with three French clearing houses merging in Clearnet SA in 1999, and continued with Clearnet taking over the activities of clearing houses in Belgium and the Netherlands in 2001 and those of Portugal in 2004.[10] Although reducing settlement and clearing costs is good for all investors, it was especially beneficial for foreign investors, who no longer had to invest in compatibility with multiple systems and were able to net transactions across different Euronext markets.[11]

Given the potential of foreign investors to benefit more from the Euronext merger in terms of reduced trading, clearing, and settlement costs, we hypothesize that if the transaction costs hypothesis explains home bias, there will be a reduction in home bias following the creation of an integrated trading platform. We also hypothesize that such attenuation of home bias should be particularly reflected in increased foreign ownership for companies traded on Euronext by foreign investors from the other countries with stock exchanges involved in the merger. Therefore, we formulate the following hypotheses (stated in alternative form):

HYPOTHESIS 1 (H1). *Foreign ownership increased relative to domestic ownership for Euronext-listed companies at the time of the Euronext merger, compared with other EU companies.*

HYPOTHESIS 2A (H2A). *The increase in foreign ownership relative to domestic ownership for Euronext-listed companies at the time of the Euronext merger is greater for foreign investors from the other countries with stock exchanges involved in the merger relative to other foreign investors.*

The information costs hypothesis provides one of the main alternative explanations of home bias. According to this hypothesis, investors refrain from investing in foreign stocks because they are at an information disadvantage compared with domestic investors. As suggested by Beneish and Yohn (2008), there are three main sources of information disadvantage for foreign investors—information processing costs, uncertainty about future cash flows, and uncertainty about the quality of financial reporting. We believe that the uncertainty about the quality of financial reporting will be particularly onerous for foreign investors who are unfamiliar with other jurisdictions' financial reporting practices and quality, and securities regulation customs.

A number of papers demonstrate the importance of financial reporting quality on home bias. Ahearne et al. (2004) find that countries in which a larger percentage of firms cross-listed on U.S. stock exchanges and complied with the stricter disclosure and reporting requirements are more heavily weighted in U.S. investors' portfolios than countries in which fewer firms did so. Bradshaw et al. (2004) document that U.S. institutional investors invest more, and therefore are less biased against firms whose accounting choices are closer to U.S. Generally Accepted Accounting Principles (GAAP).[12]

Despite the overall evidence in support of the information costs hypothesis, the extent to which it can explain home bias is not completely clear. Some authors argue that asymmetric information cannot explain the home bias phenomenon. For instance, Jeske (2001) suggests that informed investors (such as local investors) may invest less in a firm if they receive a low signal of future valuation, whereas uninformed investors (such as foreign investors) may not reduce their holdings if they are unaware of the signal, leading to overinvestment by foreign investors

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[10] A similar consolidation process took place with settlement houses and led to a substantial decrease in settlement costs for foreign investors trading in stocks on the four Euronext markets. For example, the merger in 2002 between Euronext's settlement house Euroclear and French settlement house Sivacom led to a decrease in costs for foreign investors trading in French shares. These investors could start settling their trades with Euroclear Brussels rather than having to go through a local French agent. Euroclear estimated at the time of the merger that this would cost 0.55 euros per transaction (similar to domestic trades) compared with prior costs of 5 to 20 euros per transaction with a local agent (*Reuters News* 2002).

[11] We also examine the liquidity outcomes that reflect the underlying transaction costs to provide additional support for the transaction costs argument. Specifically, we conducted a regression of the *percentage of zero return days* variable on an indicator variable for Euronext-listed firms, *Post*, and the interaction term of the two indicators, along with other control variables. The results (untabulated) support the argument that relative to other EU firms, the liquidity of Euronext-listed companies increased after the merger. However, it is possible that transaction costs and liquidity might capture different aspects of security trading.

[12] There is also a growing research stream on foreign investment decisions following voluntary and mandatory adoption of IFRS. Covrig et al. (2007) find that mutual fund investment in voluntary IFRS adopters is 45% higher than that in nonadopting firms, and that it increases by 35% in the year following IFRS adoption. Several papers also document that cross-border investment increased significantly following mandatory IFRS adoption in the EU (for mutual fund investment, see Yu 2010, DeFond et al. 2011; for institutional investment, see Florou and Pope 2012).

and underinvestment by local investors. Beneish and Yohn (2008) argue that the IFRS adoption might not have a substantial effect on home bias, because the adoption of IFRS is unlikely to be accompanied by substantial institutional changes in the adopting countries. Although investors no longer have a problem understanding the information in the financial statements, they remain uncertain about the quality of information they receive from foreign firms. Consistent with this argument, Beneish et al. (2010) find no evidence of reduction in home bias after mandatory IFRS adoption. Beneish and Yohn (2008) also attribute the lack of effects on home bias from IFRS adoption to other factors such as behavioral biases.

We believe that the Euronext setting is suitable for testing the effects of information costs on home bias. Although regulatory differences persisted across the four markets,[13] Euronext established the named segments to achieve more consistent regulation of at least some firms from the markets in each country, and to provide a mechanism by which firms could precommit to enhanced financial reporting quality and transparency. Pownall et al. (2013) document increases in accounting quality and liquidity for the segment firms relative to the nonsegment firms. In light of this evidence, we reason that the increases in accounting quality should be more beneficial for foreign investors relative to domestic investors. Foreign investors not only have better access to segment firms' financial information, they also experience lower uncertainty about the quality of the financial information if the segment firms' ability to precommit to enhanced transparency was credible. Therefore, we should observe reduced home bias for segment firms compared with nonsegment firms. However, the effective operations of the two named segments depend on the ability of Euronext to establish enforcement mechanisms at the segment level. If the creation of the two named segments is unable to deal with the ongoing national institutional differences, there will be no reduction in home bias for segment firms relative to nonsegment firms. To test the information costs hypothesis in the Euronext context,

we compare changes in domestic and foreign ownership of Euronext-listed segment companies with similar ownership changes of other Euronext-listed firms (i.e., nonsegment firms). We formulate the following hypothesis (stated in alternative form):

HYPOTHESIS 2B (H2B). *Foreign ownership increased relative to domestic ownership for segment-listed companies at the time of the merger that created Euronext, compared with other Euronext-listed companies and with other EU companies.*

3. Data, Empirical Design, and Results

3.1. Data

Our ownership data come from the Thomson ONE Ownership Module, which covers 53,000 stocks in more than 70 countries. The data include ownership levels and percentages by year according to investor types and subtypes as well as individual owners. They are reported to Thomson by investors who own shares over the minimum regulatory threshold of their domestic countries. A discussion with Thomson representatives indicated two possible shortcomings of the database. First, the information is self-reported by investors, and thus certain inaccuracies exist because investors misreport. Second, it is collected at different points in time during the year, so shares that change hands could be double counted if reported first by the seller and later on by the buyer. We conduct our empirical analyses using mutual fund ownership for the following two reasons. First, mutual funds are required in the United States and in Europe to report their holdings, and thus mutual fund ownership data are less likely subject to these shortcomings than the data provided by other types of investors. Second, mutual fund investors are more sophisticated and less likely to be subject to home bias than other investors. The focus on the mutual fund ownership data is also consistent with prior literature (see, e.g., DeFond et al. 2011, Yu 2010).[14] The ownership module covers more than 34,000 global mutual funds.[15]

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[13] Jackson and Roe (2009) show that as late as 2005 the four Euronext markets varied substantially in their regulatory effort, which the authors measure as human and financial resources dedicated to national financial market regulators. Based on this criterion, in 2005 Amsterdam ranked highest in terms of regulatory effort. Its financial market regulator employed 23 people per million of the Netherland's population and had a budget of $131,285 per billion dollars of Netherland's gross domestic product (GDP). Paris had the lowest number of people employed by its market regulator, six per million of France's population, and Brussels granted the lowest budget to its market regulator, $27,275 per billion dollars of Belgium's GDP.

[14] A recent paper by Bruggemann et al. (2012) shows that IFRS adoption increases cross-border equity investments of individual investors.

[15] Hedge funds may be more affected by transaction costs because they are more likely to use complex trading strategies across national borders. Thus it would be interesting to investigate hedge fund ownership as an additional test. Thomson ONE's hedge fund ownership data are limited and not comprehensive. For example, we checked the hedge fund ownership data for firms listed on the four exchanges of Euronext. The number of observations of hedge fund data is only 1%–2% of that of mutual fund data, and the data only reflect hedge funds from Denmark, Finland, Germany, Italy, Spain, Sweden, Switzerland, the United Kingdom, and the United States. See Thomson Financial (2003) for more details on the database.

Table 1   Sample Selection and Composition

Panel A: Sample selection procedure		
	Firm-year	Firm
All EU firms with nonmissing ownership data	16,093	3,999
Euronext	3,258	747
Other EU	12,835	3,252
Less total ownership > 100%	16,075	3,992
Less zero domestic ownership	14,286	3,663
Merge with Worldscope data	13,126	3,483
After requiring nonmissing control variables	11,091	3,123
After truncating control variables at 0.5% and 99.5%	10,711	3,080
After requiring balanced sample	9,374	2,279
After removing U.S. cross-listed firms	9,035	2,214
After PSM matching—Euronext segment and nonsegment	1,124	380
After PSM matching—Euronext segment and other EU	1,484	737

Panel B: Final sample distribution—Euronext/non-Euronext; segment/nonsegment				
	Firm-years	% of total	Firm	% of total
Balanced sample including:	9,035		2,214	
Euronext				
Segment				
Amsterdam	125	1.38	29	1.31
Brussels	157	1.74	34	1.54
Lisbon	32	0.35	7	0.32
Paris	439	4.86	97	4.38
Nonsegment				
Amsterdam	183	2.03	42	1.90
Brussels	129	1.43	29	1.31
Lisbon	105	1.16	26	1.17
Paris	1,137	12.58	266	12.01
Non-Euronext				
Budapest	36	0.40	8	0.36
Copenhagen	4	0.04	2	0.09
Dublin	33	0.37	11	0.50
Frankfurt	1,512	16.73	383	17.30
Helsinki	292	3.23	79	3.57
London	3,012	33.34	753	34.01
Luxembourg	3	0.03	1	0.05
Madrid	458	5.07	98	4.43
Milan	617	6.83	147	6.64
Stockholm	539	5.97	147	6.64
Vienna	92	1.02	24	1.08
Warsaw	130	1.44	31	1.40

Notes. This table includes the sample selection procedures and detailed composition of the sample used in the paper. Panel A describes the formation of the sample. Panel B shows the breakdown of firm-years and firms included in the final sample by exchanges participating in the Euronext merger and exchanges that did not participate in the merger, and by segment/nonsegment for the Euronext exchanges. It also shows what percentage of the total sample each of the groups represents.

Panel A of Table 1 describes our sample selection. We start with an initial sample of 3,999 firms (16,093 firm-years) from the EU with nonmissing mutual fund ownership data for the period 2000–2004. We choose a short sample period immediately surrounding the Euronext merger to mitigate concerns that other events, in particular the mandatory IFRS adoption in the EU, trigger changes in mutual fund ownership that are consistent with a reduction in home bias. Our sample period starts after the introduction of the euro (1999), and ends before the mandatory IFRS adoption in the EU (2005).[16] Of the initial sample firms, 747 are from the four Euronext countries (and the majority of those are from France), and 3,252 are from the rest of the EU. We require that total ownership not exceed 100%, resulting in the

[16] We thank the associate editor and the reviewers for this suggestion. In addition to using a short sample period, we also include a control variable *IFRS_USGAAP* to mitigate the concern that our results are a manifestation of the IFRS effect. Extending the analyses to the period 1997–2009 supports the same inferences as those reported in the paper.

loss of seven firms and 18 firm-years.[17] We exclude 329 firms (1,789 firm-years) due to zero domestic mutual fund ownership, 180 firms (1,160 firm-years) due to missing Worldscope data, and 360 firms (2,035 firm-years) due to missing control variables. Furthermore, we lose 43 firms (380 firm-years) when we exclude the top and bottom half percent of each continuous control variable distribution. Finally, we require a balanced sample with firms appearing both prior and subsequent to the formation of Euronext, which excludes 801 firms (1,337 firm-years). We further remove 65 firms (339 firm-years) cross-listed in the United States, leaving a sample of 2,214 firms with 9,035 firm-years.[18]

Panel B of Table 1 disaggregates the primary sample into Euronext firms and other EU firms. Approximately one-quarter of the sample are firms from the four Euronext countries, including 167 (363) segment (nonsegment) firms. The majority of both segment and nonsegment firms are from France (97 segment firms and 266 nonsegment firms). In contrast, Portugal contributes only 7 segment and 26 nonsegment firms. The other EU firms come from 12 countries, with the majority (753 firms) coming from the United Kingdom. The second largest concentration of other EU firms is from Germany (383 firms), and only two (one) firms come from Denmark (Luxembourg).

Table 2 presents summary statistics for the mutual fund ownership data, broken down in panel A by Euronext versus other EU firms and by premerger versus postmerger time periods. Our discussion below focuses on the comparison between premerger and postmerger periods for the two groups of firms.[19] For both Euronext and other EU firms, there is a statistically significant increase in mutual

fund holdings over the sample period (*MF_total*). For the Euronext firms, most mutual fund ownership categories increase by a statistically significant amount from the premerger to the postmerger period. The categories that show no significant changes are domestic ownership, total foreign ownership scaled by domestic ownership, and Euronext foreign ownership scaled by domestic ownership. For the other EU firms, although the undeflated values of all ownership categories increase significantly at the mean and median, when these values are deflated by domestic ownership, only ownership from EU mutual funds increases significantly at the median. These observations, especially those for foreign ownership categories standardized by domestic ownership to control for secular trends in mutual fund percentage ownership, indicate some decrease in home bias for Euronext firms compared with other EU firms from the premerger to the postmerger period.

Panel B presents the same statistics broken down by segment versus nonsegment firms and pre- versus postmerger time periods. Looking at foreign relative to domestic mutual fund ownership variables, whereas all other categories of foreign ownership increase significantly (at the mean and/or median) from premerger to postmerger for the segment firms, only UK ownership increases significantly at the mean for nonsegment firms.

3.2. Empirical Design
Our basic empirical design uses a difference-in-differences approach to control for contemporaneous financial and political factors and events that are common within each country or across the EU. Specifically, we split the time period into premerger and postmerger periods to use each firm as its own control, with a focus on the differences from before to after the merger in foreign relative to domestic mutual

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[17] Despite the shortcomings of the Thomson ONE ownership data, we use them as a proxy for true ownership with the assumption that there is no bias between the segment firms and the nonsegment firms and between Euronext-listed firms and non-Euronext-listed firms that would shift the percentage of foreign relative to domestic ownership. Furthermore, assuming that errors and omissions in ownership data occur randomly between foreign owners and domestic owners or are stable over time, we control for changes in domestic ownership when evaluating changes in foreign ownership.

[18] We eliminated U.S. cross-listed firms from the sample because segment firms are unlikely to commit to increased disclosure incremental to their U.S. cross-listing. Similarly, although we would like to control for market capitalization of all the foreign exchanges because listing on large foreign exchanges entails greater disclosure requirements, we are not able to do so due to data limitations. To mitigate this concern, we repeat our analyses by including those firms listed only on the domestic exchange (requiring that the number of foreign stock exchanges variable be equal to zero), and we continue to find results similar to those in Tables 4 and 5.

[19] An important aspect of Table 2 is a comparison of the premerger and postmerger differences between the two groups of firms. This

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is equivalent to running the regressions *Ownership Measures* = $\alpha + \beta_1 Post + \beta_2 Euronext + \beta_3 Post * Euronext$ for panel A, and *Ownership Measures* = $\alpha + \beta_1 Post + \beta_2 Segment + \beta_3 Post * Segment$ for panel B, and reporting the coefficient on the interaction terms and the statistical significance. For panel A, when we compare the pre- and postmerger differences in ownership measures deflated by domestic mutual fund ownership between Euronext firms and non-Euronext firms, the interaction term is 0.094 with *t*-statistic 2.40 for total foreign ownership, 0.052 with *t*-statistic 1.69 for EU ownership, 0.014 with *t*-statistic 1.17 for foreign Euronext ownership, and 0.078 with *t*-statistic 2.71 for UK ownership. For panel B, when we compare the pre- and postmerger differences in ownership measures deflated by domestic mutual fund ownership between Euronext segment firms and nonsegment firms, the interaction term is 0.183 with *t*-statistic 2.65 for total foreign ownership, 0.140 with *t*-statistic 2.51 for EU ownership, 0.038 with *t*-statistic 1.48 for foreign Euronext ownership, and 0.101 with *t*-statistic 2.20 for UK ownership. Given that we report similar regression results after including control variables in Tables 4 and 5, we do not tabulate the results for brevity.

Table 2   Summary Statistics on Mutual Fund Ownership

	Panel A: By Euronext/non-Euronext and by premerger/postmerger							
	Premerger				Postmerger			
	N	Mean	Median	Std. dev.	N	Mean	Median	Std. dev.
Euronext								
MF_total	970	6.7636	4.3700	7.6424	1,337	7.6897***	5.1200***	8.0824
MF_domestic	970	3.5188	2.1200	5.5255	1,337	3.5755	2.2100	5.2771
MF_foreign	970	3.2447	1.0500	5.0053	1,337	4.1142***	1.2900**	5.9672
MF_eu	970	1.6560	0.2950	2.8820	1,337	1.9907***	0.4100**	3.1017
MF_euronext	970	0.2210	0.0000	0.4737	1,337	0.3185***	0.0000*	0.6415
MF_uk	970	1.1272	0.0000	2.4653	1,337	1.3269*	0.0100**	2.5350
MF_for/dom	970	3.6113	0.5342	21.3887	1,337	4.4606	0.6106	18.0674
MF_eu/dom	970	1.3641	0.1175	4.8625	1,337	1.9161**	0.1799*	8.4024
MF_euronext/dom	970	0.1834	0.0000	1.1733	1,337	0.2299	0.0000	1.2691
MF_uk/dom	970	0.6939	0.0000	2.5035	1,337	1.3680***	0.0033**	7.8353
Non-Euronext								
MF_total	2,623	8.9322	6.6000	8.5593	4,105	10.8471***	8.0800***	10.0100
MF_domestic	2,623	6.0160	3.3600	7.0369	4,105	7.2987***	4.0100***	8.2574
MF_foreign	2,623	2.9162	0.6800	4.9384	4,105	3.5484***	0.9300***	5.6590
MF_eu	2,623	1.0940	0.0100	2.7508	4,105	1.3470***	0.0300***	2.9635
MF_euronext	2,623	0.1971	0.0000	0.5057	4,105	0.2784***	0.0000	0.6757
MF_uk	1,404	1.2708	0.0150	2.9210	2,312	1.5187**	0.0700**	3.1192
MF_for/dom	2,623	5.5445	0.2016	53.4872	4,105	4.3252	0.1960	45.2789
MF_eu/dom	2,623	2.7078	0.0009	28.7553	4,105	1.8934	0.0049**	20.3376
MF_euronext/dom	2,623	0.3182	0.0000	3.5916	4,105	0.2939	0.0000	3.0010
MF_uk/dom	1,404	2.6230	0.0057	19.8727	2,312	1.9047	0.0233	13.8956
	Panel B: By segment/nonsegment and by premerger/postmerger							
Segment								
MF_total	304	7.6832	5.1800	8.3867	449	8.1770	6.2200	7.1591
MF_domestic	304	4.2709	3.0950	6.2738	449	3.9147	2.8700	4.0248
MF_foreign	304	3.4123	1.3200	4.8575	449	4.2623**	2.0000**	5.5294
MF_eu	304	1.8759	0.3600	3.3457	449	2.2594	0.7800**	3.3158
MF_euronext	304	0.2911	0.0200	0.6079	449	0.4124**	0.0100	0.7482
MF_uk	304	1.4526	0.0200	3.0081	449	1.7349	0.1200**	2.8778
MF_for/dom	304	1.4471	0.4381	3.1716	449	3.3208***	0.6511**	10.7667
MF_eu/dom	304	0.7846	0.1381	1.8046	449	1.6953***	0.2416***	5.5222
MF_euronext/dom	304	0.1375	0.0039	0.3345	449	0.2936**	0.0017	1.4883
MF_uk/dom	304	0.5666	0.0069	1.5099	449	1.3357***	0.0484***	5.0001
Nonsegment								
MF_total	666	6.3438	4.0150	7.2453	888	7.4434***	4.5000**	8.5045
MF_domestic	666	3.1756	1.6250	5.1164	888	3.4040	1.9150	5.8030
MF_foreign	666	3.1682	0.8350	5.0731	888	4.0393***	0.9700	6.1785
MF_eu	666	1.5556	0.2700	2.6402	888	1.8548**	0.2950	2.9804
MF_euronext	666	0.1890	0.0000	0.3941	888	0.2711***	0.0000	0.5749
MF_uk	666	0.9787	0.0000	2.1593	888	1.1207	0.0000	2.3172
MF_for/dom	666	4.5992	0.6863	25.6692	888	5.0369	0.5921	20.7878
MF_eu/dom	666	1.6286	0.1139	5.7223	888	2.0277	0.1389	9.5341
MF_euronext/dom	666	0.2043	0.0000	1.3977	888	0.1977	0.0000	1.1421
MF_uk/dom	666	0.7519	0.0000	2.8431	888	1.3843**	0.0000	8.9354

Notes. Panel A of this table includes the number of firm-years, mean, median, and standard deviation of various ownership measures for firm-years belonging and not belonging to Euronext before and following the Euronext merger. Panel B of this table compares various ownership measures for firm-years that belong and do not belong to the NextPrime and NextEconomy segments before and following the Euronext merger. In both panels, *MF_dom* is defined as the percentage mutual fund ownership from the same country as the sample firm, *MF_for* is the percentage mutual fund ownership from all countries other than the sample firm's home country, *MF_eu* is the percentage mutual fund ownership from other European countries not including Euronext countries and the sample firm's home country, *MF_euronext* is the percentage mutual fund ownership from Euronext countries not including the sample firm's home country, *MF_uk* is the percentage mutual fund ownership from the United Kingdom only (this measure is not available for UK firms), *MF_for/dom* is a ratio of *MF_for* to *MF_dom*, *MF_eu/dom* is a ratio of *MF_eu* to *MF_dom*, and *MF_euronext/dom* is defined as a ratio of *MF_euronext* to *MF_dom*. Finally, *MF_uk/dom* is a ratio of *MF_uk* to *MF_dom* (this measure is not available for UK firms). The comparison of means in both panels is based on a two-sided *t*-test with unequal variances. The comparison of medians is based on a Wilcoxon rank-sum test.

*, **, and *** indicate statistical significance at the 0.10, 0.05, and 0.01 levels, respectively.

fund ownership measures. We include a large sample of other EU firms in our regressions to control for financial, political, and cultural shifts in the EU, which may have had an impact on ownership patterns. Finally, we also conduct the analysis using the sample of Euronext firms to compare the segment firms and nonsegment firms, so we control for other financial and political factors in the four countries that may have had an impact on mutual fund ownership patterns. Our regression model is as follows:

$$
\begin{aligned}
\mathrm{Log}(&1 + \mathrm{MF\_}\mathit{for/dom}_{ijt}) \\
&= \alpha + \beta_1 \mathit{Post} + \beta_2 \mathit{Segment} + \beta_3 \mathit{Nonsegment} \\
&\quad + \beta_4 \mathit{Post} * \mathit{Segment} + \beta_5 \mathit{Post} * \mathit{Nonsegment} \\
&\quad + \beta_i \sum \mathit{Controls} + \varepsilon_{it}.
\end{aligned} \tag{1}
$$

The dependent variables are the logarithm of $(1 + \mathit{MF\_for/dom}_j)$ with $\mathit{MF\_for/dom}_j$ measuring relative foreign to domestic mutual fund ownership, where foreign mutual fund ownership is measured as total foreign ownership when $j = 1$; non-Euronext EU ownership when $j = 2$; Belgian, Dutch, French, and Portuguese ownership but excluding the firm's home country owners when $j = 3$; and UK ownership when $j = 4$; and domestic ownership is measured as total domestic mutual fund ownership.[20] The different home bias measures exploit variation of the location of foreign investors (not securities) to permit us to test the relative strength of the transaction costs hypothesis and the information costs hypothesis in explaining home bias. Recall that the reduction of transaction costs should be more evident for foreign investors from the four countries involved in the Euronext merger, whereas the increase in transparency benefits all foreign investors regardless of their location. For the explanatory variables, *Post* is an indicator variable equal to 1 for 2002 (for the other EU firms) and the year in which the firm's exchange joined the integrated trading platform of Euronext (for the Euronext firms), and all years thereafter;[21] *Segment* is an indicator variable equal to 1 for companies included in the NextPrime or NextEconomy segments during any year of the sample period, and *Nonsegment* an indicator variable equal to 1 for companies listed on Euronext but not included in the NextPrime or NextEconomy segments during any year of the

sample period. The variables of interest are the interactions between *Post* and the *Segment* (*Nonsegment*) indicators, which provide evidence on whether the change in home bias from before to after the integration was significant for the Euronext segment (nonsegment) firms.

We also include firm-specific variables to control for each firm's appeal to mutual fund investors. All variables included in the regressions are summarized in the appendix. Specifically, we control for leverage, profitability, the number of foreign exchanges on which the firm is traded, size, Big 5 auditor, conformity with U.S. GAAP or IFRS, stock return volatility, liquidity (measured as the number of trading days with zero returns, following Ashbaugh et al. 2006), being included in the Morgan Stanley Capital International (MSCI) Index,[22] dividend yield, earnings–price ratio (as a proxy for long-term growth prospects), analyst following, number of stock indices in which the company is included, and ownership concentration.[23] We also include industry, country, and year fixed effects in the regression model to control for the secular trend in mutual fund ownership and the possibility that either transaction costs or information environment may vary between industries or countries and/or may vary from year to year in ways not captured by our difference-in-differences design.[24]

Panel A of Table 3 gives summary statistics for the control variables for the full sample. The table shows that sample firms are quite heterogeneous on most dimensions. Panel B compares the Euronext and other EU firm subsamples. Before the merger, Euronext firms were significantly more leveraged, more profitable, larger, had more analyst following, and had more concentrated ownership (all differences

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[20] We use the natural log of this variable because the ownership data are nonnormal (see Table 2). We also use the percentage of foreign mutual fund ownership (total foreign, EU, Euronext, and UK) in total mutual fund ownership as an alternative proxy to repeat the regression, and we find similar but relatively weaker results as those presented in Tables 4 and 5.

[21] This year is 2002 for Amsterdam, Brussels, and Paris, and 2004 for Lisbon.

[22] We use the MSCI World Index as a proxy for the company being included in a major market index. It is a free-float-adjusted market cap weighted index that combines 24 developed and 21 developing country indices, and therefore measures the performance of a broad range of economies (MSCI 2013). Since the information that MSCI Inc. provided was for the composition of the index in the period 2004–2010, and therefore failed to cover the sample period, we do not use the year-specific constituents of the index, but instead rely on the 2007 index composition only, given that 2007 is the middle point of the data we have available (see also DeFond et al. 2011 for a similar approach). The MSCI data contained herein are the property of MSCI Inc. (MSCI, its affiliates, and any other party involved in or related to making or compiling any MSCI data make no warranties with respect to any such data. The MSCI data contained herein are used under license and may not be further used, distributed, or disseminated without the express written consent of MSCI.)

[23] These controls are taken from Florou and Pope (2012), Bradshaw et al. (2004), Covrig et al. (2007), Hamberg et al. (2009), and Yu (2010), among others.

[24] We repeat the analyses by including firm fixed effects and obtain similar results as those presented in this paper.

Table 3   Summary Statistics

			Panel A: Summary statistics—Full sample			
Variable	N	Q1	Median	Q3	Mean	Std. dev.
Lev	9,035	0.3568	0.5574	0.7101	0.5349	0.2499
Profit	9,035	−0.0063	0.0247	0.0565	−0.0144	0.1846
FExchange	9,035	0.0000	0.0000	0.0000	0.2877	0.7652
Logassets	9,035	4.2433	5.5517	7.0923	5.8144	2.1960
Auditor	9,035	0.0000	1.0000	1.0000	0.7389	0.4393
IFRS_USGAAP	9,035	0.0000	0.0000	0.0000	0.0873	0.2823
ret_std	9,035	0.0158	0.0226	0.0341	0.0272	0.0162
perc_zeroret	9,035	0.0687	0.1412	0.3180	0.2330	0.2343
MSCI	9,035	0.0000	0.0000	0.0000	0.0240	0.1531
div_yield	9,035	0.0000	1.9521	3.7594	2.5019	6.0517
PERatio	9,035	−0.4824	12.1012	22.0253	16.4780	46.9417
AF	9,035	0.0000	2.0000	8.0000	5.7448	7.9678
StockIndex	9,035	0.0000	0.0000	2.0000	1.3664	2.0428
Herfindahl	9,035	0.0154	0.0523	0.2051	0.1516	0.5608
Closelyheldsharespct	7,732	17.5955	39.4350	60.0000	39.7648	25.6334

	Panel B: Summary statistics on control variables by Euronext membership pre- and postmerger						
	Euronext				Non-Euronext		
	N	Mean	Median	Std. dev.	N	Mean	Median	Std. dev.

Premerger
	N	Mean	Median	Std. dev.	N	Mean	Median	Std. dev.
Lev	970	0.6042	0.6351	0.2198	2,623	0.4939***	0.5207***	0.2537
Profit	970	0.0192	0.0309	0.1218	2,623	−0.0242***	0.0226***	0.2084
FExchange	970	0.2835	0.0000	0.8698	2,623	0.2932	0.0000***	0.6964
Logassets	970	5.8853	5.6122	2.3129	2,623	5.5892***	5.3253***	2.1123
Auditor	970	0.6608	1.0000	0.4737	2,623	0.7507***	1.0000***	0.4327
IFRS_USGAAP	970	0.0124	0.0000	0.1106	2,623	0.0679***	0.0000***	0.2516
ret_std	970	0.0300	0.0269	0.0139	2,623	0.0305	0.0253**	0.0179
perc_zeroret	970	0.2606	0.1379	0.2783	2,623	0.1873***	0.1154***	0.2021
MSCI	970	0.0000	0.0000	0.0000	2,623	0.0000	0.0000	0.0000
div_yield	970	2.8074	1.6869	16.0949	2,623	2.3290	1.6213	2.7083
PERatio	970	19.2264	12.3554	45.7059	2,623	19.1359	12.3276	56.1698
AF	970	7.3814	4.0000	8.9674	2,623	5.6374***	3.0000***	7.7179
StockIndex	970	1.4856	0.0000	2.2789	2,623	1.3302*	0.0000	1.9696
Herfindahl	970	0.2150	0.1299	0.4028	2,623	0.1277***	0.0408***	0.5702
Closelyheldsharespct	753	53.4185	55.6430	23.0966	2,197	36.2706***	33.8891***	25.1664

Postmerger
	N	Mean	Median	Std. dev.	N	Mean	Median	Std. dev.
Lev	1,337	0.6014	0.6184	0.2243	4,105	0.5230***	0.5386***	0.2545
Profit	1,337	0.0085	0.0286	0.1307	4,105	−0.0234***	0.0228***	0.1940
FExchange	1,337	0.2752	0.0000	0.9011	4,105	0.2892	0.0000***	0.7321
Logassets	1,337	6.0976	5.9339	2.2704	4,105	5.8492***	5.5684***	2.1824
Auditor	1,337	0.6657	1.0000	0.4719	4,105	0.7737***	1.0000***	0.4185
IFRS_USGAAP	1,337	0.0381	0.0000	0.1916	4,105	0.1335***	0.0000***	0.3402
ret_std	1,337	0.0260	0.0219	0.0145	4,105	0.0247***	0.0201***	0.0155
perc_zeroret	1,337	0.2689	0.1565	0.2770	4,105	0.2439***	0.1609	0.2224
MSCI	1,337	0.0396	0.0000	0.1952	4,105	0.0400	0.0000	0.1959
div_yield	1,337	2.5617	2.1543	3.3470	4,105	2.5207	2.1215	3.3282
PERatio	1,337	15.2196	11.9048	40.4037	4,105	14.5400	12.0000	42.4215
AF	1,337	6.4959	3.0000	8.2371	4,105	5.1820***	2.0000***	7.7123
StockIndex	1,337	1.4316	0.0000	2.2762	4,105	1.3401	0.0000	1.9462
Herfindahl	1,337	0.2650	0.1518	0.9699	4,105	0.1149***	0.0405***	0.3650
Closelyheldsharespct	1,127	51.9662	54.8198	23.9594	3,655	35.2900***	33.3925***	24.7222

significant at the mean and median) relative to other EU firms. However, they were also less liquid, and fewer of them were audited by a Big 5 auditor or used international accounting standards. After the merger, Euronext firms were still more leveraged, more profitable, larger, had more volatile returns and more analyst following, and had more concentrated ownership (all differences significant at the mean and median). Significantly fewer Euronext firms chose a Big 5 auditor or reported using international accounting standards, but the significance of the differences in liquidity is attenuated.

Table 3   **(Continued)**

Panel C: Summary statistics on control variables for the Euronext sample for segment/nonsegment firms and premerger/postmerger

	Segment				Nonsegment			
	N	Mean	Median	Std. dev.	N	Mean	Median	Std. dev.
Premerger								
Lev	304	0.5673	0.6037	0.2032	666	0.6210***	0.6476***	0.2251
Profit	304	0.0159	0.0370	0.1420	666	0.0206	0.0272**	0.1115
FExchange	304	0.1382	0.0000	0.4229	666	0.3498***	0.0000***	1.0034
Logassets	304	5.4269	5.5112	1.5854	666	6.0946***	5.7670***	2.5515
Auditor	304	0.7500	1.0000	0.4337	666	0.6201***	1.0000***	0.4857
IFRS_USGAAP	304	0.0164	0.0000	0.1274	666	0.0105	0.0000	0.1021
ret_std	304	0.0311	0.0275	0.0147	666	0.0295	0.0267	0.0135
perc_zeroret	304	0.1661	0.1149	0.1549	666	0.3038***	0.1609***	0.3098
MSCI	304	0.0000	0.0000	0.0000	666	0.0000	0.0000	0.0000
div_yield	304	2.2000	1.3518	2.7036	666	3.0846	1.7827	19.3363
PERatio	304	18.8975	11.8012	43.3572	666	19.3766	12.6392	46.7698
AF	304	6.4901	5.0000	5.7963	666	7.7883**	3.0000**	10.0666
StockIndex	304	1.0822	1.0000	1.5659	666	1.6697***	0.0000	2.5183
Herfindahl	304	0.1923	0.1148	0.2135	666	0.2254	0.1382	0.4640
Closelyheldsharespct	239	50.5408	51.0400	20.7378	514	54.7565**	57.9630***	24.0169
Postmerger								
Lev	449	0.5785	0.5971	0.1939	888	0.6130***	0.6313***	0.2375
Profit	449	0.0060	0.0291	0.1210	888	0.0097	0.0286	0.1354
FExchange	449	0.1359	0.0000	0.4348	888	0.3457***	0.0000***	1.0548
Logassets	449	5.6748	5.7888	1.5864	888	6.3114***	6.0826***	2.5213
Auditor	449	0.7394	1.0000	0.4394	888	0.6284***	1.0000***	0.4835
IFRS_USGAAP	449	0.0490	0.0000	0.2161	888	0.0327	0.0000	0.1778
ret_std	449	0.0253	0.0214	0.0139	888	0.0264	0.0222	0.0148
perc_zeroret	449	0.1664	0.1341	0.1327	888	0.3207***	0.1836***	0.3141
MSCI	449	0.0245	0.0000	0.1548	888	0.0473**	0.0000**	0.2124
div_yield	449	2.4844	1.8983	2.7671	888	2.6008	2.2790	3.6058
PERatio	449	18.8950	12.3384	53.7895	888	13.3612**	11.6444	31.4194
AF	449	5.5791	4.0000	4.8728	888	6.9595***	2.0000***	9.4638
StockIndex	449	1.0423	0.0000	1.5412	888	1.6284***	0.0000	2.5473
Herfindahl	449	0.2032	0.1146	0.3433	888	0.2963**	0.1783**	1.1638
Closelyheldsharespct	398	48.3621	50.5772	20.2690	729	53.9338***	59.0000***	25.5514

Notes. This table shows descriptive statistics for the companies in our sample. Panel A includes descriptive statistics for the entire sample. Panel B includes number of firm-years, means, medians, and standard deviations for the Euronext and non-Euronext firms in our sample separately for the pre- and post-Euronext merger periods. Panel C includes the number of firm-years, means, medians, and standard deviations for the segment and nonsegment Euronext firms separately for the periods before and after the Euronext merger. In all three panels, *Lev* equals the ratio of total liabilities to total assets, *Profit* is the ratio of net income to total assets, *Fexchange* is the total number of foreign exchanges on which the company is listed, *Logassets* is the natural logarithm of total assets, and *Auditor* is a dummy variable equal to 1 if the company is audited by a Big 5 auditor and 0 otherwise, *IFRS_USGAAP* is a dummy variable equal to 1 if the company uses IFRS or U.S. GAAP and 0 otherwise, *ret_std* is the standard deviation of daily returns for company i in year t, *per_zeroret* is the percentage of zero-return days for company i in year t, *MSCI* is a dummy variable equal to 1 if the company is part of the MSCI index and 0 otherwise, *div_yield* is the ratio of annual dividend to year-end share price, *PERatio* is the ratio of closing annual price to earnings per share, *AF* is the total number of analysts following company i in year t, *StockIndex* is the total number of indices of which company i is a member during a given year, *Herfindahl* is the sum of squares of ownership percentages for the three largest shareholders in a given company, and *Closelyheldsharespct* is the percentage of closely held shares in a given company. The comparison of means in panels B and C is based on a two-sided *t*-test with unequal variances. The comparison of medians in the two panels is based on a Wilcoxon rank-sum test.

*, **, and *** indicate statistical significance at the 0.10, 0.05, and 0.01 levels, respectively.

Panel C compares the segment and nonsegment firms. Before the merger, firms that eventually signed commitment agreements and became listed on the segments were less leveraged, smaller, and more liquid (all differences significant at the mean and median) than the nonsegment firms. After the merger, segment firms were still less leveraged, smaller, more liquid, and also had less concentrated ownership than did nonsegment firms.[25]

[25] Our results show that both before and after the merger, significantly more segment firm-years are audited by a Big 5 auditor.

3.3. Regression Results
Table 4 shows the results of estimations of Equation (1) using four categories of foreign mutual fund

However, the interpretation of this variable requires caution since Worldscope, which is our source for the variable, does not provide year-specific information on auditors. Thus, our data on auditors come from the last available annual report for each sample firm. We believe that the auditor variable reflects the culmination of a trend of increasing reporting and disclosure quality of segment firms (Pownall et al. 2013) following the Euronext merger and the creation of the named segments, rather than an actual premerger/postmerger distinction between segment and nonsegment firm-years.

Table 4   Regression Results for the EU Sample—All Sample Firms

	(1)	(2)	(3)	(4)
	$\text{Log}(1 + MF\_for/dom)$	$\text{Log}(1 + MF\_eu/dom)$	$\text{Log}(1 + MF\_euronext/dom)$	$\text{Log}(1 + MF\_uk/dom)$
Post	0.092	0.001	−0.004	−0.014
	(1.48)	(0.01)	(−0.16)	(−0.41)
Segment	−0.515**	−0.479***	−0.170**	0.067
	(−2.57)	(−2.79)	(−2.27)	(0.54)
Nonsegment	−0.246	−0.332*	−0.133*	0.134
	(−1.22)	(−1.94)	(−1.75)	(1.07)
Post * Segment	0.207***	0.147***	0.041*	0.131***
	(3.92)	(3.36)	(1.86)	(3.14)
Post * Nonsegment	0.011	−0.002	0.004	0.020
	(0.25)	(−0.06)	(0.24)	(0.63)
Lev	−0.193***	−0.127***	−0.054***	−0.138**
	(−3.83)	(−3.46)	(−2.83)	(−2.45)
Profit	0.003	0.074**	0.019	0.239***
	(0.06)	(2.03)	(1.21)	(4.28)
FExchange	−0.016	0.004	0.012	−0.019
	(−0.84)	(0.24)	(1.36)	(−1.37)
Logassets	0.099***	0.043***	0.014***	0.056***
	(7.98)	(4.98)	(3.59)	(4.85)
Auditor	−0.013	−0.006	−0.000	0.034
	(−0.37)	(−0.25)	(−0.04)	(1.15)
IFRS_USGAAP	0.081	0.077	0.028	0.045
	(1.33)	(1.52)	(1.23)	(0.88)
ret_std	1.839**	1.895***	0.756***	2.445***
	(2.14)	(2.94)	(2.86)	(2.81)
perc_zeroret	−0.185***	−0.173***	−0.022	−0.194***
	(−2.79)	(−3.79)	(−1.23)	(−3.75)
MSCI	0.009	−0.039	0.012	−0.087**
	(0.22)	(−1.16)	(0.67)	(−2.34)
div_yield	−0.001	−0.001	−0.000	−0.002
	(−0.60)	(−0.65)	(−0.99)	(−1.35)
PERatio	0.000	0.000	0.000	0.000**
	(0.77)	(1.07)	(0.84)	(2.51)
AF	0.014***	0.016***	0.005***	0.009***
	(5.15)	(7.29)	(4.73)	(3.67)
StockIndex	−0.019*	−0.021***	−0.005	−0.018
	(−1.89)	(−2.89)	(−1.34)	(−1.57)
Herfindahl	0.028	0.045	0.012	0.042
	(0.67)	(0.97)	(0.90)	(1.10)
Constant	1.193***	0.943***	0.327***	0.181
	(6.63)	(6.13)	(4.81)	(1.58)
Observations	9,035	9,035	9,035	6,023
Adj. R-squared	0.38	0.37	0.29	0.28

Notes. This table includes results from the regression $\text{Log}(1 + \textit{Foreign MF Own}/\textit{Domestic MF Own}) = \alpha + \beta_1 Post + \beta_2 Segment + \beta_3 Nonsegment + \beta_4 Post * Segment + \beta_5 Post * Nonsegment + \beta_i \sum Controls + \varepsilon$. The variables in the models and their sources are as defined in the appendix.

   *, **, and *** indicate statistical significance at the 0.10, 0.05, and 0.01 levels, respectively.

ownership (standardized by domestic mutual fund ownership to control for secular trends in the data) for the full sample of EU firms. The coefficient on *Post* is not statistically significant in any of the specifications, suggesting no overall Europe-wide decrease in home bias from the premerger to the postmerger period. The coefficient on *Segment* is negative and statistically significant in three out of the four model specifications, but it loses statistical significance when home

bias is measured as the logarithm of UK ownership scaled by domestic ownership. The coefficient on *Nonsegment* is negative and marginally significant when foreign ownership comes from non-Euronext EU and other Euronext jurisdictions. These results are consistent with higher home bias on average for both segment and nonsegment firms than for other EU firms. The coefficient on the interaction between *Post* and *Nonsegment* is not statistically significant in any of the

four specifications, suggesting that the integration of the trading platforms after the merger did not have a significant effect on home bias for the nonsegment firms. This finding is inconsistent with H1 that foreign ownership increased relative to domestic ownership for Euronext-listed companies at the time of the Euronext merger, compared with other EU companies. Tests of H2A (that transaction costs fall more significantly for foreign investors from the Euronext countries at the merger and were associated with a diminution of home bias) in their most straightforward form focus on the comparison between the results of column (3) (other Euronext countries' ownership only) and those of other columns, specifically the interactions between *Post* and *Segment* or *Nonsegment*. Given that the results on the interaction between *Post* and *Nonsegment* are not statistically significant in any columns, we conclude that there is only limited evidence consistent with the transaction costs hypothesis.

The coefficient on the interaction between *Post* and *Segment* is always positive and statistically significant, indicating that the decrease in home bias for the segment firms relative to other EU firms is more pronounced no matter how foreign ownership is measured. We use the estimates in column (1) to interpret the economic effects of the results: holding all other variables constant and relative to other EU companies, the level of all foreign relative to domestic mutual fund ownership of the median segment firm increases from 0.44 in the premerger period to 0.77 in the postmerger period, which is economically significant.[26] Tests of H2B (that the enhanced financial reporting and transparency pledged by the segment firms reduced perceived information costs to foreign investors and were associated with reduced home bias) focus on the coefficients in all four columns on the interaction between *Post* and *Segment*. The results thus offer strong support to the information costs hypothesis.

Among the control variables, leverage is positively associated with home bias; size, return volatility, and analyst following are negatively associated with home bias; but none of the other control variables are consistently significant. The R-squared values of the regressions range from 28% to 38%.[27]

Because our hypotheses are framed as tests on changes in home bias for Euronext firms at the time of the merger, including other EU firms as controls for EU events and forces may be redundant to including all Euronext firms. Therefore, we present results for only the Euronext firms in Table 5. Consistent with the findings in Table 4, we find that the coefficient on *Post* is insignificant, but the interaction between *Post* and *Segment* is positive and significant in three of the four specifications for foreign mutual fund ownership, indicating a bigger reduction in home bias for the segment firms from premerger to postmerger. This result suggests that joining the segments and credibly precommitting to enhanced disclosure and transparency decreased information costs for foreign investors and was associated with increases in their ownership of segment but not nonsegment firms. We note, however, that the interaction between *Post* and *Segment* in column (3) when foreign mutual fund ownership is measured as the ownership in the Euronext markets outside the firm's home country is marginally significant in Table 4, and becomes nonsignificant in Table 5. We conjecture that the geographical proximity between foreign investors and listed companies in these countries may have reduced the effects of increased transparency of segment firms relative to nonsegment firms.

4. Diagnostics and Extensions

4.1. Propensity Score Matching
As noted in the introduction of the paper, we employ matching as a robustness check to address the self-selection issue in the main analyses. First, we estimated Equation (1) comparing each segment firm-year to a propensity score matched sample of other EU firm-years, and separately to a propensity score matched sample of nonsegment firm-years. Our descriptive statistics in Table 3 show that segment firm-years differ significantly from other EU firm-years and nonsegment firm-years on a number of firm characteristics both before and after the formation of Euronext. The accounting literature has demonstrated that these characteristics affect not only the reporting decisions of firms but also their decisions to list or cross-list on a highly regulated exchange (see Lang et al. 2003 for an example). Thus, the investment decisions of foreign mutual funds might not be independent of firms' decisions to list on a named segment, and our results might be influenced by selection bias.

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[26] Given that the dependent variable is a log-transformed variable of $1 + MF\_for/dom$ and the variable of interest is the interaction term of two indicator variables, we follow Kennedy (1981) to calculate the estimate of percentage change on the interaction term to be "EXP[coefficient $- 0.5 *$ variance(coefficient)] $- 1$." The coefficient on the interaction term of *Post* and *Segment* is 0.207 in column (1) of Table 4, which translates into a 23% increase of $1 + MF\_for/dom$ from the premerger to the postmerger period. (The variance of the coefficient is 0.0028.) The median MF_for/dom of the segment firms in the premerger period is 0.44 from Table 2, panel B, so the predicted value of postmerger MF_for/dom would be 0.77 (= $(1 + 0.44) * 123\% - 1$).

[27] In untabulated analyses, we included interaction terms between profitability (*Profit*) and *Post*, and between size (*Logassets*) and *Post*. Results of the regressions including these interaction effects support exactly the same inferences as the results in Tables 4 and 5.

Table 5   Regression Results for the Euronext Sample

	(1) $\text{Log}(1 + MF\_for/dom)$	(2) $\text{Log}(1 + MF\_eu/dom)$	(3) $\text{Log}(1 + MF\_euronext/dom)$	(4) $\text{Log}(1 + MF\_uk/dom)$
Post	0.025 (0.35)	−0.070 (−1.08)	−0.015 (−0.59)	−0.032 (−0.82)
Segment	−0.310*** (−4.47)	−0.168*** (−3.23)	−0.036 (−1.52)	−0.097** (−2.24)
Post * Segment	0.195*** (2.91)	0.147*** (2.68)	0.038 (1.49)	0.110** (2.45)
Lev	−0.553*** (−4.30)	−0.348*** (−3.71)	−0.058 (−1.57)	−0.311*** (−3.75)
Profit	−0.140 (−0.67)	0.068 (0.58)	0.044 (1.33)	0.170* (1.94)
FExchange	−0.035 (−1.14)	0.007 (0.27)	0.020 (1.49)	−0.014 (−0.72)
Logassets	0.125*** (4.63)	0.056*** (3.21)	0.013** (2.23)	0.047*** (3.13)
Auditor	0.066 (0.96)	0.003 (0.06)	−0.009 (−0.49)	0.041 (1.11)
IFRS_USGAAP	0.426** (2.21)	0.445** (2.21)	0.005 (0.14)	0.328 (1.39)
ret_std	1.684 (0.72)	1.232 (0.78)	0.984** (2.10)	1.986 (1.61)
perc_zeroret	−0.216* (−1.67)	−0.181** (−2.02)	−0.037 (−1.23)	−0.246*** (−3.46)
MSCI	−0.069 (−0.70)	−0.098 (−1.21)	0.047 (1.20)	−0.075 (−1.10)
div_yield	0.001 (0.88)	0.001 (0.85)	−0.000 (−0.53)	−0.001 (−1.14)
PERatio	0.000 (1.15)	0.000 (0.37)	0.000* (1.74)	0.000* (1.87)
AF	0.010 (1.60)	0.012*** (2.98)	0.001 (0.78)	0.008* (1.91)
StockIndex	−0.016 (−0.71)	−0.009 (−0.51)	0.003 (0.39)	−0.011 (−0.66)
Herfindahl	−0.037*** (−2.60)	−0.028*** (−3.09)	−0.004 (−1.55)	−0.015** (−2.10)
Constant	0.949*** (4.35)	0.638*** (4.19)	0.228*** (4.05)	0.484*** (3.70)
Observations	2,307	2,307	2,307	2,307
Adj. *R*-squared	0.26	0.21	0.26	0.22

Notes. This table includes results from the following regressions: $\text{Log}(1 + MF\_for/dom) = \alpha + \beta_1 Post + \beta_2 Segment + \beta_3 Post * Segment + \beta_i \sum Controls + \varepsilon$ in column (1); $\text{Log}(1 + MF\_eu/dom) = \alpha + \beta_1 Post + \beta_2 Segment + \beta_3 Post * Segment + \beta_i \sum Controls + \varepsilon$ in column (2); $\text{Log}(1 + MF\_euronext/dom) = \alpha + \beta_1 Post + \beta_2 Segment + \beta_3 Post * Segment + \beta_i \sum Controls + \varepsilon$ in column (3); $\text{Log}(1 + MF\_uk/dom) = \alpha + \beta_1 Post + \beta_2 Segment + \beta_3 Post * Segment + \beta_i \sum Controls + \varepsilon$ in column (4). The variables in the models and their sources are as defined in the appendix.

    *, **, and *** indicate statistical significance at the 0.10, 0.05, and 0.01 levels, respectively.

To control for such bias, we match the segment and other EU firm-years (nonsegment firm-years) on these firm characteristics, industries, and countries of origin (for the Euronext firm-years) to obtain a sample of other EU firm-years (nonsegment firm-years) with similar likelihood of listing on a named segment.[28] Given the large number of independent variables that need to be matched, we chose to conduct a propensity score matching (PSM) analysis. The PSM analysis allows us to calculate a propensity score for

[28] Firm-level variables used in the matching include all those in Table 3 except for closely held shares. Prior research suggests that these variables might affect not only firms' listing decisions, but their attractiveness to institutional investors (Florou and Pope 2012, Bradshaw et al. 2004, Covrig et al. 2007, Hamberg et al. 2009, Yu 2010). Thus, because of fiduciary concerns, institutions prefer to invest in larger firms (*Logassets*), with better performance (*Profit*),

higher dividend yield (*div_yield*), more liquidity (*perc_zeroret*), and lower risk (*leverage, ret_std*). Growth firms are more likely to seek additional capital and therefore to make a commitment to enhanced disclosure and governance, so we control for growth prospects (*PERatio*). Other variables capture firm visibility and information environment: we use as proxies number of exchanges on which the firm is listed (*Fexchange*), analyst following (*AF*), being a member of a national index or the MSCI index (*StockIndex* and *MSCI*, respectively), and reporting using high-quality standards (*IFRS_USGAAP*). Finally, we include an ownership concentration proxy because prior research suggests that institutional investors prefer firms with lower ownership concentration (*Herfindahl*).

each firm-year in our sample, as a single balanced representation of all firm characteristics of interests (Guo and Fraser 2010).

We conducted the PSM analyses separately pre- and postmerger. We keep in our PSM sample only pairs of segment firm-years and other EU firm-years for which the absolute value of the difference in their propensity scores is less than 0.01, which leaves us with 737 firms and 1,484 firm-years (see panel A of Table 1).[29] To evaluate whether our PSM procedure was successful in eliminating the differences in firm characteristics between the segment and other EU firm-years, we recalculated the descriptive statistics by period, the differences in means and medians, and the statistical significance of these differences. The comparison (untabulated) indicates that the PSM procedure successfully eliminated the differences in means and medians between the segment and non-Euronext firm-years for most firm characteristics. The firm-years in our PSM sample premerger differ significantly on mean and median size and closely held shares percentage. The firm-years in our PSM sample postmerger differ significantly on mean and median ownership concentration and closely held shares percentage.[30]

Panel A of Table 6 presents regression results from the sample of Euronext segment firm-years and the PSM matched other EU firm-years, and supports inferences very similar to those in Table 4. The coefficient on the interaction term for Euronext segment firms after the formation of Euronext is positive and significant for all three columns, indicating that the diminution of home bias for the Euronext segment firms was higher than that for other EU firms using any of the proxies for home bias.

Similarly, we formed another PSM sample of segment firm-years and nonsegment Euronext firm-years following the same method. We again keep in our PSM sample only pairs of segment and nonsegment firm-years for which the absolute value of the difference in their propensity scores is less than 0.01. After this requirement, we are left with 380 firms and 1,124 firm-years (see panel A of Table 1). We repeat

the same procedure to calculate descriptive statistics for the PSM sample, and the results from the comparison (untabulated) indicate that the PSM procedure successfully eliminated the differences in means and medians between the segment and nonsegment firm-years for most firm characteristics. Panel B of Table 6 presents regression results from the sample of segment firm-years and the PSM matched nonsegment firm-years, and supports inferences very similar to those in Table 5, but with weaker statistical significance. The coefficient on the interaction term for segment firms after the formation of Euronext is positive in all four columns and statistically significant for columns (1) and (3), indicating that the diminution of home bias for the segment firms was higher than that for the nonsegment firms. We also note that the coefficient on *Post* is now positive and significant in three out of four columns, which might be evidence in support of the transactions costs hypothesis. However, the empirical evidence collectively provides systematically consistent supports for the information costs hypothesis, but not the transaction costs hypothesis.

4.2. The Effect of Segment Firms' Inclusion in Equity Indices in Europe

Next, we investigate an alternative explanation of the results for the segment firms. It is possible that segment firms are more likely to be included in equity indices of the Pan-EU market after the formation of Euronext, and mutual funds around the world tend to invest in equity indices rather than individual stocks. Mutual funds may have faced less "fiduciary liability risk" associated with investments in segment firms, because it was more straightforward to explain to investors that the funds chose to invest in segment firms because of their commitment to higher reporting standards. In addition, Euronext's promotion of segment firms may have increased investor recognition of these firms relative to other firms (Merton 1987). To parse out these effects, we employ the segment compliance data collected in Pownall et al. (2013, Table 1). Specifically, we use a compliance score to measure segment firms' compliance with the enhanced financial reporting requirements. Compliance is the sum of five dimensions including global auditors, early IFRS adoption, English language reporting, a functioning website, and quarterly reporting, all measured in the postmerger period from 2002 to 2004.[31] We also construct another compliance score (Compliance 4) by including global auditors, early IFRS adoption, English reporting, and a functioning website. We hypothesize that these four requirements are more likely to reduce the information accessing and processing costs for

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[29] Note that the PSM is conducted on a firm-year basis (see, e.g., Armstrong et al. 2010), so a segment firm is usually matched with multiple other EU firms and multiple nonsegment Euronext firms. As a result, the two PSM samples have more than 334 firms (167 segment firms in the final sample * 2).

[30] We did not include the closely held shares variable in the logit regression to calculate the PSM scores, because the requirement of nonmissing closely held shares severely reduces the sample size. So there are significant differences in closely held shares between segment firms and other EU firms (nonsegment firms) in the PSM sample. To increase our confidence in the inferences drawn from the PSM sample, we repeat the regressions by including closely held shares, and we obtain similar results as those in Table 6.

[31] Note that the global auditor variable is from hand-collected data, so it should be more reliable than that collected from Worldscope.

Table 6   **Propensity Score Matching Analysis**

	Panel A: Euronext segment and other EU		
	(1)	(2)	(3)
	Log(1 + *MF_for/dom*)	Log(1 + *MF_eu/dom*)	Log(1 + *MF_euronext/dom*)
Post	0.161	0.094	−0.069*
	(1.05)	(1.46)	(−1.68)
Segment	−1.092***	−1.050***	−0.471***
	(−2.99)	(−3.15)	(−2.73)
*Post * Segment*	0.237***	0.131**	0.082***
	(3.29)	(2.27)	(2.74)
Constant	2.194***	1.715***	0.771***
	(6.94)	(5.69)	(4.69)
Observations	1,484	1,484	1,484
Adjusted *R*-squared	0.29	0.31	0.27

	Panel B: Euronext segment and Euronext nonsegment firms			
	(1)	(2)	(3)	(4)
	Log(1 + *MF_for/dom*)	Log(1 + *MF_eu/dom*)	Log(1 + *MF_euronext/dom*)	Log(1 + *MF_uk/dom*)
Post	0.491***	0.323***	0.035	0.261***
	(4.27)	(4.06)	(1.02)	(3.97)
Segment	−0.292***	−0.123*	−0.073**	−0.066
	(−3.34)	(−1.88)	(−2.19)	(−1.20)
*Post * Segment*	0.178*	0.102	0.080*	0.082
	(1.70)	(1.28)	(1.90)	(1.14)
Constant	0.592***	0.331***	0.126***	0.209***
	(7.94)	(6.41)	(4.57)	(5.22)
Observations	1,124	1,124	1,124	1,124
Adjusted *R*-squared	0.02	0.02	0.01	0.01

Notes. This table includes results from a PSM analysis. Panel A includes results from the analysis using a propensity score matched sample of Euronext segment firms and non-Euronext EU firms. It shows the results of the following logistic regressions: Log(1 + *MF_for/dom*) = $\alpha + \beta_1 Post + \beta_2 Segment + \beta_3 Post * Segment + \varepsilon$ in column (1); Log(1 + *MF_eu/dom*) = $\alpha + \beta_1 Post + \beta_2 Segment + \beta_3 Post * Segment + \varepsilon$ in column (2); Log(1 + *MF_euronext/dom*) = $\alpha + \beta_1 Post + \beta_2 Segment + \beta_3 Post * Segment + \varepsilon$ in column (3). The variables in the models and their sources are as defined in the appendix. Panel B includes results from the analysis using a propensity score matched sample of Euronext segment and nonsegment firms. It shows the results of the following logistic regressions: Log(1 + *MF_for/dom*) = $\alpha + \beta_1 Post + \beta_2 Segment + \beta_3 Post * Segment + \varepsilon$ in column (1); Log(1 + *MF_eu/dom*) = $\alpha + \beta_1 Post + \beta_2 Segment + \beta_3 Post * Segment + \varepsilon$ in column (2); Log(1 + *MF_euronext/dom*) = $\alpha + \beta_1 Post + \beta_2 Segment + \beta_3 Post * Segment + \varepsilon$ in column (3); Log(1 + *MF_uk/dom*) = $\alpha + \beta_1 Post + \beta_2 Segment + \beta_3 Post * Segment + \varepsilon$ in column (4). The variables in the models and their sources are as defined in the appendix.

*, **, and *** indicate statistical significance at the 0.10, 0.05, and 0.01 levels, respectively.

foreign investors, whereas quarterly reporting makes information more frequently available to both domestic and foreign investors.[32] For each dimension of compliance requirements, we define an indicator variable equal to 1 if the segment firm's average compliance in the postmerger period is above the median and 0 otherwise. We then add the indicators together to get the summary compliance score. If the reduction of equity home bias we report in our paper is due to equity index inclusion, fiduciary liability risk, or investor recognition as opposed to increased information quality of segment firms, we should not observe cross-sectional variation in the reduction of equity

home bias among segment firms in the postmerger period. We run a regression of Log(1 + *MF_for/dom*) that includes *Compliance*, *Post*, an interaction term of *Compliance* and *Post*, and other control variables included in Tables 4 and 5. The results are reported in Table 7. Although we do not find a significant coefficient on the interaction term in column (1), we document a positive and statistically significant coefficient on the interaction term in column (2) when compliance is measured using the four dimensions of compliance that are more likely to increase accounting information accessibility and comparability of segment firms.[33] This result does not support inclusion in

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[32] We are not aware of research on the association between reporting frequency and home bias. Thus, our hypothesis about the role of quarterly reporting is based solely on our judgment. It is possible that domestic investors are able to get information more frequently benefiting from the geographic proximity of domestic firms.

[33] We also ran regressions using other forms of foreign mutual fund ownership relative to domestic mutual fund ownership as the dependent variables, and we found similar results as those in Table 7.

Table 7   Regression Results for the Euronext Segment Firms—The Effect of Segment Compliance

	(1)	(2)
	Log(1 + MF_for/dom)	Log(1 + MF_for/dom)
Compliance	−0.022	
	(−0.64)	
Post	0.659***	0.560***
	(5.06)	(5.32)
Post ∗ Compliance	0.001	
	(0.07)	
Compliance 4		−0.046
		(−1.44)
Post ∗ Compliance 4		0.050**
		(2.18)
Control variables	Included	Included
Observations	757	757
Adjusted R-squared	0.20	0.20

Notes. This table includes results from regression $\text{Log}(1 + MF\_for/dom) = \alpha + \beta_1 Post + \beta_2 Compliance\ (Compliance\ 4) + \beta_4 Post * Compliance\ (Compliance\ 4) + \beta_i \sum Controls + \varepsilon$. *Compliance* (*Compliance 4*) represents the sum of five (four) dimensions of segment firms' compliance to the enhanced financial reporting requirements: global auditors, IFRS, English reporting, functioning website, and quarterly reporting (global auditors, IFRS, English reporting, and functioning website). For each dimension of compliance requirements, we define an indicator variable equal to 1 if the segment firm's average compliance in the postmerger period is above the median and 0 otherwise. We then add the five (four) indicators together to get the summary compliance score. Other variables in the models and their sources are as defined in the appendix.

** and *** indicate statistical significance at the 0.05 and 0.01 levels, respectively.

an index, fiduciary liability risk, or investor attention as an alternative explanation of our segment results. On the other hand, it provides further evidence that firms' credible precommitments to make accounting information more accessible and more comparable have the potential to reduce home bias.[34]

4.3.   Other Robustness Checks
We performed several replications of our primary analyses to assess the sensitivity of our results to including various sample definitions and combinations of control variables. We first consider the effect of the lack of free-float adjustment in the

[34] It is plausible that a focus on the changes in the compliance variables rather than the level of compliance might generate a cleaner test. We do not perform such tests due to data availability in the premerger period. However, we employ a unique feature of our empirical setting that Lisbon joined Euronext in 2004. Given that we collected compliance data starting from 2002, we compute the change in the compliance variables from 2002 to 2004 for Lisbon listed firms, and repeat the same analyses using the change variables but on a very small sample of Lisbon listed firms (32 observations). We find that the interaction term of *Post* and *Compliance Change* is not significant, but we again find that the interaction term of *Post* and *Compliance Change* that includes the four dimensions of compliance (*Compliance 4*) is positive and statistically significant. This supports the general inferences we draw from Table 7.

research design. The home bias literature suggests that it is important to adjust for free-float differences (Dahlquist et al. 2003, Leuz et al. 2010), but including free-float data would significantly reduce our sample size (by 1,303 observations). Therefore, we chose to conduct a sensitivity analysis by including *Closelyheld-sharespct* as a control variable instead of presenting the results from a reduced sample as the main empirical evidence. The results from this sensitivity analysis are similar to those reported in Tables 4 and 5.

We also addressed concerns about the difference-in-differences research design raised in Bertrand et al. (2004), that the standard errors might be inconsistent because of the serial correlation in the dependent variables. Given that the mutual fund ownership variables might be serially correlated, we replicated our primary analyses using a change specification as proposed in Bertrand et al. (2004), in which the change in foreign relative to domestic ownership is the dependent variable, and the independent variables are all expressed as changes from before to after the merger. The inferences from the change specification are exactly the same as the inferences from the difference-in-differences specification in Tables 4 and 5.

Finally, we test whether our results are due solely to increased disclosure/governance or increased disclosure/governance in conjunction with the Euronext creation. Specifically we additionally include an interaction term between *Post* and *IFRS* in regression model (1). We expect that if the increased disclosure/governance is the primary driving force for our findings, we should observe a positive and significant interaction coefficient on *Post* and *IFRS*, whereas the main result for segment firms should be attenuated. Our analysis (untabulated) shows that the interaction of *Post* and *Segment* remains positive and significant. In contrast, we observe an insignificant interaction term on *Post* and *IFRS*, which increases our confidence that our findings are not completely driven by increased disclosure/governance.

5.   Summary and Conclusions
In this paper, we examine the ability of global stock exchange mechanisms to reduce equity home bias. Our research setting is the formation of the Euronext stock market from the merger, demutualization, and initial public offering of the Amsterdam, Brussels, Paris, and Lisbon stock exchanges. The two mechanisms we investigate are the integration of trading platforms across the four national predecessor exchanges and the creation of named segments of the exchange on which firms could voluntarily list by precommitting to enhanced disclosure and transparency.

Employing a difference-in-differences research design using other EU companies as a control group, we

document that the integration of the Euronext market was associated with a reduction in home bias for firms listed on the named segments of the Euronext exchange, but not for the nonsegment Euronext firms. Our results suggest that the reduction in transaction costs from the integration of the trading platform did not make the nonsegment Euronext firms more attractive to the specific investors for whom the transaction costs were reduced. On the other hand, the decrease in information costs due to the precommitments to enhanced transparency made the segment firms more attractive to all categories of foreign investors, consistent with the information costs hypothesis.

These results are important in light of the ongoing consolidation of global stock exchanges. Integrating the trading platforms of stock exchanges from different countries has the potential to create ever larger pools of liquidity, especially in the presence of a mechanism such as the Euronext named segments that allows firms to commit to higher standards than those effectively imposed by their home countries. Our results suggest that the enhanced financial reporting and disclosure supported by the segmentation mechanism have the potential to reduce home bias for firms listed on the integrated global capital markets and allow foreign investors to garner more of the benefits of international diversification.

Appendix. Variable Definitions and Data Sources

Variable	Definition	Source
MF_total	Percentage of total mutual fund ownership for firm i	Thomson Ownership
MF_domestic	Percentage mutual fund ownership from firm i's home country	Thomson Ownership
MF_foreign	Percentage mutual fund ownership from all countries other than firm i's home country	Thomson Ownership
MF_eu	Percentage mutual fund ownership from other European countries not including Euronext countries and firm i's home country	Thomson Ownership
MF_euronext	Percentage mutual fund ownership from Euronext countries excluding firm i's home country if firm i is part of Euronext	Thomson Ownership
MF_uk	Percentage mutual fund ownership from UK only (this measure is not available for UK firms)	Thomson Ownership
MF_for/dom	*MF_foreign* divided by *MF_domestic*	Thomson Ownership
MF_eu/dom	*MF_eu* divided by *MF_domestic*	Thomson Ownership
MF_euronext/dom	*MF_euronext* divided by *MF_domestic*	Thomson Ownership
MF_uk/dom	*MF_uk* divided by *MF_domestic* (this measure is not available for UK firms)	Thomson Ownership
Lev	Total liabilities/total assets	Worldscope
Profit	Net income/total assets	Worldscope
FExchange	Number of foreign exchanges on which firm i is listed	Worldscope
Logassets	Natural logarithm of total assets	Worldscope
Auditor	An indicator variable equal to 1 if firm i is audited by a Big 5 auditor and 0 otherwise	Worldscope
IFRS_USGAAP	An indicator variable equal to 1 if firm i uses IFRS or U.S. GAAP and 0 otherwise	Worldscope
ret_std	Standard deviation of daily returns in year t	Datastream
perc_zeroret	Percentage of zero returns for firm i in year t	Datastream
MSCI	An indicator variable equal to 1 if firm i is included in the MSCI index and 0 otherwise	MSCI Inc.
div_yield	Dividends per share/year-end market price	Worldscope
PERatio	Year-end market price/earnings per share	Worldscope
AF	Total number of analysts following firm i in year t	IBES detailed hist.file
StockIndex	Number of stock indices in which firm i is included	Worldscope
Herfindahl	The sum of the squares of the ownership of the three largest shareholders in firm i	Thomson Ownership
Closelyheldsharespct	Percentage of closely held shares of firm i in year t	Worldscope
Compliance	The sum of dummy variables for five compliance dimensions including global auditors, IFRS, English language reporting, functioning website, and quarterly reporting. Dummy variables for each dimension equal 1 if the segment firm's average compliance in the postmerger period is above the median and 0 otherwise.	Worldscope and search of websites

Appendix. (continued)

Variable	Definition	Source
Compliance 4	The sum of dummy variables for four compliance dimensions including global auditors, IFRS, English language reporting, and functioning website	Worldscope and search of websites
Post	Indicator variable equal to 1 for 2002 (for the non-Euronext EU firms) or the year the exchange joined Euronext and all the years thereafter (for the Euronext firms, 2002 for Paris, Brussels, and Amsterdam, and 2004 for Lisbon)	n/a
Segment	Indicator variable equal to 1 for companies in the NextPrime or NextEconomy segments during any year of the sample period and 0 otherwise	Euronext cash market-monthly statistics (http://www.euronext.com)
Nonsegment	An indicator variable equal to one for Euronext companies not included in the NextPrime or NextEconomy segments during any year of the sample period and 0 otherwise	Euronext cash market-monthly statistics

Note. IBES, International Brokers' Estimate System; n/a, not applicable.

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