Ethnic Investing and the Value of Firms[*]

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Abstract

We study ethnic investing, using transaction level data from Kenya's stock exchange and CEO/board turnover. We first show that a given investor invests more in a given firm when the firm is run by coethnics and earns lower risk-adjusted returns on such investments. Absent sufficiently large supply-side or arbitrage responses, the implied taste- or psychology-driven investor discrimination may lower aggregate value creation. We test this prediction, and find that Kenya's publicly listed firms could have been worth $72-78$ percent more if all had access to coethnic potential investor bases of the same size as ethnic majority-run firms.

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1 Introduction

Individuals, regions, and nations tend to invest much more in others to which they are linked through ethnic ties.[1] This may be due to information asymmetries arising, for example, from easier communication or screening among coethnics, in which case investors will tend to earn higher returns on coethnic investments (Lang, 1986; Cornell & Welch, 1996; Fisman, 2003; Fisman *et al.*, 2017). Alternatively, investors may have a taste for—or a psychological or social bias towards—investing in coethnics, in which case they will tend to earn lower returns on coethnic investments (Becker, 1957; Hjort, 2014; Fisman *et al.*, forthcoming).

Individual investors' differential returns on coethnic investments can thus help identify the underlying source of investor biases. The *aggregate* economic consequences of coethnic investing—of empirical interest to economists at least since Banerjee & Munshi (2004) demonstrated its distortionary impact on firms in Tirupur, India—do not follow directly from the sign and size of such differential returns, however. How coethnic investing affects value creation depends also on the extent of both supply-side responses (Becker, 1957)—such as prefered use of CEOs from large ethnic groups—and, in the case of taste-based coethnic investing, arbitrage from unbiased investors (Shleifer & Vishny, 1997).

In this paper we study the extent, nature, and aggregate economic consequences of coethnic investing in Kenya. To do so, we use complete transaction level data from the Nairobi Securities Exchange (NSE) from 2006 through 2011. Exploiting an unusual feature of the context we study—some firms "change ethnicity" during our data period as a consequence of management turnover—we first show that a *given Kenyan investor* invests considerably more *in a given firm* when its CEO and/or board is of the same ethnicity as the investor, and earns lower risk-adjusted returns as a result. The average investor's preference for coethnic firms misallocates demand across firms. Taking advantage of the complete market nature of the NSE, we show that market responses do not offset the impact on firms' market valuation. Our estimates imply that coethnic investing dramatically lowers the combined value of publicly listed Kenyan firms.

The Kenyan stock exchange is an ideal setting to study cothnic investing for several

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[1]See, among many others, Saxenian (1999); Fafchamps (2000); Rauch (2001); Banerjee & Munshi (2004); Guiso *et al.* (2009); Hjort (2014); Burgess *et al.* (2015); Beach & Jones (2017); Fisman *et al.* (2017); Burchardi *et al.* (2019); Fisman *et al.* (forthcoming).

reasons. First, ethnic divisions permeate Kenyan society (Ndegwa, 1997; Barkan, 2004). Second, some investment objects—in our context, large firms—in effect change ethnicity across time in Kenya, and we observe the ethnicity and investment behavior of tens of thousands of ethnically identifiable individual investors. This means that we can estimate how coethnicity affects investment *within investor-investment object pairs*, which has not been possible to do in existing research (see also Bertrand & Mullainathan, 2004). Third, since we study "atomistic" investors whose returns are fully observed, we can distinguish returns- increasing and decreasing sources of discrimination with confidence. Finally, and most importantly, observing all firms and all investors in the market allows us to capture aggregate phenomena that are difficult to get at in partial samples (Becker, 1957; Arrow, 1973; Shleifer & Summers, 1990), in particular the ultimately impact of coethnic investing on stock prices market-wide. Stocks market are broadly considered among the most efficient ways to allocate capital, and around 45 developing countries have established exchanges during the last 30 years.

We start our analysis by documenting a positive and large coethnicity effect in investment decisions. To do so, we first regress measures of an investor's investments in a given firm on measures of the firm's CEO and/or board belonging to the same ethnicity as the investor in the month in question, controlling for month, investor, and firm (or, alternatively, investor-firm) fixed effects. We show that the particular parallel trends assumption required to interpret the estimate causally appears to hold.[2]

To investigate *why* investors invest more in coethnic firms, we show that the risk-adjusted return on such investments is on average lower. This suggests that coethnic investing in Kenya is primarily explained by investor preferences or biases.[3]

In the final part of the paper, we show that the constraint on ethnic minority-run firms' access to potential investors implied by our results markedly influences firms' market valuation. Theory suggests that, relative to counterfactual, ethnicity-blind investing, preference or bias-driven coethnic investing will lower the average value of firms unless supply-side responses or arbitrage equate demand for and supply of each type of firm (Becker, 1957; Merton, 1987; Shleifer & Vishny, 1997). We test this pre-

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[2]That is, the times when firms switch to management of another ethnicity are not times when investment from "pre-coethnics"/"post-coethnics" are trending up/down, relative to investment from other investors.

[3]Investor psychological biases—and related social phenomena such as for example herd behavior or peer pressure—may also contribute to the form of coethnic investing we identify. Like Becker (1957)-style taste-based discrimination, psychology-based coethnic investing predicts lower financial returns for investors and adverse consequences for *firms*, the focus of this paper.

diction in two ways, first exploiting demand-side variation and thereafter supply-side variation in firms' coethnic investor bases.

In the first approach we analyze how the value of a given Kenyan firm responds to changes in the proportion of all potential investors that consists of active investors that belong to the same ethnic group as the firm's CEO, and changes in the proportion of portfolio wealth held by such investors. We find that, when these measures of a firm's "coethnic (potential) investor base" increase, the price-to-book value of the firm also increases significantly, and vice versa.

In the second approach we exploit a sharper form of variation that arises when a change in CEO ethnicity resulting from CEO turnover changes the firm's coethnic investor base from one ethnic group to another from one month to the next. We find that when a firm's coethnic investor base abruptly increases because of CEO turnover, the firm's price-to-book value also increases significantly. In contrast, when the firm's coethnic investor base abruptly decreases because of a change in CEO ethnicity, the firm's price-to-book value also decreases significantly.

We do not find any evidence of changes in a firm's "ethnicity" affecting *other* firms' stock market valuations, perhaps in part because each firm is small relative to the market as a whole. A back-of-the-envelope calculation suggests that the total value of the firms listed on Kenya's stock exchange would be about USD 8 – 9 billion higher today if ethnic minority-run firms had access to coethnic *potential* investor groups of the same size as ethnic majority-run firms.[4]

This paper contributes to three distinct but related areas of the literature on discriminatory investing: work studying its magnitude, nature, and ultimate economic consequences. Our most novel contribution is to the latter. We estimate how homophily investing affects total value creation, something that has been difficult to do with the data and variation used in existing research. Economists have long been interested in the possibility of market-wide economic costs of discrimination (Becker, 1957; Arrow, 1973; Phelps, 1972; Banerjee & Munshi, 2004),[5] but empirical estimates have, with the exception of Charles & Guryan (2008) and Hsieh *et al.* (forthcoming)'s analyses of U.S.

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[4]Since publicly listed firms' decisions—about investment, debt versus equity, mergers and acquisitions, compensation, etc—depend on their market capitalization (Baker *et al.*, 2003), distortions in market capitalizations likely in turn constrain real economic growth.

[5]This area of research began with the famous debate between Becker (1957) and Arrow (1973) over taste-based versus statistical models of discrimination (see also Phelps (1972)). The seminal work of Banerjee & Munshi (2004) emphasized the possible impact on firm growth if access to capital differs across ethnic groups.

labor markets, remained elusive.[6] The primary reason is that responses that mediate the impact on market-wide growth—such as induced differential changes in the supply of investment objects of different ethnicities and arbitrage by unbiased investors—are difficult to account for in partial samples. Our contribution is made possible by the fact that we analyze a complete market; in which some firms "change ethnicity" over time; and wherein a specific form of discrimination yielding predictions for how value creation should—in the absence of fully compensating market responses—be affected can be identified at the micro (investor×firm) level.[7] We document the extent to which co-ethnic investing misallocates demand and thereby lowers the average value of a large Kenyan firm.

Our primary contribution to the body of work quantifying the micro-level relationship between ethnic ties and investment is to identify the causal effect of coethnicity *holding the identity of the investor-investment object pair constant* (see, among many others, Banerjee & Munshi, 2004; Fisman *et al.*, 2017; Burchardi *et al.*, 2019; Fisman *et al.*, forthcoming). Existing studies estimate a different causal effect. They do so by comparing a given investor when s/he is quasi-randomly assigned to a coethnic versus a non-coethnic investment opportunity (Hjort, 2014; Fisman *et al.*, 2017, forthcoming) or vice versa (Burgess *et al.*, 2015; Burchardi *et al.*, 2019). Such an approach cannot separate the effect of correlated, unobserved match characteristics from that of coethnicity itself. Studying changes in coethnicity within investor-investment object pairs arguably does so.[8] In addition, we analyze a type of market—stock markets—and a type of firm—

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[6]Hsieh *et al.* (forthcoming) back out the change in discrimination and related frictions in the U.S. from 1960 to 2010 that can explain the observed convergence in the occupational distribution and wages of blacks and women relative to white men, and filter the resulting estimates through a general equilibrium model to quantify the impact on GDP per person that such changes may explain. Charles & Guryan (2008) show support for the predictions of Becker (1957)'s taste-based model of discrimination in data on U.S. wages and racial attitudes. They then use the model to predict how much higher black workers' wages would be if the "marginal discriminator" among employers was less discriminatory.

[7]The direct mapping from the change in the size of a given firm's group of coethnic potential investors that we exploit in our aggregate (firm) level analysis on the one hand, and the corresponding predictions for how such changes in investor groups should affect the value of a firm that come out of the specific form of discrimination we identify at the micro (investor×firm) level on the other hand, is important. Existing studies have restricted attention to how the ethnicity (or related characteristics) of an investment object correlate with the value of, or returns to investing in, the object. Banerjee & Munshi (2004) document a relationship between the community group to which a knitted garment firm in Tirupur, India belongs and how much capital the firm has. Rauch & Trindade (2002) and Banerjee & Pande (2007) show related evidence on international trade and politics respectively. In finance, Hong & Kacperczyk (2009) show that "sin stocks" are less held by institutional investors subject to norms and display higher returns than otherwise comparable stocks.

[8]Unobserved match characteristics between *CEOs and boards* on the one hand and investors on the other that are correlated with coethnicity are—even among the retail investors that make up the large majority of our sample—a possibility, but much less of a concern than the match characteristics between investors and investment objects

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large firms—on which evidence from developing countries is almost entirely absent (see also Anagol & Kim, 2012; Yenkey, 2015; Anagol *et al.*, forthcoming, 2018; Yenkey, 2018a,b), despite both generally being considered essential to economic growth (Rajan & Zingales, 1998; Levine, 2005; Larrain, 2010).

Our contribution to the line of research that studies the *nature* of discrimination is made possible by analyzing a context where investors are "atomistic" and returns— above and beyond taste-based and psychological rewards—are therefore purely financial (and fully observed) (see Loury (1998); Altonji & Blank (1999); List & Rasul (2011); Charles & Guryan (2013) for overviews).[9] We show that, in such a context, a classical information asymmetry story in which investments in coethnic investment objects reap higher returns appears not to be the primary explanation underlying coethnic investing.[10] Preference or psychology-based coethnic investing of the form we uncover may help explain why investors across the world invest much more in firms with which they share a geographical location, language, or culture, and—related—why capital flows to poor countries are much lower than the abnormally high associated returns would suggest (Banerjee & Duflo, 2005; McKenzie *et al.*, 2008). The widespread phenomenon of homophily investing—or "home bias"—is extensively documented in existing research (French & Poterba, 1991; Coval & Moskowitz, 1999; Huberman, 2001; Seasholes & Zhu, 2010; Hvide & Døskeland, 2011), but poorly understood.

themselves that existing studies may in part capture. One reason for this is that managers have limited influence on even more basic measures of firm's activities than factors specific to the firm itself (Bertrand & Schoar, 2003). Another is that utility that a given small investor derives, not from investing in a given large firm, nor from the firm being run by coethnic managers, but from herself investing in the firm when it is run by coethnic managers, is arguably conceptually close in nature to taste itself.

[9]See, among others, Altonji & Pierret (2001); Knowles *et al.* (2001); Bertrand & Mullainathan (2004); Charles & Guryan (2008); Bandiera *et al.* (2009); Shayo & Zussman (2011); Hedegaard & Tyran (2017); Bohren *et al.* (forthcoming, 2018). There is also a set of studies that specifically investigate why individuals in developing countries often discriminate against non-coethnics (see e.g. Greif, 1993; Habyarimana *et al.*, 2007; Eifert *et al.*, 2010; Hjort, 2014; Burgess *et al.*, 2015; Berge *et al.*, forthcoming; Fisman *et al.*, 2017, forthcoming).

[10]In most existing studies, using the fundamental difference between the predicted consequences of information asymmetry- versus preference-driven discriminatory investing to tell apart motivations has not been possible because returns are rarely observed. We follow a handful of existing studies of real markets and workplaces in doing so (Cohen *et al.*, 2008; Bandiera *et al.*, 2009; Hjort, 2014; Fisman *et al.*, 2017, forthcoming). However, in settings where investors are not atomistic relative to the investment objects, the researcher may not observe all relevant dimensions of the return on investment. For example, it may be that upstream "suppliers" in a production line who send more intermediate inputs to downstream coethnics than non-coethnics lower their own pay—as in Hjort (2014)—but are rewarded socially outside of the workplace for doing so. This paper's results are essentially unchanged when we exclude the largest investors, who could conceivably influence (coethnic) managers' behavior. This is expected as we do not weight investors by their size.

2   Background and Data

Ethnic rivalries have characterized Kenyan political and economic affairs since independence (for more background, see e.g. Ndegwa, 1997; Barkan, 2004; Dupas & Robinson, 2012; Hjort, 2014; Berge *et al.*, forthcoming; Jakiela & Ozier, 2019), but the Nairobi Securities Exchange (NSE) was effectively inaccessible to ordinary Kenyans until the 2000s. By the early 2000s, more firms wanted to be listed on the NSE, and more Kenyans could afford to invest in stocks. The Privatization Act of 2005 lowered entry barriers to retail investing by digitizing the trading system and by requiring firms to make a higher proportion of newly issued shares accessible to domestic, small-scale investors via smaller lots. Especially in the first few years after 2005, the number of investors on the NSE grew rapidly (Yenkey, 2015).

Detailed information on the data we use is in the Appendix; we now provide an overview. The version of the NSE's Transactions Registry we have access to reports the firm's ticker id, the number of shares traded, the price, the seller's (masked) id, the buyer's (masked) id, and the date for all trades that occurred on the NSE between January 1, 2006 (when the NSE's trading system "went digital") through December 31, 2011. The version of the NSE's Investor Registry we have access to reports the investor's (masked) id, account creation year, and—crucially—last name. In addition, the names of listed firms' CEO and board-members are publicly available. Information on firms' book value, outstanding shares, etc, come from their financial statements.

Table 1 provides summary statistics on our analysis sample. We restrict attention to investors who trade (buy or sell) five or more times at least one year during our 2006 – 2010 data period. As seen in Panel A, there are about 55,000 such investors in our dataset for which we can also infer ethnicity.[11] These investors have average portfolio values of around USD 6,000 at the beginning of our data period.[12] Panel B shows that 41 of the 47 firms that are observed on the NSE during our data period were listed before the stock exchange's digital operations began in 2006. The firms cover a range of sectors, with 24 percent in "Commercial and Services", 31 percent in "Finance and Investment", and 36 percent "Industrial". The firms are large, with an average total

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[11]This includes a small number of brokers and institutional investors for which we can infer the ethnicity of the individual listed as account owner.

[12]The average portfolio value is somewhat lower at the end of our data period, in part because many smaller investors joined the NSE during 2006 – 2010.

market capitalization of around USD 261 million in 2006 and USD 286 million in 2010. In Panel C we see that the investor belongs to the same ethnicity as the CEO in 27 percent of investor×firm×month observations in our analysis dataset.[13]

We probabilistically assign ethnicities to investors, CEOs, and board-members using their last names. The starting point is name×ethnicity match probability information recorded by Yenkey (2018a,b). The author hired eight Kenyan research assistants (RAs), each of whom reported if s/he was highly confident that a given name could belong to a given ethnicity or not.[14] There is overlap in the names used by some ethnicities so that the RAs could assign a given name to multiple ethnicities. Using the RAs' reports, we construct four measures of an investor's ethnic proximity to a CEO and to a board respectively. The first CEO measure, $CoethnicCEO_{ijt}$, is an indicator variable equal to one if investor i and the CEO running firm j in month t are relatively likely to belong to the same ethnicity and relatively unlikely to belong to two different ethnicities. The second CEO measure, $CEOCoethnicityIndex_{ijt}$, is a 0 (minimum proximity) to 1 (maximum proximity) measure of the expected ethnic proximity between the investor's and the CEO's name, given each person's expected probability of belonging to each ethnicity.[15] One board measure, $BoardCoethnicityIndex_{ijt}$, is equal to the proportion of board-members that are coethnic, where coethnicity is measured as for $CoethnicCEO_{ijt}$. The other board measure, $CoethnicBoard_{ijt}$, is a 0/1 variable, and essentially repeats the construction of $CoethnicCEO_{ijt}$ twice, first between individual board-members and the investor, then for the board as a whole vis-a-vis the investor. More detailed information on the construction of our four measures of coethnicity is in the Appendix.[16]

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[13]Coethnicity is here measured as $CoethnicCEO_{ijt}$=1. This measure is described in the next paragraph.

[14]The ethnicities the RAs were asked about, and that we observe, are Anglo, Embu, Kalenjin, Kamba, Kikuyu, Kisii, Luhya, Luo, Maasai, Meru, Somali, South Asian, and Swahili.

[15]Specifically, the index is equal to 1 minus Lieberson (1969)'s index of population diversity.

[16]All four of our measures of investor-firm coethnicity give similar results. $CEOCoethnicityIndex_{ijt}$ is "assumptions-free" and follows directly from the raw data. (This measure also allows us to make use of a larger part of our sample as it does not require leaving out observations for which we cannot assign a name to a given ethnicity with confidence, as we do for the other three measures of coethnicity). We show in the Appendix that our results are generally robust to an alternative way to construct the measures of ethnicity itself that enter into the construction of $CoethnicCEO_{ijt}$, $BoardCoethnicityIndex_{ijt}$, and $CoethnicBoard_{ijt}$ from the name×ethnicity match probability data. $CoethnicBoard_{ijt}$ is a strict measure of investor-board coethnicity in the sense that, to set $CoethnicBoard_{ijt} = 1$ in month t, we require, first, each individual board-members to be either a likely coethnic or a likely non-coethnic of the CEO, and second, for the board as a whole to be relatively likely to belong to the same ethnicity as the CEO and relatively unlikely to belong to another ethnicity.

3 Ethnic Investing in Kenya

To estimate how investor-firm coethnicity causally affects investment, we take avantage of two features of the context we study. First, we observe which particular investors belong to the same ethnicity as a given firm's management at a given point in time. Second, when CEOs and board-members are replaced by others of another ethnicity, the coethnicity status of a given investor-firm pair changes.

We first run:

$$\text{Investment}_{ijt} = \alpha + \beta \text{CoethnicFirm}_{ijt} + \gamma_i + \delta_j + \psi_{c(jt)} + \theta_t + \varepsilon_{ijt} \qquad (1)$$

where Investment_{ijt} is the value of the investment investor i holds in firm j in month t, normalized by the total value of all her investments, or firm j's "portfolio weight" in i's portfolio.[17] In addition to month fixed effects θ_t, we also include investor, firm, and CEO ethnicity fixed effects γ_i, δ_j, and $\psi_{c(jt)}$ so that our results are not driven by differences across investors, firms, or the various ethnic groups present in our data.[18] We assess whether a given investor holds a bigger investment in a given firm in a given month when the firm is of the same ethnicity as the investor versus when it is not. As discussed in Section 2, we show results for four definitions of $\text{CoethnicFirm}_{ijt}$, two measuring investor-CEO coethnicity and two measuring investor-board coethnicity. We cluster the error term ε_{ijt} at the investor level.

The portfolio weight specification of the outcome variable Investment_{ijt} follows standard practice in the investor behavior literature, whose focus is generally on cross-sectional relationships (see e.g. Cohen *et al.*, 2008; Hvide & Døskeland, 2011). However, our focus is on how coethnicity affects investment—and ultimately firms themselves—and $\text{CoethnicFirm}_{ijt}$ varies across time within a given investor-firm pair. It is reasonable to expect an investor's *stock* of investments in a given firm to respond only gradually after a firm "becomes coethnic" (or becomes non-coethnic), but her investment

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[17]We do not observe shares that an investor had bought before the NSE "went digital" in 2005 and did not trade thereafter. To construct a measure of an investor's portfolio, we thus assume that all investors have zero holdings at the beginning of 2006. We thereafter simply add any observed purchases to investor i's inferred holdings, and subtract any observed sales from her inferred holdings. Our results are very similar if we instead focus only on investors who opened their NSE account in 2006 or later, in which case we observe investors' full portfolio at every point in time. The fact that we do not observe pre-2005 holdings is not relevant for the "flow" measure of coethnic investing, $\text{OrderImbalance}_{ijt}$, we use below.

[18]Including firm fixed effects also means that our analysis controls for differences in average market capitalization across firms.

flows should respond more rapidly if she is in fact influenced by the firm's ethnicity. We thus exploit the full granularity of the NSE transactions data to construct the outcome variable OrderImbalance$_{ijt}$—the value of shares in firm j purchased by investor i in month t minus the value of shares in the firm sold by the same investor in the same month, divided by the sum of purchases and sales by i in j at t (see e.g. Chordia *et al.*, 2002).[19] We run:

$$\text{OrderImbalance}_{ijt} = \alpha + \beta \text{CoethnicFirm}_{ijt} + \gamma_i + \delta_j + \psi_{c(jt)} + \theta_t + \varepsilon_{ijt} \qquad (2)$$

The results for both approaches are shown in Table 2. As seen in the top panel, the share of an investor's investments that is held in a given firm at a given point in time is 3.6 percent higher if the firm is managed by a coethnic CEO (CoethnicCEO$_{ijt}$ = 1).[20] Similarly, the fraction of her investments an investor holds in a given firm is 6 percent greater when she has maximum ethnic proximity to the firm's CEO (CEOCoethnicityIndex$_{ijt}$ = 1) than when she has minimum ethnic proximity to the firm's CEO (CEOCoethnicityIndex$_{ijt}$ = 0). Columns 3 and 4 show that the share of an investor's investments that is held in a given firm at a given point in time is 4 percent higher if the firm is managed by a co-ethnic board (CoethnicBoard$_{ijt}$ = 1), and 30 percent greater when she has maximum ethnic proximity to the firm's board (BoardCoethnicityIndex$_{ijt}$ = 1) than when she has minimum ethnic proximity to the firm's board (BoardCoethnicityIndex$_{ijt}$ = 0.[21]

Columns 1 and 2 of the bottom panel of Table 2 show that a given investor's normalized net investment in a given firm in a given month—investor i's OrderImbalance$_{ijt}$ for firm j in month t—is 3.2 percent greater if the firm is managed by a coethnic CEO in the month in question; 7 percent greater with maximum relative to minimum ethnic

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[19]Another reason for focusing on OrderImbalance$_{ijt}$ is that, unlike Investment$_{ijt}$, this measure of investment decisions is not influenced by the evolution of (the values of) an investor's holdings *after* purchases are made. Note that normalizing net purchases by volume traded is standard. Doing so controls for potential liquidity differences across observations (see e.g. Chordia *et al.*, 2002).

[20]All stock market transactions have both a seller and a buyer. This raises the question of who is, on average, on the other side of the market in transactions that increase the portfolio weight of coethnic firms for a given buyer (or seller). An important part of the answer is that "ethnic concentration"—the proportion of equity held by coethnic investors—increases during our data period, implying that many such transaction partners are simply non-coethnics of the relevant CEO or board. Another contributor is that the period we study is one in which many small investors joined the stock market, buying equity from larger investors. This contributes to the estimates in Table 2 as we do not weight investors by their size.

[21]The are several potential reasons why board coethnicity may have a greater effect on investment than CEO coethnicity. It could for example be that changes in which ethnic group dominates a board are less frequent than changes in the identity of the CEO and hence provide a more deeply rooted measure of a firm's true identity in the eyes of investors.

proximity to the CEO; 15 percent greater if the firm is managed by a coethnic board in the month in question; and 76 percent greater with maximum relative to minimum ethnic proximity to the board. The results in Table 2 are similar if we restrict attention to ethnically Kenyan investors and managers.

We cannot rule out based on the results in Table 2 themselves that it is other correlated, unobserved match characteristics rather than coethnicity itself that increases an investor's investment in a firm. This is an important qualification to our interpretation of our findings thus far, and to our knowledge to those of essentially all existing studies of ethnic discrimination in real markets and workplaces.[22] To zero in on a coethnicity-based interpretation of the estimated match effect, we replace γ_i and δ_j with an investor-firm fixed effect, and thus identify how coethnicity affects investment *within investor-investment object pairs*. Rather than also taking advantage of variation in coethnicity-vs.-non-coethnicity status across investor-firm pairs while holding investors and firms themselves constant, we then exclusively rely on CEO/board turnover for identification. Such an approach will isolate a pure coethnicity effect as long as firms that switch from being managed by a CEO/board of ethnicity A to being managed by a CEO/board of ethnicity B in a given month are on trends in investment from investors of ethnicity A and B that, relative to the trend in investment from investors of other ethnicities, are parallel to those of other firms. We begin by providing direct evidence in support of this assumption.

In Figure 1 we restrict attention to points in time around when a given firm "changes ethnicity" by replacing a CEO belonging to one ethnicity with one belonging to another ethnicity. We plot the flow of investment from "pre-coethnics" and "post-coethnics" (investors of respectively the same ethnicity as the outgoing and incoming CEO), and others, in the four months before and the four months after such CEO switches. We see that, when the new CEO takes over, investment from post-coethnics rises markedly relative to investment from pre-coethnics and others. In the subsequent months, the flow of investment from post-coethnics returns to the pre-coethnic/others *trend*, but remains at a higher level. This implies that the portfolio share of the firm for post-

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[22]We know of one existing study that directly investigates the extent to which a range of other *observed*, correlated match effects explain discrimination attributed to coethnicity (or, more precisely, co-religiosity). Lavy *et al.* (2018) do so by controlling for the other observed match characteristics. Such an approach is conceptually similar to that of audit studies in which the worker attributes listed on a CV are held fixed while the name on the CV is experimentally varied (see e.g. Bertrand & Mullainathan, 2004).

coethnics relative to others further rises in the months after the CEO switch. Finally, and most importantly, we see no indication of concerning non-parallel pre-tends in Figure 1. In the months *before* the CEO ethnicity switch, the trend in investment from all three groups is roughly flat, with a level of investment that is somewhat higher for pre-coethnics and others than for post-coethnics.[23] These patterns in the raw data provide direct, visual support for a causal, coethnicity-based interpretation of the results from a version of the regressions in (1) and (2) that include an investor-firm fixed effect.

We show those results in Table 3. We lose some power when restricting the analysis to investor-firm pairs that change coethnicity status during our data period because most firms do not switch CEO ethnicity. However, the estimates in Table 3 indicate that investors if anything adjust the share of their investments that is held in a given firm when a non-coethnic CEO is replaced by a coethnic CEO somewhat more when we hold constant the investor-firm pair in question.[24] The two investor-board coethnicity measures both increase in magnitude and remain highly statistically significant when we restrict attention to changes in coethnicity within investor-investment object pairs.

In this section we showed that Kenyan investors invest considerably more in a given firm when the firm is run by coethnics. We also showed that the coethnicity effect holds even within investor-firm pairs and arises only after (before) a firm "becomes" coethnic (non-coethnic), pointing towards a causal interpretation. In the next section we investigate *why* coethnicity causes investors to invest more in a firm.

4   Understanding Ethnic Investing

As discussed in the introduction, ethnic investing may broadly speaking be due to *information asymmetries* or investor *preferences or biases*. The former imply *higher* return on coethnic investments, while the latter imply *lower or equal* return on coethnic investments. We thus run the following regression:

$$\text{RiskAdjReturns}_{bijt} = \alpha + \beta \text{CoethnicFirm}_{ijt} + \gamma_i + \delta_j + \psi_{c(jt)} + \theta_t + \varepsilon_{bijt} \qquad (3)$$

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[23]In the figure, post-coethnics' differential investment response to the CEO switch appears to begin in the calendar month before the switch itself happens, presumably because this is when the switch is announced.

[24]The same holds when we consider investment flows in the bottom panel and CoethnicFirm$_{ijt}$ is measured through CEOCoethnicityIndex$_{ijt}$. However, for this outcome, the estimated coefficient of interest is negative (but noisily estimated) when CoethnicFirm$_{ijt}$ is defined as CoethnicCEO$_{ijt} = 1$, a surprising result relative to the other estimates in tables 2 and 3 that may be due to the smaller sample of firms that can be used in Table 3.

where RiskAdjReturns$_{bijt}$ is the risk-adjusted return on investment b made by investor i in firm j in month t—that is, returns divided by risk—and the other variables are as defined above. Our measures of returns and risk are straightforward and follow the finance literature (see e.g. Cohen *et al.*, 2008); details are in the Appendix.[25] Within a given firm-month pair, RiskAdjReturns$_{bijt}$ varies across investors because different investors invest in the firm on different days within the month and because different investors sell their stocks at different times.

A given investor's risk-adjusted returns on her investment in a given firm in a given month are respectively 4.6 and 2.4 percentage points lower if the investment is made when the firm is run by a coethnic CEO or when the investor has maximum ethnic proximity to the firm's CEO, relative to when the investment is made when the CEO is a non-coethnic, as seen in the first two columns of Table 4. Similarly, the investor's risk-adjusted returns on investments made when the firm's board is generally of the same ethnicity as the investor are 14.6 percentage points lower.[26]

As seen in Appendix Table B3, the estimated relative risk-adjusted return on coethnic investments are very similar—if anything slightly lower—if we restrict the sample to firms whose CEO ethnicity remains constant during our data period. For these firms the estimated differential return on coethnic investments cannot be due to any stock price dynamics associated with CEO turnover.

Our results in this section indicate that engaging in coethnic investing lowers the return Kenyan investors achieve at a given level of risk-taking. We conclude that their behavior appears to be driven by a taste for or a psychological bias towards coethnic firms.

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[25]An assumption on which of i's purchases of equity in j a given sale corresponds to is necessary. We follow standard practice in the literature by assuming first-in, first-out. Risk is simply the standard deviation of returns across months. In the Appendix we also show how coethnic investing affects risk and returns respectively. Our results are driven by a combination of lower raw returns and higher variability in returns on—that is, the risk of—coethnic investments.

[26]We lack power to estimate how risk-adjusted returns differ on investments made when the firm is run by a board with a greater versus a lower BoardCoethnicityIndex$_{ijt}$ with precision.

5 The Consequences of Ethnic Investing

5.1 Ethnic investing and the value of a firm: conceptual background

Coethnic investing of the form we documented in sections 3 and 4, in which investors "neglect" non-coethnic firms and thereby earn lower returns for a given level of risk, may have adverse *aggregate* economic consequences. In particular, if each group of investors exclusively or primarily invests in firms of a specific type, this will—relative to an ethnicity-blind investing scenario—tend to lower the average value of a firm. The reason is that investors as a whole could earn higher returns by investing in firms with a smaller investor base. This "clientele" prediction, first emphasized by Merton (1987)[27], holds only as long as supply-side and arbitrage responses to coethnic investing are limited, however.

To see this, suppose there are two groups of otherwise identical groups of firms, Blue and Green firms, and that Blue is the bigger of the two ethnic groups in the country. The results in sections 3 and 4 suggest that the demand curve for Blue firm shares lies to the right of that for Green firm shares. If in addition there are initially not many more Blue than Green firms, "suppliers" of shares—existing owners of different firms' shares and firms themselves—may require a higher price to sell Blue shares than Green shares. Both of these forces imply that the price of otherwise similar Blue firm shares will be higher than that of Green firm shares.

We might expect three types of responses to such a situation. First, Blue firms and owners of their shares who do not have a taste for coethnicity may increase the supply of such shares, shifting the supply curve out. Similarly, investors who do not have a taste for coethnicity may shift demand from Blue to Green firms in response to the price wedge. Both of these forces will tend to reduce the price wedge between Blue and Green firms.

Second, over time investors—especially in emerging economies like Kenya's—will tend to join the stock market, increasing overall demand. If the composition of those joining the stock market is similar to the population as a whole we can expect the shift in demand for Blue shares to exceed that for Green shares because of coethnic investing,

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[27]The comparative static analysis in Merton (1987) is cross-sectional in the sense of assuming that the market portfolio and aggregates of the economy do not vary with changes in the relative size of investor groups, but the intuition underlying the predictions we discuss below is straightforward and holds more broadly.

further increasing the relative price of Blue firms. Of course, it may also be that Green investors join the stock market to a greater extent than Blue investors if e.g. they expect to be able to earn a higher return while investing in coethnic shares.

Finally, it may be that firms want to exploit a lower cost of capital that comes with being Blue. We should see an increase in the valuation of a Green firm that changes its CEO to become Blue as demand for the firm's shares has increased. Existing Blue firms may now face downward pressure on prices from the demand and/or the supply-side of the market. It is reasonable to assume, however, that—unless a large number of or especially large firms choose to "become Blue"—the price of other Blue firms would remain above that of Green firms. If not, the taste for coethnicity and higher returns would both attract investors to (existing) Blue firms. We thus expect the price wedge between Blue and Green firms to persist despite potential demand displacement across individual firms.

In sum, as this discussion makes clear, under preference-based coethnic investing we expect demand and supply forces to distort the relative price of firms with large and small coethnic investor bases relative to an ethnicity-blind investing scenario, as long as compensating supply-side and arbitrage responses are limited. This will tend to lower the average price of a firm.

5.2   Ethnic investing and the value of a firm: empirics

The size of Kenyan firms' coethnic investor bases vary over time. In combination with the fact that we observe all investors and all firms on the country's stock market, this means that we can estimate how demand affects stock prices in a way that to our knowledge has not been possible in the existing literature.

To test how coethnic investing affects the price-to-book value of a firm, we first run regressions of the following simple form:

$$\text{PriceToBook}_{jt} = \alpha + \beta \text{InvestorBase}_{jt} + \delta_j + \theta_t + \varepsilon_{jt} \tag{4}$$

We include firm fixed effects δ_j, month fixed effects θ_t, and cluster the error term ε_{jt} at the firm level. The regressor of interest is the size of the firm's coethnic investor base, the estimated sign on which should be significantly positive if coethnic investing of the form identified in sections 3 and 4 distorts firms' stock market valuations. We

measure InvestorBase$_{jt}$, the size of firm j's coethnic investor base at time t, simply as the number of investors that are active—that is, that trade—at time t who belong to the same ethnicity as the firm's CEO, relative to all potentially active investors. We define potentially active investors as all investors who have invested on the NSE up to and including the month in question. Alternatively, we also measure InvestorBase$_{jt}$ as the portfolio value coethnic investors hold at time t relative to all potentially active investors. We restrict the sample to firms whose ethnicity remains constant during our data period—that is, firms who do not change their CEO from someone belonging to one ethnicity to someone else belonging to a different ethnicity during our data period. In this sample, variation in InvestorBase$_{jt}$ thus arises from investors joining and leaving the stock market and active versus passive status (as well as changes over time in investors' portfolio wealth).

The results are shown in Panel A of Table 5. We see that, when the coethnic investor base of a given firm on the NSE increazes in size, the price-to-book value of the firm increases significantly relative to other firms. The estimates imply, for example, that we would expect the price-to-book value of a firm that is led by a CEO from an ethnic group that has the same proportional number of investors as the group with the biggest investor base observed in our data to be 24 percent greater than an otherwise identical firm led by a CEO from an ethnic group with an investor base of the same size as the smallest one in our data.[28]

In Panel B of Table 5 we exploit a sharper, supply-side form of variation. We now code changes in a firm's investor base exclusively as 0/1 up-or-down events resulting from CEO (ethnicity) turnover, and restrict attention to 12 month windows around such events (six months prior and six months following). In addition to exploiting abrupt and large changes in firms' coethnic investor bases, this allows us to include terms that capture displacement effects on the value of *other* firms of changes in a given firm's

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[28]This calculation uses the average investor base size of firms in our data. The biggest investor base size is thus equal to the investor base size of the firm which has the maximum average size. The smallest investor base size is defined analogously.

ethnicity. We run the following regression:

$$
\begin{aligned}
\text{PriceToBook}_{jt} = \alpha &+ \beta\text{I(CEO switch} \rightarrow \Delta\text{Investor base size)}_{jt} \qquad\qquad (5) \\
&+ \gamma\text{I(}-j \text{ CEO switch \& } j \text{ of} -j's \text{ post-CEO switch ethnicity)}_{jt} \\
&+ \omega\text{I(}-j \text{ CEO switch \& } j \text{ of} -j's \text{ pre-CEO switch ethnicity)}_{jt} \\
&+ \delta_j + \theta_t + \varepsilon_{jt}
\end{aligned}
$$

which broadly follows Crépon *et al.* (2013)'s approach to estimating displacement effects of active labor market policies in France. I(CEO switch $\rightarrow \Delta$Investor base size)$_{jt}$ is an indicator for firm j changing its CEO from an individual belonging to one ethnicity to someone else belonging to another ethnicity. The indicator equals one in any month t after the switch. Such a switch implies either an increase or a decrease in the firm's coethnic investor base.[29] β thus captures the impact on a firm's stock market valuation of a change in CEO ethnicity that changes the size of the firm's coethnic investor base.

I($-j$ CEO switch \& j of $-j's$ post-CEO switch ethnicity)$_{jt}$ is an indicator that equals one (after the switch) for firm j after another firm $-j$ changes its CEO from another ethnicity to someone belonging to firm j's ethnicity. Similarly, I($-j$ CEO switch \& j of $-j's$ pre-CEO switch ethnicity)$_{jt}$ equals one (after the switch) for firm j after another firm $-j$ changes its CEO from someone belonging to firm j's ethnicity to someone of another ethnicity. γ and ω thus capture displacement effects across firms of changes in a given firm's ethnicity.

The omitted group consists of firms that do not themselves "change ethnicity" during our data period, and that also do not belong to an ethnicity that sees other firms "joining" or "leaving" the set of firms that share ethnicity with the firm in question during our data period. We include firm and month fixed effects as in the rest of our analysis, and cluster the error term ε_{jt} at the firm level.

The results are shown in Panel B of Table 5. In the first column we focus on CEO (ethnicity) switches that imply an increase in the relevant firm's coethnic investor base, and in column 2 switches than imply a decrease in the investor base. We find that a firm that changes its ethnicity from one with a smaller to one with a larger investor base sees a significant and large—59 percent—increase in its price-to-book value, while a firm

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[29](5) is short-hand in that we distinguish between "up" and "down" events, and their associated displacement effects, in the regressions we run.

changing its ethnicity from one with a larger to one with a smaller investor base sees a significant and large—albeit proportionally smaller, at around 30 percent—decrease in its price-to-book value. These findings exploiting variation in firms' coethnic investor base coming from the supply (firm) side of the market supports the evidence from Panel A, where variation in investor base comes from the demand (investor) side of the market.[30]

We find no evidence of displacement effects on the value of *other* firms of a given firm changing its ethnicity due to CEO turnover and thereby increasing or decreasing the number of firms that belong to the same ethnicity as the other firms in question. This may help explain the significant impact on the value of firms of variation in the size of coethnic investor bases we find when exploiting demand-side variation in Panel A.

To summarize, we see a significant change of the expected sign in the valuation *both* of firms whose relative investor base size changes because investors join and leave active investing on the NSE *and* those that "change ethnicity" because of CEO turnover and therefore see the size of their investor base change. This suggests that the relationship we have established between coethnic investing and the value of large Kenyan firms as a whole may be causal. In itself Table 5 does not rule out other interpretations.[31] However, the aggregate patterns in Table 5 are—as Sub-section 5.1 makes clear—exactly what theory predicts we should see under the form of causally identified "neglect" of non-coethnic firms we established in sections 3 and 4 in the absence of large, compensating market responses.

5.3 The cost of ethnic investing

We can now estimate the overall cost of coethnic investing. Our results in Panel B of Table 5 suggest that, if firms led by managers from smaller ethnic groups were to switch to managers from the biggest group, this would not necessarily lead to signifi-

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[30]In Appendix Table B4, we add the particular expected predictors of firms' valuation that come out of Merton (1987)'s version of "clientele" theory, i.e. firm size and return on equity in the last 12 months. We measure firm size as j's market capitalization in month t. The estimated coefficients of interest in Appendix Table B4 are generally similar to those in Table 5, but of somewhat smaller magnitude.

[31]Similarly, in and of themselves, the results in Panel B of Table 5 could be consistent with the ability of CEOs from ethnic minority groups exceeding that of CEOs from ethnic majority groups, and minority CEOs therefore generating higher cash flows for firms they manage. However, such a story cannot explain the results in Panel A of Table 5, where we control for the ethnicity of the CEO.

cant displacement effects across firms.[32] This in turn suggests that simple counterfactual scenarios in which we assign firms bigger coethnic (potential) investor bases can inform debate over the value gains we should expect if investors were blinded to firms' ethnicity, or did not have a preference for or bias towards coethnic investing.

We consider two counterfactual scenarios. In the first one we assign all publicly listed firms a coethnic investor base as large as the one corresponding to the largest ethnic (investor) group with a positive portfolio at the end of our data period (in December 2010). In this scenario we thus abstract from whether investors are active at the relevant point in time or not. In the second scenario, we assign all firms a coethnic investor base as large as the one corresponding to the largest *active* ethnic (investor) group in Kenya observed at any point during our data period.[33]

These scenarios are directly inspired by Merton (1987)'s clientele theory. As he points out, a situation in which each firm's "clientele"—that is, its potential investors—is made up of *all* investors in the market conceptually corresponds to a state of the world in which investors do not have a taste for or bias towards certain firms. In such a situation, investors may—relative to a clientelistic investment status quo—both allocate their investments across firms so as to earn higher returns, and also choose to invest more (see also Hjort, 2014). However, as Merton (1987) acknowledges, such a state of the world may be unattainable in reality; for example, most retail investors probably have attention bandwidths that fundamentally constrain how many firms they can pay attention to.[34] We thus consider more realistic scenarios in which all firms get access to investor bases corresponding to those that firms led by managers from the biggest ethnic group benefit from in the status quo.

The estimated coefficient on a firm's investor base in regression (4) is $\hat{\beta}$. $(\text{InvestorBase}_{jt}^{C} - \text{InvestorBase}_{jt}) \times \hat{\beta}$, is thus the difference between the firm's price-to-book value under the counterfactual less-coethnic-investing scenario and the observed state of the world. This implies that the decrease in the expected value of a firm due to coethnic investing is $(\text{InvestorBase}_{jt}^{C} - \text{InvestorBase}_{jt}) \times \hat{\beta} \times \text{BookValue}_{jt} \times \text{TotalShares}_{jt}$. Computing

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[32]Of course, Table 5 does not rule out displacement effects if many firms were to "switch ethnicities" at the same time.

[33]In both scenarios we calculate expected changes in firms' valuation at the end of our data period in December 2010, however.

[34]In Merton (1987)'s example, individual *firms* face convex costs of expanding investor knowledge about their existence. Note that our estimates in Table 5 imply that Kenya's publicly listed firms would in the extreme scenario in which all investors can invest in all firms have been worth 281 percent more than in the status quo.

this quantity for the last month observed in our data (December 2010), we estimate that the average listed Kenyan firm would be worth USD 184 – 200 million more if Kenyan investors' investing was less coethnic.[35] These numbers correspond to the two counterfactual scenarios we consider, and imply that the total value of all firms listed on Kenya's stock exchange would be around USD 8.27 – 8.99 billion, or 72 – 78 percent, greater if Kenyan investors did not neglect firms run by non-coethnic managers and all firms therefore had access to coethnic potential investor bases of the same size as ethnic majority-run firms.[36]

6   Conclusion

Ethnic investing—excess investing in coethnic relative to non-coethnic investment objects—is common worldwide, but why do investors restrict their investments in this way, and what are the consequences? In this paper we first use transaction level data from Kenya's stock exchange and CEO/board turnover to document the surprising extent of ethnic investing—even *within investor-investment object pairs*—in a large, anonymous type of market that is broadly considered among the most efficient ways to allocate capital. Kenyan investors invest considerably more in a given firm when the firm is run by managers of the same ethnicity as the investor. This occurs despite coethnic investments earning lower risk-adjusted returns, pointing towards a taste-based or psychological explanation. Taking advantage of the complete market nature of a stock exchange and variation over time in firms' coethnic investor bases, we then show that supply-side responses and arbitrage do not offset the impact of coethnic investing on firms' market valuation. Our estimates imply that coethnic investing lowers the combined value of publicly listed Kenyan firms by about USD 8 – 9 billion.

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[35]Since in the regression we use $\log(PriceToBook)$, the decrease in the expected value of a firm due to coethnic investing is given by $[\exp\{(\text{InvestorBase}_{jt}^{C} - \text{InvestorBase}_{jt}) \times \hat{\beta}\} - 1] \times \text{PriceToBook}_{jt} \times \text{BookValue}_{jt} \times \text{TotalShares}_{jt}$. These expected value gains are calculated using the estimated coefficient on "Investor base size" in Panel A of Table 5. Note that 45 firms were listed on the NSE in December 2010.

[36]If we use the estimated coefficient on "Investor base value" instead of the one on "Investor base size", the expected value gain is USD 277 – 294 million per firm, or USD 12.47 – 13.24 billion for the market as a whole.

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Figures

FIGURE 1: INVESTMENT BY PRE-COETHNICS, POST-COETHNICS, AND OTHERS WHEN A FIRM "CHANGES ETHNICITY" DUE TO CEO TURNOVER

Order Imbalance Pre-Coethnics
Order Imbalance Post-Coethnics
Order Imbalance Others
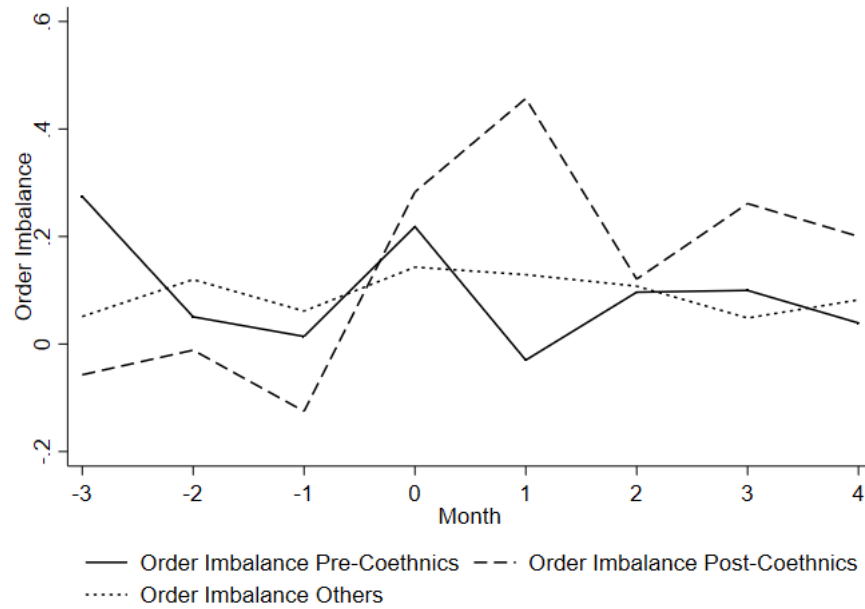
The figure depicts average monthly "Order Imbalance" for pre-coethnics (investors for which CoethnicCEO$_{ijt}$ = 1 before the change of CEO), post-coethnics (investors for which CoethnicCEO$_{ijt}$ = 1 after the change of CEO), and others, before and after a CEO (ethnicity) change, including only those firms for which the (ethnicity of the) CEO changes at least once during our data period. "Order Imbalance" (OI) measures how much the investor buys or sells the firm's stock on net, as a proportion of the investor's total trade in the firm's stock during the same month (see Section 3 for details). The change occurs at month 1.

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Tables

TABLE 1: SUMMARY STATISTICS

Variable	Mean	Std. Dev.
Panel A: Investor level		
N = 54915		
Average portofolio value 2006 (USD)	5999	66832
Average portofolio value 2010 (USD)	4570	47340
Panel B: Firm level		
N = 47		
Listed by 2006	.872	.337
Agricultural	.089	.288
Commercial and Services	.244	.435
Finance and Investment	.311	.468
Industrial and Allied	.356	.484
Market cap. 2006 (USD 000's)	260599	466847
Market cap. 2010 (USD 000's)	285579	488948
Panel C: Investor $\times$ firm $\times$ month level		
N = 658188		
Investment	.547	.405
Order Imbalance	.069	.985
CoethnicCEO	.271	.445
CoethnicBoard	.406	.491
CEOCoethnicityIndex	.184	.294
BoardCoethnicityIndex	.152	.168

The dataset spans January 2006 – December 2010, and includes all investors observed over the period that made at least five trades (buying or selling) in a given year, as well as 47 firms that were listed on the NSE during some part of the period. These firms include ACCS, BAMB, BAT, BBK, CABL, CMC, DTK, EABL, EQTY, EVRD, HFCK, ICDC, JUB, KCB, KEGN, KENO, KNRE, KPLC, KQ, MSC, NBK, NIC, NMG, OCH, PORT, REA, SCAN, SCBK, SCOM, SGL, TOTL, TPSE, ARM, SASN, FIRE, PAFR, UNGA, BERG, CFC, UCHM, COOP, CandG, MASH, KUKZ, BOC, UTK, CARB. The trades were aggregated to the investor-firm-month level. For any given investor and firm, only those months where a trade was made are included.

TABLE 2: INVESTOR-FIRM COETHNICITY AND INVESTMENT

	(1) Investment	(2) Investment	(3) Investment	(4) Investment
CoethnicCEO	0.00980*** (0.00313)			
CEOCoethnicityIndex		0.0110*** (0.00359)		
CoethnicBoard			0.0199*** (0.00352)	
BoardCoethnicityIndex				0.0458*** (0.00808)
Investor FE	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes
CEO Ethnicity FE	Yes	Yes	Yes	Yes
Mean of Dep. Var.	0.276	0.185	0.497	0.155
R2	0.399	0.393	0.431	0.390
N	273691	399737	187525	429797
	(1) OI	(2) OI	(3) OI	(4) OI
CoethnicCEO	0.00876* (0.00462)			
CEOCoethnicityIndex		0.0129** (0.00532)		
CoethnicBoard			0.0711*** (0.00630)	
BoardCoethnicityIndex				0.117*** (0.0145)
Investor FE	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes
CEO Ethnicity FE	Yes	Yes	Yes	Yes
Mean of Dep. Var.	0.273	0.184	0.488	0.153
R2	0.330	0.324	0.343	0.317
N	409616	602827	280740	648540

The top and bottom panels show results from regressions (1) and (2), which are estimated on investor-firm-month-level data. Observations for all months in which the investor trades (buys or sells) the relevant firm are included. (The number of observations varies across columns because of variation in the data requirements of the four measures of investor-firm coethnicity (see Section 3 and the Appendix)). "Investment", the outcome in Panel A, is the proportion of the investor's portfolio that is held in the relevant firm in the relevant month. "Order Imbalance" (OI), the outcome in Panel B, measures how much the investor buys or sells the firm's stock on net, as a proportion of the investor's total trade in the firm's stock during the same month (see Section 3 for details). All specifications include investor, firm, month, and CEO ethnicity fixed effects. Standard errors are clustered at the investor level. The dataset spans January 2006-December 2010. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

TABLE 3: INVESTOR-FIRM COETHNICITY AND INVESTMENT WITHIN INVESTOR-FIRM PAIRS

	(1) Investment	(2) Investment	(3) Investment	(4) Investment
CoethnicCEO	0.0122			
	(0.0202)			
CEOCoethnicityIndex		0.0265		
		(0.0219)		
CoethnicBoard			0.0616***	
			(0.00810)	
BoardCoethnicityIndex				0.232***
				(0.0296)
Pair FE	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes
CEO Ethnicity FE	Yes	Yes	Yes	Yes
Mean of Dep. Var.	0.271	0.181	0.494	0.154
R2	0.606	0.607	0.629	0.606
N	205090	295941	135028	316352

	(1) OI	(2) OI	(3) OI	(4) OI
CoethnicCEO	-0.0358			
	(0.0413)			
CEOCoethnicityIndex		0.0382		
		(0.0454)		
CoethnicBoard			0.160***	
			(0.0187)	
BoardCoethnicityIndex				0.658***
				(0.0629)
Pair FE	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes
CEO Ethnicity FE	Yes	Yes	Yes	Yes
Mean of Dep. Var.	0.279	0.186	0.502	0.156
R2	0.444	0.445	0.466	0.441
N	307144	449438	201384	481444

The top and bottom panels show results from regressions (1) and (2), which are estimated on pair (investor×firm)-month-level data. Observations for all months in which the investor trades (buys or sells) the relevant firm are included. (The number of observations varies across columns because of variation in the data requirements of the four measures of investor-firm coethnicity (see Section 3 and the Appendix)). "Investment", the outcome in Panel A, is the proportion of the investor's portfolio that is held in the relevant firm in the relevant month. "Order Imbalance" (OI), the outcome in Panel B, measures how much the investor buys or sells the firm's stock on net, as a proportion of the investor's total trade in the firm's stock during the same month (see Section 3 for details). All specifications include pair, month, and CEO ethnicity fixed effects. Standard errors are clustered at the investor level. The dataset spans January 2006-December 2010. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

TABLE 4: INVESTOR-FIRM COETHNICITY AND RETURNS

	(1) Risk-adjusted Returns	(2) Risk-adjusted Returns	(3) Risk-adjusted Returns	(4) Risk-adjusted Returns
CoethnicCEO	-0.0459**			
	(0.0225)			
CEOCoethnicityIndex		-0.0240		
		(0.0349)		
CoethnicBoard			-0.146***	
			(0.0405)	
BoardCoethnicityIndex				0.0289
				(0.0916)
Investor FE	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes
CEO Ethnicity FE	Yes	Yes	Yes	Yes
Mean of Dep. Var.	-0.0600	0.148	0.290	-0.0602
R2	0.569	0.587	0.616	0.569
N	354420	331053	157813	355667

The table shows results from regression (3), which is estimated on investor-firm-month-transaction-level data. Risk-adjusted returns is defined as the return on investment of the transaction divided by the risk or standard deviation of the monthly returns over the holding period. The sample consists of all transactions initiated during the period. The month indicates origination of the transaction. An investor may have multiple transactions for a given firm's stock in a given month. The sample includes both transactions that were closed (sold in full) during the period, as well as those open at the end of the period. For those open at the end of the period, we assume the transactions were closed in the last month (see Section 4 and the Appendix for details). All specifications include investor, firm, month of origination, and CEO ethnicity fixed effects. Standard errors are clustered at the investor level. The dataset spans January 2006-December 2010. (The number of observations varies across columns because of variation in the data requirements of the four measures of investor-firm coethnicity (see Section 3 and the Appendix)). * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

TABLE 5: AGGREGATE CONSEQUENCES OF COETHNIC INVESTING

	(1) Log Price-to-book	(2) Log Price-to-book
Investor base size	1.655* (0.871)	
Investor base value		2.320** (0.866)
Firm FE	Yes	Yes
Month FE	Yes	Yes
CEO ethnicity switch	No	No
Mean of Dep. Var.	0.853	0.853
R2	0.856	0.857
N	1828	1828

	CEO switch → Investor base ↑ (1) Log Price-to-book	CEO switch → Investor base ↓ (2) Log Price-to-book
I(Firm switched CEO → Δ Investor base size) × post-switch	0.435*** (0.107)	-0.245** (0.117)
I(Other firm of post-CEO switch ethnicity) × post-switch	0.200 (0.153)	0.0247 (0.0617)
I(Other firm of pre-CEO switch ethnicity) × post-switch	-0.289 (0.219)	0.0237 (0.0611)
Month FE	Yes	Yes
Firm FE	Yes	Yes
Mean of Dep. Var.	0.966	0.802
R2	0.795	0.831
N	1655	2319

(1) The top panel shows results from regression (4), which is estimated on firm-month level data. The dataset spans January 2006-December 2010 and the sample covers only those firms listed on the NSE for which the ethnicity of the CEO remained constant throughout the period. Investor base size refers to the active investors in a given month of the same ethnicity as the firm CEO as a proportion of all investors active in the same month, and investor base value refers to the aggregate value traded by those coethnic investors in the month as a proportion of total value traded in the same month (see Section (5) for details). All specifications include firm and month fixed effects. Standard errors are clustered at the firm level.

(2) The bottom panel shows results from regression (5), which is estimated on firm-month level data. The dataset spans January 2006-December 2010. "Firm switched CEO" is an indicator equal to 1 if the ethnicity of the firm's CEO changed during the period, and post-switch is an indicator equal to 1 after the change of CEO. "Other firm of post-CEO switch ethnicity" is an indicator for all firms with post-switch is an indicator equal to 1 after the change of CEO. "Other firm of post-CEO switch ethnicity" is an indicator for all firms with CEOs having the same ethnicity as that of the new CEO, and "Other firm of pre-CEO switch ethnicity" is an indicator for all firms with CEOs having the same ethnicity of as that of the old CEO. Investor base size and Investor base value are defined as in the top panel. The sample looks at a 12 month window around the switch, 6 months prior and 6 months following. Column (1) limits the sample to those firms for which the new CEO has a bigger coethnic investor base size than the old CEO, and column (2) limits the sample to those firms for which the new CEO has a smaller coethnic investor base size than the old CEO. See Section (5) for details. All specifications include firm and month fixed effects. Standard errors are clustered at the firm level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Appendix

6.1 Data and outcome variables

6.1.1 Data

We use the following data sources. The NSE's Transactions Registry is recorded by the Central Depository and Settlement Corporation, Ltd. (CDSC), the "back office" that manages the clearing and settlement of NSE transactions. The CDSC also maintains a Registry of NSE Investor Accounts. They gave us access to a de-identified version that contains, in addition to a scrambled id, the investor's gender, residential location (typically a town or city), account creation year, account type (individual/institutional investor/broker), nationality (Kenya/East African Community (Burundi, Rwanda, South Sudan, Tanzania, and Uganda)/"foreign"), and last name. Information on firm characteristics (book value, outstanding shares, etc) comes from the firms' financial reports.

6.1.2 Outcome variables

What we term **Investment**, or holdings imbalance, ranges from 0 to 1. It measures, at the investor-firm-month level, the value of a particular investor's holdings of a particular stock, as a proportion of the value of the investor's total portfolio.

   Order Imbalance ranges from -1 to 1. It measures, at the investor-firm-month level, how much the investor net buys or sells a particular firm's stock, as a proportion of the investor's total traded stock of the same stock during the same month (see e.g. Chordia *et al.*, 2002). Specifically,

$$\text{Order Imbalance} = \frac{\text{(Total value of stocks bought)} - \text{(Total value of stock sold)}}{\text{Total volume traded within the month}}$$

   The way we calculate **Returns** follows the finance literature (see e.g. Cohen *et al.*, 2008) and is explained in detail in Section 4. For buys that were not subsequently sold before the end of our data period, the 31st of December 2010, we compute returns at that point in time.

6.1.3   Other variables

Beta refers to a firm's beta with respect to the Nairobi Stock Exchange's index returns.

Firm size (one of the Merton (1987) "value controls" in Appendix Table B4) refers to a firm's market capitalization relative to the total market capitalization within the sample during a particular month.

Investor base. For a particular firm and month, "Investor base (size)" is defined as the proportion of unique investors that have traded on the NSE during the month that are of the same ethnicity as the firm's CEO (measured as CoethnicCEO$_{ijt}$). Similarly, for a particular firm and month, "Investor base (value)" is defined as the proportion of unique investors' total value traded on the NSE that is traded by unique investors that are of the same ethnicity of the firm's CEO.

6.2   Coding ethnicity and coethnicity

6.2.1   Ethnicity

We probabilistically assign ethnicities to investors, CEOs, and board-members using their last names. As described in Section 2, the starting point is name×ethnicity match probability information recorded by Yenkey (2015). The author hired eight Kenyan research assistants (RAs). For each last name, each RA was asked to assign a 1 to any ethnicity that the RA felt 75 percent confident that the name was likely to belong to, and a 0 otherwise. There is overlap in the names used by some ethnicities so that the RAs could assign a given name to multiple ethnicities.[37] We start by taking the average of the 1's and 0's across all RAs for each name to arrive at a single number for each name n and ethnicity e, p_{en}.

From this information we need to construct a measure of whether an individual investor is likely to be of the same ethnic group as a given CEO and board. We say that ethnicity e is name n's *Likely Ethnicity* if $p_{en} \geq 0.4$ and p_{en} is ≤ 0.3 for all other ethnicities.[38] If this it not true for any ethnicity, n does not have a Likely Ethnicity.

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[37]RAs were asked to do so for the following ethnicities: Anglo, Kalenjin, Kamba, Kikuyu, Kisii, Luhya, Luo, Maasai, Meru, South Asian, Swahili.

[38]These cut-offs were chosen with the goal of minimizing both type 1 and type 2 errors. We also wish to make use of a high proportion of the sample of investors; for this reason the 0.4 threshold is relatively low and the 0.3 threshold

6.2.2 Coethnicity

As described in Section 2, the first CEO measure, CoethnicCEO_{ijt}, is an indicator variable equal to 1 if investor i and the CEO running firm j in month t share a Likely Ethnicity, and 0 if not CoethnicCEO_{ijt} is missing if either the investor or the CEO does not have a Likely Ethnicity.

The second CEO coethnicity measure, $\text{CEOCoethnicityIndex}_{ijt}$, is a 0 (minimum proximity) to 1 (maximum proximity) measure of the expected ethnic proximity between the investor's and the CEO's name, given each person's expected probability of belonging to each ethnicity. Specifically, the index is equal to 1 minus Lieberson (1969)'s index of population diversity, or in other words, the inner product of the investor and the CEOs' p_{en}'s. In this case no cut-off choices are necessary, we can make use of the full sample, and we avoid restricting attention to the most likely ethnicity for the investor and the CEO.

One board measure, $\text{BoardCoethnicityIndex}_{ijt}$, is equal to the proportion of board-members that are coethnic, where coethnicity is measured as for the CoethnicCEO_{ijt}.

The other board measure, $\text{CoethnicBoard}_{ijt}$, is a 0/1 variable, and essentially repeats the construction of CoethnicCEO_{ijt} twice, first between individual board-members and the CEO, then for the board as a whole vis-a-vis the CEO. So this measure is stricter in the sense that, to set $\text{CoethnicBoard}_{ijt} = 1$ in month t, we require, first, each individual board-members to be either a likely coethnic or a likely non-coethnic of the CEO (that is, to be relatively likely to belong to the same ethnicity and relatively unlikely to belong to a different ethnicity than the CEO, or vice versa), and second, for the board as a whole—given the expected individual board-member/CEO co-ethnicity/non-coethnicity statuses—to be relatively likely to belong to the same ethnicity as the CEO and relatively unlikely to belong to another ethnicity.

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relatively high, given considerable overlap in the names used by some Kenyan ethnic groups. In sub-section B1 of this appendix we show that our results are qualitatively very similar if we vary the thresholds.

6.3 Robustness checks

In Appendix Table B1 we show that our results from Section 3 of the paper are qualitatively very similar if we vary the thresholds used to define investors' and managers' ethnicities. The coethnicity variables are defined differently than in Table 2: the cutoffs, both to define individual and board level ethnicity are a high of 0.3 and low of 0.2, compared to 0.4 and 0.3, respectively in the main analysis

In Appendix Table B2 we show that the lower risk-adjusted returns on coethnic investments we document in Table 4 are driven by a combination of lower raw returns and higher variability in returns on—that is, higher risk of—coethnic investments.

Appendix Tables

	(1) Investment	(2) Investment	(3) Investment	(4) Investment
CoethnicCEO	0.00990*** (0.00361)			
CEOCoethnicityIndex		0.0121*** (0.00358)		
CoethnicBoard			0.00233 (0.00578)	
BoardCoethnicityIndex 2				0.0168* (0.00954)
Investor FE	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes
CEO Ethnicity FE	Yes	Yes	Yes	Yes
Mean of Dep. Var.	0.256	0.185	0.319	0.0718
R2	0.395	0.393	0.446	0.390
N	183923	399737	68062	429797

	(1) OI	(2) OI	(3) OI	(4) OI
CoethnicCEO	0.00298 (0.00569)			
CEOCoethnicityIndex		0.0184*** (0.00531)		
CoethnicBoard			-0.00511 (0.00998)	
BoardCoethnicityIndex 2				0.0161 (0.0160)
Investor FE	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes
CEO Ethnicity FE	Yes	Yes	Yes	Yes
Mean of Dep. Var.	0.254	0.184	0.328	0.0710
R2	0.332	0.324	0.396	0.316
N	274897	602827	109361	648540

The top and bottom panels show results from regressions (1) and (2), which are estimated on investor-firm-month-level data. Observations for all months in which the investor trades (buys or sells) the relevant firm are included. (The number of observations varies across columns because of variation in the data requirements of the four measures of investor-firm coethnicity (see Section 3 and the Appendix)). "Investment", the outcome in Panel A, is the proportion of the investor's portfolio that is held in the relevant firm in the relevant month. "Order Imbalance" (OI), the outcome in Panel B, measures how much the investor buys or sells the firm's stock on net, as a proportion of the investor's total trade in the firm's stock during the same month (see Section 3 for details). The coethnicity variables are defined differently than in Table 2: the cutoffs, both to define individual and board level ethnicity are a high of 0.3 and low of 0.2, compared to 0.4 and 0.3, respectively in the main analysis (see the Appendix for details). All specifications include investor, firm, month, and CEO ethnicity fixed effects. Standard errors are clustered at the investor level. The dataset spans January 2006-December 2010. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

	(1) Returns	(2) Returns	(3) Returns	(4) Returns
CoethnicCEO	-0.00534** (0.00257)			
CEOCoethnicityIndex		-0.00968** (0.00429)		
CoethnicBoard			-0.00228 (0.00522)	
BoardCoethnicityIndex				0.0191* (0.0112)
Investor FE	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes
CEO Ethnicity FE	Yes	Yes	Yes	Yes
Mean of Dep. Var.	-0.0508	-0.0278	-0.0216	-0.0508
R2	0.556	0.572	0.597	0.555
N	366615	341579	161601	367885
	(1) Risk	(2) Risk	(3) Risk	(4) Risk
CoethnicCEO	0.0163** (0.00645)			
CEOCoethnicityIndex		0.0254** (0.0124)		
CoethnicBoard			-0.0311*** (0.0103)	
BoardCoethnicityIndex				0.162*** (0.0231)
Investor FE	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes
CEO Ethnicity FE	Yes	Yes	Yes	Yes
Mean of Dep. Var.	0.256	0.274	0.368	0.256
R2	0.655	0.658	0.673	0.655
N	354697	331038	156270	355940

The table shows results from regression (3), which is estimated on investor-firm-month-transaction-level data. Panel A shows results for the risk-unadjusted returns, or the return on investment, and panel B shows the risk or standard deviation of the monthly returns over the holding period. The sample consists of all transactions initiated during the period. The month indicates origination of the transaction. An investor may have multiple transactions for a given firm's stock in a given month. The sample includes both transactions that were closed (sold in full) during the period, as well as those open at the end of the period. For those open at the end of the period, we assume the transactions were closed in the last month (see Section 4 and the Appendix for details). All specifications include investor, firm, month of origination, and CEO ethnicity fixed effects. Standard errors are clustered at the investor level. The dataset spans January 2006-December 2010. (The number of observations varies across columns because of variation in the data requirements of the four measures of investor-firm coethnicity (see Section 3 and the Appendix)). * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

TABLE B3: INVESTOR-FIRM COETHNICITY AND RETURNS, CONSTANT FIRM ETHNICITY SAMPLE

	(1) Risk-adjusted Returns	(2) Risk-adjusted Returns	(3) Risk-adjusted Returns	(4) Risk-adjusted Returns
CoethnicCEO	-0.0593**			
	(0.0281)			
CEOCoethnicityIndex		-0.0322		
		(0.0442)		
CoethnicBoard			-0.150***	
			(0.0429)	
BoardCoethnicityIndex				-0.102
				(0.106)
Investor FE	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes
CEO Ethnicity FE	Yes	Yes	Yes	Yes
Mean of Dep. Var.	-0.112	0.149	0.453	-0.112
R2	0.589	0.611	0.615	0.589
N	277241	253636	140995	278238

The table shows results from regression (3), which is estimated on investor-firm-month-transaction-level data. The sample is restricted to those firms for which the (ethnicity of the) CEO did not change during our data period. Risk-adjusted returns is defined as the return on investment of the transaction divided by the risk or standard deviation of the monthly returns over the holding period. The sample consists of all transactions initiated during the period. The month indicates origination of the transaction. An investor may have multiple transactions for a given firm's stock in a given month. The sample includes both transactions that were closed (sold in full) during the period, as well as those open at the end of the period. For those open at the end of the period, we assume the transactions were closed in the last month (see Section 4 and the Appendix for details). All specifications include investor, firm, month of origination, and CEO ethnicity fixed effects. Standard errors are clustered at the investor level. The dataset spans January 2006-December 2010. (The number of observations varies across columns because of variation in the data requirements of the four measures of investor-firm coethnicity (see Section 3 and the Appendix)). * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

TABLE B4: AGGREGATE CONSEQUENCES OF COETHNIC INVESTING: ALTERNATIVE CONTROLS

	(1) Log Price-to-book	(2) Log Price-to-book
Investor base size	1.075 (0.660)	
Investor base value		1.691** (0.697)
Value Controls	Yes	Yes
Month FE	Yes	Yes
CEO ethnicity switch	No	No
Mean of Dep. Var.	0.853	0.853
R2	0.884	0.884
N	1828	1828

	CEO switch → Investor base ↑ (1) Log Price-to-book	CEO switch → Investor base ↓ (2) Log Price-to-book
I(Firm switched CEO → Δ Investor base size) × post-switch	0.290*** (0.0734)	-0.162* (0.0853)
I(Other firm of post-CEO switch ethnicity) × post-switch	0.0736 (0.0859)	0.0187 (0.0599)
I(Other firm of pre-CEO switch ethnicity) × post-switch	-0.181 (0.203)	0.00970 (0.0545)
Value Controls	Yes	Yes
Month FE	Yes	Yes
Mean of Dep. Var.	1.051	0.897
R2	0.899	0.893
N	1379	1795

(1) The top panel shows results from regression (4), which is estimated on firm-month level data. The dataset spans January 2006-December 2010 and the sample covers only those firms listed on the NSE for which the ethnicity of the CEO remained constant throughout the period. Investor base size refers to the active investors in a given month of the same ethnicity as the firm CEO as a proportion of all investors active in the same month, and investor base value refers to the aggregate value traded by those coethnic investors in the month as a proportion of total value traded in the same month (see Section (5) for details). All specifications include month fixed effects and controls for the market capitalization of the firm relative to the entire market, the return on equity (ROE) in the prior 12 month period, and the 1 and 2 year forward ROE. Standard errors are clustered at the firm level.

(2) The bottom panel shows results from regression (5), which is estimated on firm-month level data. The dataset spans January 2006-December 2010. "Firm switched CEO" is an indicator equal to 1 if the ethnicity of the firm's CEO changed during the period, and post-switch is an indicator equal to 1 after the change of CEO. "Other firm of post-CEO switch ethnicity" is an indicator for all firms with CEOs having the same ethnicity as that of the new CEO, and "Other firm of pre-CEO switch ethnicity" is an indicator for all firms with CEOs having the same ethnicity of as that of the old CEO. Investor base size and Investor base value are defined as in the top panel. The sample looks at a 12 month window around the switch, 6 months prior and 6 months following. Column (1) limits the sample to those firms for which the new CEO has a bigger coethnic investor base size than the old CEO, and column (2) limits the sample to those firms for which the new CEO has a smaller coethnic investor base size than the old CEO. See Section (5) for details. All specifications include month fixed effects and controls for the market capitalization of the firm relative to the entire market, the return on equity (ROE) in the prior 12 month period, and the 1 and 2 year forward ROE. Standard errors are clustered at the firm level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$