Speculation as a Learned Behavior? Adaptive Rationality Among New Investors and the Evolution of a Nascent Market

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Abstract
This inductive study examines the extent to which small, newly recruited investors learn to mimic the trading behaviors of experienced institutional investors in an emerging capital market characterized by policies that incentivize speculative trading in IPO shares. Theoretically, I explore how small, inexperienced investors learn to trade shares more effectively and how the ordering and attributes of listing firms facilitate or impede this learning process. Empirically, I model rates of speculative IPO trading for investors based on portfolio value, registration type (individual vs. company), and previous experience in the Kenyan IPO market and chart the relative rates of speculative trading between investor groups over the course of successive IPOs. Analysis of individual data for 1.4 million domestic investors across six consecutive IPOs in Kenya’s nascent stock market from 2006 to 2008 suggests that low portfolio value individual investors are initially much less likely than institutional investors to act on short-term profit opportunities, but small increases in experience levels quickly produce rates of speculative trading by small investors that matches those of the largest investors. However, this learning process can be disrupted by differences in share price trajectories between IPOs as well as characteristics of listing firms, as smaller investors are more likely to formulate unreasonable expectations of share price gains in IPOs of high status firms and in IPOs that follow offers with abnormally high returns. Results are discussed as a theory of nascent market evolution, where I argue that the investing public’s learned orientation to short-term share ownership forces a reconsideration of state-level regulatory policies as well as firm-level decisions about when to list in an emerging market.

Keywords: Emerging markets, institutional development, investor behavior, constraints to firm/market development
INTRODUCTION

This paper studies how an inexperienced investing population learns to take advantage of routine short term profit opportunities in a nascent financial market and discusses the implications of a more experienced population of investors on the continued development of the market. I model a nascent financial market as a heterogeneous population of investors that differ in a range of attributes linked to what has elsewhere been labeled as “sophistication,” including portfolio values, registration status as individuals or companies, and levels of experience in the market. I consider it uncontroversial that less sophisticated participants in an emerging stock exchange might be less aware of the full range of possible trading strategies and therefore underperform their more experienced counterparts; the theoretical and empirical question addressed here, however, is the extent to which trading strategies of these types of investors evolve over time, how events in the market alter this learning process, and the effect that a maturing investing population might have for the continued development of a nascent market.

My investigation of the formation of trading strategies by new investors is premised on a simple condition: the logic inherent in owning shares is simpler than the logic involved in trading shares. The decision to own a share requires only that the investor come to believe that the value of those shares will be more in the future than in the present (or that the practice of share ownership is in some other way beneficial); actually realizing that value, however, requires the actor to leave that arena of cognitive abstraction and arrive at a concrete, time-specific decision of when to sell her shares such that the increased value of them are realized. Share prices in emerging markets are often highly volatile, thus possibly putting inexperienced

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Although there are a number of reasons to be uncomfortable with using the term “sophistication” to signify expected behaviors based on wealth, registration status and the like, I stick with it for the time being based on its definition as “to make less naïve and more worldly.”
investors at a disadvantage in recognizing better and worse times to sell existing shares or buy additional ones.

Rejecting the perspective of many behavioral finance scholars that smaller, retail investors are doomed to repeatedly underperform larger institutional investors, I draw on from sociological models of organizational learning to build a theoretical framework that endogenizes investor sophistication in a way that explains improved trading efficacy based on the experiences investors accumulate in the market. I do not, however, contend that this maturation is a linear process; I document and discuss how idiosyncratic events within the market might derail investor learning. Overall, however, I find that the trading behavior of new investors quickly comes to mirror that of experienced, institutional investors, following a learning path that positions current trading strategies relative to recent events in the market.

The analysis of changing share trading behaviors across different investor types is followed by a discussion of the implications for financial market development of a maturing population of participants as part of a theory of market evolution based on increased experiential learning across a newly recruited investing public. As such, this paper expands the scope of earlier work on emerging financial markets that studies the rate at which they are established (Sylla 1995; Weber, Davis, and Lounsbury 2009), growth in total market capitalization (Singh 1997; Weber, Davis, and Lounsbury 2009), and growth in the number of listed firms (e.g. Bouchkovva and Megginson 2000) by contributing an analysis of how newly recruited investing populations change their behaviors as they gain experience and how these changes impact continued market performance.

The particular trading behavior I focus on is speculative investing in IPO shares, which I define as when an investor subscribes for shares in an IPO and then sells those shares in the first
month of trading. An investigation of rates of speculative selling in emerging market IPOs is a particularly apt arena for studying investor learning processes because emerging market IPOs often employ politicized offer terms that result in sharp rises in early IPO trading. A common strategy for legitimating investor participation in nascent capital markets is to hold IPO share prices artificially low, an especially common practice in privatization offers which form the bulk of emerging market listings, the result being sharp gains in early trading that make the practice of shareholding visible and attractive to the general population. New, less experienced investors in such markets might then be conditioned to think that such short term gains are a normal part of stock exchanges. In such an environment, it might be natural for new market participants to adopt a speculative approach to shareholding (Keynes 1936; Kaldor 1939). If share price gains are predictably and sufficiently high in the short run, then one strategy, especially in countries where inflation is often high and unpredictable and there are myriad other sources of long-run volatility that can affect real returns to the investors, might be to liquidate the investment early on, eschewing a longer term position in the market.

The incentivization of speculative shareholding in emerging markets that employ politicized offer terms makes for a particularly interesting laboratory for studying heterogeneous groups of investors because these nascent markets are venues where investors of widely differing levels of experience and capitalization compete against each other. Although lower income groups in developing countries have a long history of utilizing sophisticated financial arrangements in the informal economy (Guyer 1995), share trading is a new arena of exchange for the vast majority of stock market participants in developing countries. In these settings, it is common for large numbers of inexperienced retail investors to be recruited into the stock exchange where they are exposed to competition against more experienced and better capitalized
institutional investors. Public and private pension funds, commercial banks, and high net worth individuals make use of professional financial services firms to invest in these domestic securities, and the awareness to buy and sell at different times, as is the case in all capital markets, is a key determinant of the profitability of each actor’s investment.

This article seeks to explain rates of speculative trading that emerge from groups of emerging market investors that vary in a number of measures of what is often called “sophistication” by behavioral finance researchers. Rather than approach market savvy as a set of exogenous characteristics one brings to the market, I think of it as arising from social mechanisms endogenous to the market. In particular, I build and test theoretical propositions of how experiential learning in politically manipulated emerging markets is related to higher incidences of speculative trading, in effect arguing that the political manipulations common to emerging stock exchanges tend to condition new investors to approach capital market investment as an opportunity for speculative gains rather than long term investment.

I study these issues through a case study of IPO share trading behaviors in a heterogeneous population of capital market investors in Kenya’s Nairobi Stock Exchange (NSE). With access to the NSE’s electronic share ownership and trading databases, I model the effects of market experience, portfolio value, and registration type on the likelihood of speculative trading in a market characterized by rapid early share price gains brought on by the use of politicized offer terms.

The following section provides the reader with necessary background information about the Kenyan context, followed by a theory building section, then the empirical data, methods, and results; a concluding section discusses the results in the context of building a theory about nascent market evolution stimulated by the maturation of the investing population.
THE KENYAN CONTEXT

In the years between the NSE’s founding in 1954 by British colonial businessmen and Kenya’s independence in 1963, indigenous Kenyan’s were forbidden to own shares (Bishop 1988). For several decades after independence, the NSE operated as a closed group, with shares bought and sold among a small group of Kenya’s elite (Ngugi 2003). As a result, liquidity in the market was low even by African standards and growth in market capitalization and the number of listed firms stagnated. The election of a more pro-business administration in 2000 led to a wave of market liberalization reforms, including one measure intended to stimulate the domestic capital market. The Privatization Act of 2005 required that all newly listing firms receive regulatory approval when setting initial share prices and minimum buy-ins required of IPO investors, and that high percentages of IPO shares are allocated to retail investors. The goal of this policy change was to stimulate public participation in the stock exchange, which would increase liquidity and mobilize small pockets of nascent capital to finance uptake of shares in several large state-owned firms whose privatizations were part of market liberalization reforms. Cheap, easy access to shares was seen as the key strategy for mobilizing lower income groups.

An estimated 140,000 investors owned shares prior to the state’s effort to deepen participation starting in 2006, and by late 2008 that number grew to approximately 1.4 million in a country with just over 2.7 million households earning more than double the poverty wage (Kenya Central Bureau of Statistics 2005). Of these 1.4 million shareholders, more than 87% are registered as domestic individuals, 12% are registered as domestic companies, with the
remaining one percent being foreigners. Regardless of registration status, high participation rates by lower income groups is inferred by the fact that the portfolio value of the median domestic investor is approximately US$70. One must look above the 80th percentile of shareholding accounts to find an account valued at more than $120, the equivalent of two months wages at the average Kenyan income of two dollars per day.

The role played by IPOs in recruiting new investors can scarcely be overstated, as 98% of all new recruits to investor capitalism in Kenya entered the system by subscribing for shares in an IPO rather than purchasing shares in open market trading. In an effort to recruit new investors into newly formed stock exchanges, policy makers in many developing and transition economies employ politicized offer terms when conducting initial public offerings (IPO) (Dewenter and Malatesta 1997). Politicized offer terms consist of a number of state regulations that require shares of listing firms to be made accessible to large portions of the domestic population, which in developing countries includes lower income groups that do not normally have access to intangible securities. In what some describe as a populist approach to deepening capital market participation (Price Waterhouse 1998; Menyah et al. 1996), regulators often require that initial share prices be set artificially low (making shares affordable to a large portion of a low income country’s population), prohibit the use of book building or other competitive tender offers in setting initial share prices, and allocate large portions of shares to retail rather than institutional investors (Jones et al. 1999). Considering that the majority of firm listings on emerging stock exchanges are privatizations of state owned firms (Bouchkova and Megginson 2000), most listing firms do not object to these offer terms because the state owns both the listing firm and the regulatory agency that craft the terms of the IPO.

2 All summary data presented here is made possible through access to the complete electronic database of investor accounts used by the NSE. The data source is described in more detail below
One common outcome of these policies is that share prices in newly listed firms tend to increase dramatically in early trading. In Kenya, the undervaluation resulting from politicized offer terms is seen in the indexed share prices of the six IPOs shown in Figure 1. Undervaluation of IPO shares is measured as the increase in share price during early secondary trading (Ritter 1991), and increases in share prices during the first month of trading in these six IPOs range from a low of a 55% to a high of 250%. Although three different IPOs saw share price gains of 200% or more in early days of trading, it is worth noting that all IPO share prices increase at least 50% in the first two days. For all but one offer, this is the highest price the equity reaches in the first year of trading. An additional justification of this paper’s focus on trading in the first 30 days on the secondary market is that after this period the level of liquidity drops considerably; put simply, the majority of all trading in IPO shares in Kenya happens in the first 30 days (see Figure 2).

**Figures 1 and 2 about here**

Finally, it should be noted that the Kenyan investing public, despite a lack of previous experience in this market, is largely responsible for formulating and executing their own trading strategies. The collective investment industry, where investors can either consult with professional advisors or surrender management of their portfolio entirely, serves only an elite clientele. Minimum buy-ins of more than 500,000 Kenyan Schillings, approximately 10 times the average annual income, are the norm in Kenya, thus excluding all but a very few investors.
THEORY DEVELOPMENT AND PROPOSITIONS

Moving beyond exogenous conceptions of investor sophistication

Analysis that differentiates behaviors of varying types of investors has largely been the domain of behavioral finance scholars. Shefrin and Statman (1985) provided early work in disposition theory, the central premise being that investors are risk adverse when assets are positively performing and risk loving when assets are declining in value. The disposition effect has stimulated a large empirical literature (e.g. Odean 1998) showing that investors in general tend to sell well performing assets too early and hold poorly performing assets too long and that the tendency is stronger for retail as opposed to institutional investors (Dhar and Zhu 2006). The disposition effect has been studied in non-U.S. markets as well, including Israel (Shapira and Venezia 2001) and Taiwan (Shu et al. 2005).

Outside of studies of the disposition effect, behavioral finance scholars often compare behaviors of different types of investors. Barber and Odean (2000) argue that many retail investors overestimate the value of information they collect, leading to over trading and a tendency to purchase stocks that underperform those previously owned. Graham and Kumar (2005) find that older and lower income investors are more likely to purchase shares after announcements of firm dividend payments, an indication of lower performance trading by more economically vulnerable investors. International patterns of suboptimal trading strategies are also a part of this literature. Seasholes and Wu (2004) show that retail investors on the Shanghai Stock Exchange are increasing willing to purchase shares the day after a large run up in prices, a trait that makes them vulnerable to market manipulations by more savvy institutional investors.

A common theme of this literature is the range of strategic missteps by “unsophisticated” retail investors that negatively impact the performance of their investments relative to
professional, institutional investors. Several studies include proxy measures for individual attributes that should ameliorate suboptimal behavior including wealth, occupational prestige, trading frequency, or age (Dhar and Zhu 2006; Graham and Kumar 2005). I consider it to be uncontroversial that investors exhibiting weaker traits associated with market sophistication tend to manage assets sub-optimally relative to professional investors. The central question considered here, however, is how investors learn to better manage assets. Previous research has tended to make use of panel data, and in doing so generates fixed measures of investor attributes. The case study presented here, however, makes use of longitudinal data that tracks individual investor’s participation in consecutive IPOs, thus measuring experience gained through each round of investing and looking for patterns of changing trading behavior that result.

The purpose for doing this is to endogenize investor sophistication, and in doing so apply the sociologist’s toolkit to the study of how investor’s learn to trade more effectively as a result of their interactions with the market rather than measuring sophistication as exogenous, atomistic traits that each investor brings to the market. I operationalize market experience as iterations of exposure to a social system in which interactions with the market mechanism, and that iterative gains in experience in the market can potentially bridge the differences in trading behaviors of investors that do differ in more atomistic traits such as portfolio value (a reflection of outside wealth) and registration status (individuals versus companies). The analysis presented here studies not just how types of investors tend to behave, a central feature of much sociological as well as economic research, but also how these behaviors change with repeat interaction.

The meaningful events considered here are the early weeks of trading in six sequential IPOs. As shown in Figure 1 and discussed above, share prices in Kenyan IPOs uniformly increase substantially in the early days of secondary trading before deviating into diverse
medium range trajectories. The propositions below suggest relationships between investors’ repeated exposure to IPO price movements and the likelihood of taking advantage of profit opportunities regularly created in this politically manipulated market. Subscribing for IPO shares with an orientation toward selling them in early trading is a clear example of speculation, defined by Kaldor (1934) as the purchase of an asset with the intent to profit solely from the change in price of the asset rather than through changes in the real value of the asset, e.g. dividend payments or firm growth over time. Keynes (1967) greatly expanded this concept, arguing that the focus on short term price changes rather than long run firm performance, “which are obviously of an ephemeral and non-significant character, tend to have an altogether excessive, even absurd, influence in the market” (p. 154). Rather than these excessive swings being countered by professional investors, Keynes notes that professional investors are uninterested in making long term predictions about firm performance, instead preferring to “beat the gun” by second guessing what others in the market will be willing to pay for an asset in the short term future. Keynes also argues that short term gains are a salient goal for many investors, as longer term investing entails risks that are avoided when focusing on short term gains.

This paper does not have as its goal naming winners and losers among Kenyan investors. The IPOs modeled here are too young to determine what the long-term gains from investing will be. Instead, I seek to better understand reactions to a policy regime that creates stable opportunities for short term profit making in a long run risky environment. Many investors will likely subscribe for IPO shares with the intention of using the asset as a long term savings and investment vehicle, but the focus of this paper is better understanding the rates at which different groups act on this state-sponsored incentive, and more importantly, how reactions change with repeated exposure.
Previous studies of the disposition effect among capital market investors find that less sophisticated investors tend to sell well performing assets too early and hold poorly performing assets too long. In contrast, I suggest that the opposite will be true in Kenya. Following Keynes, I expect more professional investors, such as high net worth investors and those registered as companies, to eschew long term risk in favor of short term gains by selling shares during early IPO price bubbles at a higher rate than other investors. And in contrast to earlier work by behavioral finance scholars, I expect that unsophisticated investors will also learn to do the same.

*Toward an endogenous theory of investor sophistication*

The theoretical focus of this paper is the link between investor experience with IPOs that employ politicized offer terms and share trading behavior that takes advantage of the short term profit opportunities they provide. In the absence of previous interactions with the market, it might be logical to expect that inexperienced investors would initially be less likely to recognize and act on these early, stable profit opportunities. But do they become more likely to do so as with increasing experience? Do new investors learn to take advantage of the opportunities presented? Earlier work on models of organizational learning give reasons to believe that past experiences might force a reconsideration of less effective trading strategies in future rounds of investing.

A cornerstone idea in the organization learning literature is that organizations review the success and failure of prior actions and base future actions on their understanding of what led to the success (Cyert and March 1963; March and Simon 1958; Greve 2003). This initial idea has stimulated considerable attention in recent decades, and these and numerous other authors have specified and deepened the idea in a number of ways.
One expansion on this idea that past experience helps determine future actions is by specifying how quantities of experience facilitate more durable learning from past successes and failures. For example, Haleblien and Finkelstein (1999) find a U-shaped relationship between firm performance with mergers and acquisitions and firm experience with M&A- firm acquisitions performed poorly until the acquiring firm gained sufficient experience in the practice. Similarly, Kim, Kim, and Miner (2009) argue that organizations are likely to form faulty conclusions about the connections between past actions and successes unless a sufficient level of experience has been reached; actions that led to past success, they argue, are likely to be poorly understood and improperly applied to future decisions unless the organization possesses a sufficient body of experience that allows for a more accurate learning process to unfold.

These earlier works give a good general framework for thinking about how the trading behaviors of newly recruited investors might evolve according to a learning process based on growing tenure in the market. An increasing body of experience that demonstrates that gains are routinely available in the short term market might be expected to lead these less sophisticated investing groups to act on such opportunities. Given the exploratory nature of the analysis here, I stop short of predicting behaviors, preferring instead to frame the research questions and their possible answers as propositions rather than hypotheses:

Proposition 1: To what extent are less sophisticated types of investors more likely to act on profit opportunities as they gain experience in the market? The differences between less and more sophisticated investing groups should attenuate as the former gains experience in the market; smaller, retail investors should act on short term profit opportunities at a higher rate as they participate in additional IPOs.

Another specification of how past performance affects current action is by moving away from objective measures of performance toward relative measures. This more relative performance metric has been studied as aspirational performance, whereby actual outcomes are
judged relative to expected outcomes rather than against some objective metric (March and Simon 1958; Baum and Dahlin 2007). Performance below the level aspired to initiates a search process for a new course of action that favors learning from others, while performance that equals or exceeds aspirations favors repeating one’s actions again in the future.

What forms the basis for aspirational performance among investors who have no track record in a nascent financial market? For investors that enter the market in the very early stages, there is arguably no such benchmark because they have no past share price movements to compare with; for new investors that enter the market at later stages, it is unknown whether they were observing the market before deciding whether to enter, such that they either have the same reference points as earlier investors or if they start afresh and build their own reference points.

Comparing the short term price trajectory of the current IPO against past offers might be expected to serve as the same aspirational frame of reference for less experienced investors. These investors are likely aware of past price changes in early trading and use this historical knowledge to form expectations about price trajectories in the current period; price changes that equal past changes might signal that the time has arrived to sell shares and realize the expected, or aspired, gains in value; share prices that are yet to reach past levels might trigger an experiential lesson that suggests to the less sophisticated investor that he wait to sell because higher prices are yet to come. Therefore:

*Proposition 2: To what extent does performance of the current IPO relative to past offers influence the rate at which inexperienced investors sell their shares in early trading? IPOs that meet or exceed past performance should increase the likelihood of less sophisticated investors acting on the opportunity, while IPOs that underperform relative to past offers should decrease the likelihood.*

Propositions 1 suggests a rather linear learning processes- with each iteration of gained experience, less sophisticated investors should learn from past experiences in a way that
stimulates higher rates of speculative trading; Proposition 2, however, suggests that the pattern of relative successes versus failures that occur across IPO events might disrupt a pattern of steady, chronological learning. Another stimulus that might disrupt a linear learning pattern might come from attributes of listing firms themselves. But might we expect that smaller retail investors might be disproportionately influenced by high status listing firms, such that early price gains might be less of a sign of opportunity and instead taken as indication of even greater gains in the future? In order to account for the possibility that the listing of well-known firms might distort the learning process predicted here:

Proposition 3: To what extent does the he listing of a high status firms distort aspirational performance expectations for less sophisticated investors more so than for professional investors? Less sophisticated investors might be more likely to see early price gains in high status firms as confirmation of greater future gains, and therefore be less likely to engage in early trading to realize short term gains.

Two potential challenges to the validity of the analysis deserve mention. First, capital markets in general and emerging markets in particular are frequently plagued by information asymmetries that favor insiders to the detriment of other shareholders. Second, emerging markets are often plagued by low levels of liquidity, making it difficult to reach valid conclusions about trading behavior. The research design employed here takes these into consideration. First, the benefit to insider information should be mitigated by restricting the analysis to a consideration of share sales in the first 30 days of trading, a sufficiently short time period that firms are assumed to not exhibit material changes in performance and underlying valuation. Regarding liquidity constraints in IPO share trading, interviews with NSE officials confirm that the source of the constraint is regularly on the buy side. Because bids and offers are matched on a “first come, first served” manner, it is assumed that the oversupply of sell orders each has an equal probability of being matched with the limited number of bids. Without access to data showing the extent to
which buy-side liquidity constraints curtail share sales, I cannot reach conclusions about absolute levels of speculative activity in each IPO. Instead, relative rates of speculative selling will be the focus of the analysis, a comparison unaffected by liquidity constraints.

DATA AND METHODS

I test the above hypotheses using a unique dataset provided by the Central Depository and Settlement Corporation. The CDSC databases contain records of all share transactions since the NSE migrated to an electronic platform in November 2004. Because more than 90% of all investors have entered the market via the six IPO events starting in 2006, the CDSC databases provide a complete record of all ownership and trading activity in the IPOs modeled here. CDSC databases contain useful registration data for each investor including categorical registration type (individual or company), and town of residence (used to generate location-specific control variables). The CDSC database also provides a complete, longitudinal record of the number of shares each investor subscribed for in every IPO that investor participates and all subsequent trading activities.

Dependent variable

In all models, the dependent variable is a dichotomous measure of whether or not an investor that subscribed for IPO shares sold any of their allotted shares in the first 30 days of secondary trading in that IPO. No distinction is made as to the proportion of allocated IPO shares sold or the number of trades executed by the investor.

3 The CDSC is the legal entity that acts as clearinghouse for all share transactions on the NSE. It is jointly owned by the Nairobi Stock Exchange and the Capital Markets Authority (Kenya’s regulatory body).
Independent variables

Three key variables that collectively determine investor type are constructed, as well as a range of control variables that capture environmental and structural variation across investors.

The first measure of investor type is registration status, which is indicated by the investor as she opens her CDSC account; investors must register as an individual or a company, and only domestic investors are included in the sample. As mentioned above, registration as a company does not necessarily exclude an investor account from being in fact a retail investor, as the majority of company accounts mirror the majority of individual accounts in subscribing for minimum allowable IPO subscriptions. Across all IPOs, more than 98% of all investors and a similar level of trades in the secondary market are domestic investors; hence, foreign participation is excluded from this analysis.

The second measure of investor type is the size of the initial investment, which is measured as a categorical indicator of the number of shares each account purchases during the subscription period prior to secondary trading. All IPO share subscriptions take place during a several week subscription period prior to the actual listing of the firm. During this subscription period, each investor places an order with his or her stockbroker for the number of shares demanded, subject to the minimum required number of shares allowed for any subscription. For modeling purposes, I create a three-category measure representing size of initial investment: “small” (those in the lower 60th percentile), “medium” (between the 60th and 90th percentiles), and “large” (those above the 90th percentile of all IPO subscribers).

The final measure of investor type is experience, another three-category variable showing if the IPO is the investor’s first or second IPO participated in, or if the investor has either participated in three or more IPOs or owned shares prior to the first IPO.
Influence by proximate others is measured by “Town Selling,” which is the percentage of other IPO subscribers in one’s town that sell shares during the first month. This variable does not measure whether other investors sold prior to or after the focal investor, allowing for the possibility that discussion of selling might be as influential on an actor’s decision making as the execution of the trade itself.

Several control variables are included in the analysis. All Kenyan investors must execute trades through a registered stock broker, and the extent to which any brokerage influences investor trading behavior. To control for this, I include a fixed effect dummy variable for each of the brokers that handle investor accounts; the analysis presented here controls for but does not seek to explain broker influence. In order to control for the influence of socio-economic factors and other structural features of the local environments in which investors reside, I include district-level aggregates of the percentages of the adult population that report having graduated from high school used a formal line of credit or insurance policy. These measures are meant to control for levels of education and financial literacy, respective. District measures of population density also control for investors’ level of urbanization. I use district-level data from the 2006 and 2009 waves of the FinAccess Survey. Data from the 2006 survey is used for models of IPO trading from 2006 through the end of 2007, while data from the 2009 survey is used in models of IPOs that began trading in 2008. This background data is aggregated at the district level, with considerable heterogeneity among Kenya’s 69 administrative districts.

Counts of the number of other investors in the district that speculate in the current and past IPO periods control for social contagion influences of this trading behavior. Because the focus of this analysis is to determine how individual-level experience in the market alters trading behavior, it is sufficient to control for behaviors of others in order to tease out the effects of
individual interactions with the market. Table 1 provides basic summary statistics and a correlation matrix for the full population considered in the analysis.

**Table 1 about here**

Table 2 summarizes firm and offer-level attributes of each IPO relevant to the analysis, including the prevalence of speculative trading as well as the number of subscribers and a basic description of each firm.

**Table 2 about here**

Binomial logistic regression models are used to estimate the likelihood of an investor selling shares in the first month of trading. Robust standard errors are calculated by clustering at the district level. The relatively small percentages of investors in each IPO that engage in speculative trading bias coefficients of explanatory variables away from statistical significance, yielding stronger arguments for the role played by investor attributes estimated to be statistically significant. Results are interpreted as ratios of predicted probabilities of speculative selling of less sophisticated investor groups relative to the most experienced institutional investors, using institutional investor behavior as the benchmark against which less sophisticated investor’s trades are compared.

I begin by estimating a baseline model of all six IPOs together to recreate the aggregate results of behavioral finance researchers noted above that show that smaller, inexperienced, and retail investors are less likely to act on short term profit opportunities available on the NSE.
Next, I model each IPO separately in order to note the changing relative behaviors across investor types as this market goes through additional experiential iterations. The first five IPOs constitute a more comparable sample because each was a relatively unknown company to the general public prior to listing, even though they vary significantly in other characteristics of interest to this analysis. The sixth IPO serves as an example of the influence of a high status firm and provides an opportunity to look at how this kind of event effects patterns in relative trading behaviors. It is worth noting that a seventh IPO took place, but its timing immediately following the 2008 financial crisis resulted in exceptionally low investor uptake and much reduced trading in the secondary market, such that it does not make a valid comparison to the first six.

RESULTS

Table 3 displays logistic regression estimates of speculative selling across all six IPOs; these results serve as a baseline model for recreating earlier findings of behavioral finance scholars and establishing aggregate differences in trading behaviors between investing groups that vary in attributes associated with sophistication. Earlier findings that smaller, individual investors are less likely to recognize and act on short term profit opportunities is supported by the results in Table 3. Model 1 estimates the effects of only the key indicators of investor type considered here: registration type (individual vs. company), size of initial investment, and experience in the market as measured by the number of IPOs in which the investor has participated. The positive effect of larger portfolio value and status as a company investor on speculative trading is clearly seen, and a series of three iterative models that add fixed effects for brokerage used, the overall level of speculative selling in each separate IPO (captured by IPO dummies), speculative activities among other investors in one’s district in the current and
previous IPO, as well as several controls for socio-economic status indicators in the district, is unable to change this baseline finding even though the inclusion of additional control variables improves model fit with each iteration. To get at a deeper understanding of the combined effects of the two primary indicators of sophistication, Model 5 adds an interaction term between size of initial investment and experience.

**Table 3 about here**

Predicted probabilities generated from the fully specified Model 5, suggest that company investors are 1.6 times more likely to sell shares in the first 30 days relative to individual investors averaged across all six IPOs, while large investors are 2.2 times more likely to do so when compared to small investors. Interestingly, first time investors are the most likely to speculate, being 1.3 times more likely to sell than the most experienced investors and slightly more likely than second-time investors. This negative effect of experience is overwhelmed when interacted with size of initial investment, but the baseline effect might indicate some tendency to return to the market with a longer term orientation, an idea that future work will need to consider in greater detail.

An additional result from Table 3 worth noting is that the positive effect of size of initial investment on speculative trading is not seen between small and medium investors in the fully specified models; instead, the real dividing line for this behavior, net of other investor attributes, lies between the largest investors (operationalized here as the top 10% of IPO subscribers) and all others rather than as a continuous, linear effect as share subscriptions increase.
Taken together, these results that aggregate across all six IPOs support earlier findings from behavioral finance: less sophisticated investors are less likely to act on the stable profit opportunities presented in this politically manipulated market. But this aggregate finding is unsatisfying if we want to look at how the trading behaviors of these groups of investors evolve as they gain more experience in the market. To see these evolving patterns, I next model each IPO separately to look at the changing relative probabilities across subsequent IPO events.

Evolving trading strategies

Table 4 presents regression coefficients estimated on each of the six IPOs individually using the fully specified Model 5 from the baseline analysis in Table 3. Coefficients for effects of investor attributes are quite consistent across all IPOs and similar to the results produced by Model 5 of all six IPOs together. What I’m interested in, however, is their relative differences in magnitude across these IPOs. In other words, registration status as a company versus an individual is almost always a positive effect on speculative trading, as is the size of initial investment. The key question, though, is the extent to which these differences changes across subsequent IPO events.

Rather than dedicating scare time to a detailed discussion of the individual regression coefficients, I will focus on a discussion of Figures 3 - 6, which show the predicted probabilities generated from models 6 – 11 of the key explanatory variables of interest. The interested reader will find complete regression coefficients and model statistics in Table 4. Figure 3 shows the positive effect of registration status as company as opposed to an individual across all six IPOs; the magnitude of the difference changes from one IPO to the next, but the direction of the influence remains constant. Figure 4 demonstrates the similar but much larger effect of size of
initial investment on speculative selling, with small and medium investors often speculating at roughly similar rates but large investors always exceeding them by significant margins. Figure 5 revisits the curious finding that first-time investors are often relatively more likely to speculate in IPO shares than are more experienced investors. The pattern seen in this attribute, however, varies somewhat over time, with first-time investors as or more likely than the most experienced group of investors to speculate in five of six IPOs; it is only in the sixth IPO, the case of Safaricom, than first-timers are less likely to do so. That case is considered in more detail below.

Rather than use the allotted space to discuss these baseline effects further, I use estimates from each IPO to generate predicted probabilities of the speculative trading of ideal types of investors. After all, investors exhibit multiple attributes at any given time, so it is reasonable to take a range of attributes into account in each IPO, looking at the two most relevant manifestations of investor types: the first time, small, individual investor juxtaposed against the more experienced, large, company investor. The predicted probabilities of speculative selling based on the sum of these three attributes, with all other model estimates assigned to their mean values, are presented in Figure 6. Figure 6 also presents the ratio of the predicted probabilities between these groups. The changing ratios between these groups suggest strong support of the learning effects proposed in the first two propositions.

As mentioned earlier, the absolute level of speculative selling by any particular investor group cannot be directly considered given the differential liquidity constraints in the secondary market between the IPOs. Therefore, it is not appropriate to consider the extent to which one
group speculates, but instead to compare groups to each other and consider if this relative measure changes with time. Using this methodology, I use the group of most experienced, highest portfolio value company investors as the comparison group, with the assumption that this group can be expected to best understand what the full range of options is; in short, this group is the most likely to embody the lowest level of “boundedness” in their boundedly rational behavior.

When such comparisons are considered among our three ideal type investors, Figure 6 suggests support for an experiential learning effect. In the first IPO, our experienced, institutional, company investor is 8.8 times more likely to sell shares in early trading that the ideal first time, minimum, individual investor in an IPO. By the fifth IPO, the relative difference between these two investors is only a quarter of what it was in the first, at 2.2 times. This overall trend lends some support to Proposition 1, but the reader is surely quick to note that the path between these two points is rocky at best, which triggers the consideration of Proposition 2 relating to aspirational performance.

Figure 6 also shows the maximum share price observed in each IPO, indexed to 100 for easy comparison. Share prices rose similarly in the first two IPOs, with each tripling in the first month, and in the second of these two events the relative differences in trading behaviors between the ideal type investors shrinks to one-fourth of what it had been just a few months earlier. In contrast, share price gains were relatively low in the third and fourth IPOs, with gains in the third doubling compared to only a 50% increase in the fourth. While these might still sound like very healthy gains, consider that each case represents a halving of the profit rate relative to the preceding IPO.
The largest drop in relative differences comes between the first and second IPOs, which occur only three months apart, when the difference drops from 8.8 times to only 2.4 times as the second IPO comes very close to matching the performance benchmark set in the first. The third and fourth IPOs, however, both underperform aspirational reference points set in the previous IPOs, and the ratio of speculative trades between the more and less sophisticated groups grows as well. The fifth IPO, though, not only outperforms the fourth but it also reaches a very similar level as the third and the fifth IPO is marked by the lowest ratio of differential selling among all IPOs. If speculative trading is partly conditioned by expectations of early price gains, the relatively disappointing performances of the third and fourth IPOs may have made most investors unwilling to sell shares for low gains relative to the first two IPOs, preferring instead wait for expected gains. However, by the time of the fifth IPO, expectations might have been reconsidered and the behavioral differences between our ideal type investors reach the lowest level since the popularization of the stock market in Kenya.

Clearly a durable causal argument cannot be made based on a single change between events only three months apart or a total of five reference points, but the fact that the difference between these two groups is never more than half of what it was in the first IPO after the stock exchange was opened to mass retail participation suggests that this newly recruited population has learned to anticipate price movements in the market quite quickly and at least makes possible the conclusion that later IPOs that reach or approach price levels seen in earlier IPOs give credence to experiential learning based in aspirational performance, such that investors that did not sell in the earlier IPO learned from the behaviors of those that did and are therefore more likely to sell in the latter event.
This pattern of current performance rising above past disappointments is theorized as “recovery experience” by Kim, Kim, and Miner (2009). The pattern of disappointingly low performance of the Eveready and then AccessKenya IPOs is then recovered from in the Kenya Re event, and this recovery process is matched with increased rates of speculative trading by learning investors such that the same price performance in the fifth IPO that was experienced in the third results in a 33% improvement in trading behavior by less sophisticated investors.

The case of the sixth IPO, Safaricom, presents an example of the possible disruptive effects of high status firms on this pattern of market evolution as discussed in Proposition 3. In the sixth IPO, the difference between the most savvy investor type and the least increases considerably, almost back to the initial level seen in the first IPO. The status of Safaricom in Kenya can scarcely be overstated; it dominates the telecom industry with 85% market share among cell phone users in a society where ownership and use of a cell phone is itself a status activity. Safaricom outspent all other IPOs on advertising by 800% compared to the next highest advertiser. This author was in Kenya at the time of the IPO subscription period, and the Safaricom logo was ubiquitous all around the country. But the results presented in Figure 6 suggest that large, experienced, company investors were not swayed by the symbolism of Safaricom- they speculated in that offer at about the same rate as other IPOs, and almost eight times more often than the small retail ideal type investor. Another possibility is that Safaricom’s reduced performance failed the test of aspirational performance, but the dramatic increased in the differences in trading between the two focal groups is substantially more than in earlier events that different in aspirational performance, such that I favor an argument about the role play by firm characteristics rather than deviation from an expected benchmark. One member of Safaricom’s executive management team put it this way: “I think investors were thinking that if
the shares of Kenya Re, a considerably smaller and less powerful company, could increase 80%, then imagine how high the shares of Safaricom must go?” Future research in this area will need to develop a more systematic methodology for exploring the effects of Safaricom’s status on small investor trading behaviors, given that this is only a single data point in this analysis.

**IMPLICATIONS FOR POLICY AND PRACTICE**

The findings presented above suggest three primary conclusions. First, investors that exhibit generic attributes associated with more sophisticated financial actors (high portfolio values, high levels of experience in financial markets, and registration status as companies rather than individuals) are more likely to recognize and act on stable short-term profit opportunities in the emerging market considered here. Second, and most importantly, the potential disadvantages of possessing traits associated with lower levels of investor sophistication attenuate sharply in a short period of time as investors participate in repeat IPO investments, leading small retail investors to quickly learn to behave in similar ways to larger institutional investors. Third, this learning process is not necessarily linear or stable; it is potentially disrupted by fluctuations in performances between IPOs and possibly by attributes of listing firms, with less sophisticated investors more influenced by transient status characteristics and sub-aspirational performance than are more experienced professional investors. These findings force a consideration of how increased levels of experience among the investing public and the order in which IPO events occur might affect market performance in a nascent financial market.

In this discussion, I incorporate these findings into a general theory on nascent market evolution. The framework of this theory rests on the following propositions:

1. Because gains and losses from investing are easily calculable and highly salient to lower income populations, smaller individual investors quickly learn to take
advantage of available profit opportunities; in markets that employ politicized offer terms, this learning process manifests in high degrees of speculative investing;

2. Learning processes for the bulk of the investing public involve comparisons of past and current IPO performances; therefore, between-IPO performance volatility can disrupt the pattern of educating a new investing public;

3. Learning processes are also contingent on attributes of listing firms, with well-known and high status firms affecting the aspirational performance evaluations of less sophisticated investors.

4. The outcome of these learning processes is an overall downward pressures on the extreme price gains that often legitimate the practice of shareholding to a new population; as a result, investor recruitment strategies that work in early stages of nascent markets are less likely to be successful in later stages.

The central focus of this theory building exercise is a consideration of the reflexive relationship between IPO share price performance and the future development of the market. In other research, the author found significant effects of early profits earned on IPO shares by proximate other investors to be a central influence in the recruitment of new investors into the Nairobi Stock Exchange. This performance effect was found to the total exclusion of any kind of mimicry effect; that is, new investors did not enter the stock market because others around them had already adopted the practice- Kenyans enter the stock market because people around them experienced higher paper profits soon after the launch of the previous IPO. However, if the analysis presented here is valid, a more experienced investing population limits these early share price gains because a greater proportion of investors, by virtue of their increased experiential learning, are prepared to sell shares in early trading; thus, increased liquidity on the sell side of secondary IPO markets works to restrict the kinds of high early gains in IPO shares that works to legitimate the activity to the next generation of new investors. Descriptive evidence of this is seen in Table 1 and Figure 1- the earlier IPOs among the six considered here have considerably higher maximum share prices than do the later IPOs.
This empirical prediction is born out in the descriptive share price data shown in Figure 1 and Table 1, with later IPOs reaching considerably lower levels of peak share price gains than earlier IPOs. The contrast between the influence of short-term IPO price gains on legitimating the practice of shareholding to a new constituency on the one hand, with the downward pressure on these same price gains exerted by a more experienced investing population on the other hand, leads to a simple and obvious question regarding the future development of this nascent market: if share price gains legitimate the practice of shareholding, and these gains are to some degree the result of inexperienced investors, what does the future hold for stock market participation when the investing public ceases to be inexperienced? If the high growth that often characterizes nascent capital markets is partly a function of the trading behaviors of an inexperienced population of traders and that as these traders gain experience, gains in asset prices attenuate and therefore so does the pull that the market exerts on future potential participants.

A better understanding of how inexperienced investors effect price movements in is especially pressing in emerging markets given that the majority of emerging capital markets largely operate by attracting domestic rather than foreign capital. Contrary to popular notions of the ubiquity of foreign investment across emerging markets, most emerging markets fail to attract large amount of foreign investment and instead survive by recruiting small pockets of indigenous savings (Singh 1999). In Africa, only South Africa’s Johannesburg Stock Exchange attracts any significant amount of foreign capital (Kennedy and Moss 1999). Since more than half of the world’s approximately 142 stock exchanges are less than 25 years old and the majority of these are located in developing countries (Mondovision 2007), understanding the
orientations and proclivities of these newly created investing populations is also necessary in
order to more fully understand the burgeoning global growth of capital markets.

An additional implication of this theory is that state regulators, whose focus is on
recruiting more investors to grow the market, should attend to the order in which firms are listed
in order to better manage the progressive maturation of the investing public they work to create.
The case might be made for a risk-adverse set of IPOs, where early IPOs set a realistic set of
expectations about what gains should be aspired to. In the Kenyan case, one is left to consider
the counterfactual of the first two IPOs, both of which more than tripled in share price, and
wonder if state policies should actually employed a less strict set of politicized offer terms and
higher initial share prices in order to avoid the possibility of conditioning the public to think that
300% gains in early trading are the normal function of the stock market.

A similar argument might be made for the choice of when to list well known, high status
firms on a nascent market. Their ability to generate high aspirational performance might be a
detriment to the overall effort to educate a new investing public, and as such they might be best
left for listing after a sufficient level of public knowledge has been built through prior
experience. Alternatively, high status firms might be well utilized early in the investor
recruitment process in a manner that still generates reproducible performance, such that the
relatively unsophisticated investing public is presented with a clear and reproducible reference
point for future aspirational performance benchmarks.

The above arguments are made based on the analysis of data on more than 1.4 million
investors, many of whom participate in multiple IPOs. However, the analysis aggregates this
large number of observations into six data points by modeling each IPO separately; the effects of
sub-aspirational performance are based on a subset of these six, while conclusions about the
effect of high status firms on trading behavior are drawn from a single observation. As such, I recognize that my argument stems from an interpretation of the results of six models. Additional data is needed to more fully test this theory of market evolution resulting from investor learning, and cross-national data of investor reactions to IPOs in other nascent markets would be very valuable as well.

Capital markets contain multiple incentive structures, only some of which stimulate speculative trading while others encourage longer term investing, depending on the interests of the investor. My goal has not been to assign final judgments of rationality or sophistication to particular behaviors, but to better understand what types of investors are more likely to react to the particular set of incentives resulting from the use of politicized offer terms. It is also a goal of this paper to advance both our understanding of financial market behaviors and the institutionalization of investor capitalism in developing countries around the world. It is my hope that the evidence presented here will be an early source of information and inspiration to other scholars interested in studying the factors that contribute to the construction of the demand side of markets as well as the value of emerging market settings as natural laboratories where young markets can be observed.
REFERENCES


Figure 1: Early Gains in IPO Share Prices

Trading days after IPO launches
Indexed Share Price

Figure 2: Trading Volume, weekly

Weeks of trading
Trading volume as % of Total Shares Floated
<table>
<thead>
<tr>
<th>Firm</th>
<th>Description</th>
<th>Date Listed</th>
<th>State Ownership (%)</th>
<th>IPO Subscribers</th>
<th># Speculating investors</th>
<th>1st time investors (%)</th>
<th>2nd time investors (%)</th>
<th>3rd + time investors (%)</th>
<th>Max share price (index = 100)</th>
</tr>
</thead>
<tbody>
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<td>Electricity utility (monopoly)</td>
<td>May, 2006</td>
<td>100</td>
<td>182,288</td>
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<td>80.3</td>
<td>n/a</td>
<td>19.7</td>
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<td>ScanGroup</td>
<td>Advertising conglomerate</td>
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<td>0</td>
<td>84,591</td>
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<td>46.7</td>
<td>34.7</td>
<td>18.6</td>
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<td>Eveready</td>
<td>Consumer products Internet service provider</td>
<td>Dec, 2006</td>
<td>35</td>
<td>175,408</td>
<td>4,133</td>
<td>54.4</td>
<td>22.0</td>
<td>23.4</td>
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</tr>
<tr>
<td>AccessKenya Reinsurance</td>
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<td>June, 2007</td>
<td>0</td>
<td>26,951</td>
<td>1,171</td>
<td>29.3</td>
<td>21.6</td>
<td>49.1</td>
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<tr>
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<td>Reinsurance</td>
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<td>130,926</td>
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<td>70.7</td>
<td>12.6</td>
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*Source: Firm prospectus and CDSC database*

### Table 1: Firm and Offer-level Descriptive Statistics

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<th>Variable</th>
<th>N</th>
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<th>S.D.</th>
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<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
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<tbody>
<tr>
<td>1 Sells in first month</td>
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<td>0.02</td>
<td>0.14</td>
<td>0</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td>2 Investor type</td>
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<td>0.30</td>
<td>1</td>
<td>2</td>
<td>0.04</td>
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<td></td>
<td></td>
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<td></td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>3 Experience</td>
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<td>1.59</td>
<td>0.82</td>
<td>1</td>
<td>3</td>
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<td>4 Size</td>
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<td>1</td>
<td>3</td>
<td>0.03</td>
<td>0.20</td>
<td>0.10</td>
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<td>5 IPO period</td>
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<td>4.56</td>
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<td>6 Broker</td>
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<td>19.41</td>
<td>1</td>
<td>59</td>
<td>-0.07</td>
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<td>0.07</td>
<td>0.40</td>
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<td>7 No. Speculative trades in district (t)</td>
<td>1,317,907</td>
<td>1.99</td>
<td>2.23</td>
<td>0</td>
<td>20</td>
<td>0.17</td>
<td>0.01</td>
<td>0.18</td>
<td>-0.08</td>
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<td>-0.36</td>
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<td>8 No. Speculative trades in district (t-1)</td>
<td>1,135,619</td>
<td>2,146.59</td>
<td>2,141.05</td>
<td>0</td>
<td>4,957</td>
<td>0.00</td>
<td>0.23</td>
<td>-0.02</td>
<td>0.09</td>
<td>-0.16</td>
<td>-0.06</td>
<td>0.02</td>
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<tr>
<td>9 Population density (district)</td>
<td>1,244,206</td>
<td>1,985.52</td>
<td>1,357.97</td>
<td>2</td>
<td>3,079</td>
<td>0.05</td>
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<td>0.07</td>
<td>0.11</td>
<td>-0.17</td>
<td>-0.16</td>
<td>0.33</td>
<td>0.82</td>
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<tr>
<td>10 Population using formal credit product (district, %)</td>
<td>1,317,907</td>
<td>0.12</td>
<td>0.04</td>
<td>0</td>
<td>0.29</td>
<td>0.08</td>
<td>0.08</td>
<td>0.11</td>
<td>-0.04</td>
<td>-0.45</td>
<td>-0.26</td>
<td>0.46</td>
<td>0.33</td>
<td>0.44</td>
<td></td>
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<tr>
<td>11 Population using formal insurance product (district, %)</td>
<td>1,317,907</td>
<td>0.12</td>
<td>0.06</td>
<td>0</td>
<td>0.24</td>
<td>0.05</td>
<td>0.20</td>
<td>0.05</td>
<td>0.09</td>
<td>-0.16</td>
<td>-0.14</td>
<td>0.31</td>
<td>0.71</td>
<td>0.85</td>
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<tr>
<td>12 Population graduated high school (district, %)</td>
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<td>0.12</td>
<td>0</td>
<td>0.51</td>
<td>0.11</td>
<td>0.11</td>
<td>0.13</td>
<td>-0.04</td>
<td>-0.62</td>
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<td>0.68</td>
<td>0.47</td>
<td>0.65</td>
<td>0.61</td>
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*Source: Firm prospectus and CDSC database*
### Table 3: Logistic Regression estimates of probability of selling IPO shares in first 30 days across all 6 IPOs

<table>
<thead>
<tr>
<th></th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
<th>Model 5</th>
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<tr>
<td><strong>Explanatory variables</strong></td>
<td></td>
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<tr>
<td>Investor type: Local Company</td>
<td>0.700*** (0.031)</td>
<td>0.610*** (0.025)</td>
<td>0.475*** (0.065)</td>
<td>0.483*** (0.062)</td>
<td>0.499*** (0.057)</td>
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<tr>
<td>Experience: 2nd IPO</td>
<td>-0.037* (0.015)</td>
<td>-0.042*** (0.013)</td>
<td>-0.046** (0.016)</td>
<td>-0.047** (0.016)</td>
<td>-0.040* (0.018)</td>
</tr>
<tr>
<td>Experience: 3 + IPOs</td>
<td>-0.076 (0.043)</td>
<td>-0.113* (0.048)</td>
<td>-0.140*** (0.039)</td>
<td>-0.132*** (0.031)</td>
<td>-0.202*** (0.022)</td>
</tr>
<tr>
<td>Investor size: medium</td>
<td>0.397*** (0.098)</td>
<td>0.384*** (0.091)</td>
<td>0.080 (0.082)</td>
<td>0.072 (0.080)</td>
<td>0.068 (0.104)</td>
</tr>
<tr>
<td>Investor size: large</td>
<td>0.875*** (0.039)</td>
<td>0.919*** (0.035)</td>
<td>0.857*** (0.031)</td>
<td>0.854*** (0.031)</td>
<td>0.769*** (0.032)</td>
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<tr>
<td>2nd IPO * investor size medium</td>
<td>-0.048 (0.060)</td>
<td>0.015 (0.036)</td>
<td>0.070 (0.074)</td>
<td>0.273*** (0.035)</td>
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<tr>
<td>2nd IPO * investor size large</td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>3 + IPOs * investor size medium</td>
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<td>3 + IPOs * investor size large</td>
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<td><strong>Control variables</strong></td>
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<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
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<tr>
<td>Broker fixed effects</td>
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<td>no</td>
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<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>No. Speculative trades in district (t)</td>
<td>0.138*** (0.012)</td>
<td>0.135*** (0.014)</td>
<td>0.134*** (0.013)</td>
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<td></td>
</tr>
<tr>
<td>No. Speculative trades in district (t-1)</td>
<td>0.000*** (0.000)</td>
<td>0.000*** (0.000)</td>
<td>0.000*** (0.000)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Population density (district)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Population graduated high school (district, %)</td>
<td>-1.615*** (0.273)</td>
<td>-1.368*** (0.210)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Population using formal credit product (district, %)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-1.124*** (0.318)</td>
</tr>
<tr>
<td>Population using formal insurance product (district, %)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-0.699 (0.618)</td>
</tr>
<tr>
<td>Constant</td>
<td>-3.999*** (0.256)</td>
<td>-4.222*** (0.121)</td>
<td>-4.192*** (0.077)</td>
<td>-3.730*** (0.094)</td>
<td>-3.601*** (0.092)</td>
</tr>
<tr>
<td>Pseudo r-squared</td>
<td>0.1189</td>
<td>0.1332</td>
<td>0.1508</td>
<td>0.1509</td>
<td>0.1513</td>
</tr>
<tr>
<td>Log Likelihood</td>
<td>-114618.28</td>
<td>-112750.45</td>
<td>-93257.18</td>
<td>-90011.65</td>
<td>-89972.83</td>
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<tr>
<td>Likelihood ration Chi2 d.f.</td>
<td></td>
<td></td>
<td></td>
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<td>Chi-squared P</td>
<td>No. of obs. 1317907</td>
<td>1317789</td>
<td>1135502</td>
<td>1072144</td>
<td>1072144</td>
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</tbody>
</table>

* p<.05   ** p<.02   *** p<.001
Robust standard errors in parentheses
Table 4: Logistic Regression estimates of probability of selling IPO shares in first 30 days, each IPO modeled separately

<table>
<thead>
<tr>
<th>Explanatory variables</th>
<th>IPO name (model number)</th>
<th><strong>KenGen (6)</strong></th>
<th><strong>ScanGroup (7)</strong></th>
<th><strong>Eveready (8)</strong></th>
<th><strong>AccessKenya (9)</strong></th>
<th><strong>Kenya Re (10)</strong></th>
<th><strong>Safaricom (11)</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Investor type: Local Company</td>
<td></td>
<td>0.505***</td>
<td>0.904***</td>
<td>0.685***</td>
<td>0.145***</td>
<td>0.295***</td>
<td>0.088</td>
</tr>
<tr>
<td>Experience: 2nd IPO</td>
<td></td>
<td>-0.137***</td>
<td>-0.143*</td>
<td>0.198**</td>
<td>0.062</td>
<td>-0.090</td>
<td></td>
</tr>
<tr>
<td>Experience: 3 + IPOs</td>
<td></td>
<td>-0.263**</td>
<td>-0.337***</td>
<td>-0.226**</td>
<td>-0.165**</td>
<td>-0.152*</td>
<td>0.416***</td>
</tr>
<tr>
<td>Investor size: medium</td>
<td></td>
<td>0.964***</td>
<td>-0.171**</td>
<td>0.106</td>
<td>-0.022</td>
<td>0.282**</td>
<td>0.215**</td>
</tr>
<tr>
<td>Investor size: large</td>
<td></td>
<td>1.336***</td>
<td>0.369***</td>
<td>0.382***</td>
<td>1.557***</td>
<td>0.567***</td>
<td>1.493***</td>
</tr>
<tr>
<td>2nd IPO * investor size medium</td>
<td></td>
<td>0.011</td>
<td>0.187</td>
<td>0.280*</td>
<td>-0.370***</td>
<td>0.298***</td>
<td></td>
</tr>
<tr>
<td>2nd IPO * investor size large</td>
<td></td>
<td>0.013</td>
<td>0.126</td>
<td>-0.050</td>
<td>-0.231*</td>
<td>0.473***</td>
<td></td>
</tr>
<tr>
<td>3 + IPOs * investor size medium</td>
<td></td>
<td>0.361***</td>
<td>0.241**</td>
<td>0.041</td>
<td>0.402**</td>
<td>-0.220**</td>
<td>-0.408***</td>
</tr>
<tr>
<td>3 + IPOs * investor size large</td>
<td></td>
<td>0.737***</td>
<td>0.079</td>
<td>0.270**</td>
<td>0.049</td>
<td>0.137</td>
<td>0.072</td>
</tr>
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</table>

**Control variables**

<table>
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<tr>
<th>Broker fixed effects</th>
<th>yes</th>
<th>yes</th>
<th>yes</th>
<th>yes</th>
<th>yes</th>
<th>yes</th>
<th>yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. Speculative trades in district (t)</td>
<td>0.687***</td>
<td>0.104***</td>
<td>0.501***</td>
<td>0.316***</td>
<td>0.207***</td>
<td>3.123***</td>
<td></td>
</tr>
<tr>
<td>No. Speculative trades in district (t-1)</td>
<td>0.000*</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Population density (district)</td>
<td>-0.000*</td>
<td>0.106</td>
<td>0.045</td>
<td>-0.293</td>
<td>-0.342</td>
<td>-0.366</td>
<td></td>
</tr>
<tr>
<td>Population using formal credit product (district, %)</td>
<td>-1.826***</td>
<td>0.000*</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td></td>
</tr>
<tr>
<td>Population using formal insurance product (district, %)</td>
<td>-1.097</td>
<td>0.000</td>
<td>0.000**</td>
<td>0.000</td>
<td>0.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Population graduated high school (district, %)</td>
<td>-0.818*</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>5.468***</td>
<td>3.513***</td>
<td>4.650***</td>
<td>3.184***</td>
<td>4.377***</td>
<td>6.983***</td>
<td></td>
</tr>
<tr>
<td>Pseudo r-squared</td>
<td>0.0901</td>
<td>0.041</td>
<td>0.0452</td>
<td>0.0797</td>
<td>0.0378</td>
<td>0.1009</td>
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<tr>
<td>Log Likelihood ratio Chi2 d.f.</td>
<td>17973.75</td>
<td>21246.29</td>
<td>18024.02</td>
<td>4295.37</td>
<td>24366.37</td>
<td>14758.38</td>
<td></td>
</tr>
</tbody>
</table>

| No. of obs. | 171,945 | 82,269 | 166,354 | 25,726 | 125,418 | 617,130 |

*p<.05  ** p<.02  *** p<.001
Robust standard errors in parentheses