Initial Public Offerings and the Firm Location

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Abstract

The firm geographic location matters in IPOs because investors have a strong preference for newly issued local stocks and provide abnormal demand in local offerings. Using equity holdings data for more than 53,000 households, we show the probability to participate to the stock market and the proportion of the equity wealth is abnormally increasing with the volume of the IPOs inside the investor region. Upon nearly the universe of the 167,515 going public and private domestic manufacturing firms, we provide consistent evidence that the isolated private firms have higher probability to go public, larger IPO underpricing cross-sectional average and volatility, and less pronounced long-run under-performance. Similar but opposite evidence holds for the local concentration of the investor wealth. These effects are economically relevant and robust to local delistings, IPO market timing, agglomeration economies, firm location endogeneity, self-selection bias, and information asymmetries, among others. Findings suggest IPO waves have a strong geographic component, highlight that underwriters significantly under-estimate the local demand component thus leaving unexpected money on the table, and support state-contingent but constant investor propensity for risk.

Keywords: IPO, Going Public Decision, Underpricing, Long-run Under-performance, Firm Location
JEL Classification: G10; G14; G32; G24

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Acknowledgments

Thanks to Dawei Fang, Youyan Fu, Giancarlo Giudici, Jennifer Monroe, Andreas Rathgeber, and Evangelos Vagenas-Nanos and participants at World Finance Conference (July 2014), Eurasia Business and Economics Society Annual Conference (October 2014), and Multinational Finance Society Annual Conference (June 2015) for comments and suggestions. We further thank Ilaria Cingottini (Centro Studi Unioncamere) and Carlo Podaliri for assistance on data gathering. The views expressed herein are those of the authors, and we alone bear responsibility for any mistakes and inaccuracies.

1. Introduction

We provide evidence the firm geographic location matters in IPOs because investors have a strong preference for the newly issued local stocks and provide abnormal demand in the local equity offerings. More in particular our findings include i) the likelihood of a private firm to go public increases the less the private firm is clustered with the listed firms, ii) the IPO first-day returns (underpricing) increase the less the IPO firm is clustered with the listed firms, but this effect is entirely generated by correspondent increases in the cross-sectional volatility of the IPO stocks initial returns, and iii) the IPO long-run under-performance flattens the less the IPO firm is clustered with the listed firms. To our best knowledge, this is the first paper introducing geography in IPOs.

Fostered by the investor preference for the local stocks (e.g., Coval and Moskowitz 2001; Grinblatt and Keloharju 2001; Huberman 2001; Coval and Moskowitz 1999; Ivković and Weisbenner 2005) and postulated in some of the previous research (e.g., Loughran 2008; Korniotis and Kumar 2013), the investor preference for new local equity is *per se* new evidence. Importantly, it is the micro-foundation of the effect of the firm location in IPOs we posit. Using equity holdings data for more than 53,000 households over 1998-2012, we show the local investors provide abnormal demand in the local IPOs. More specifically, we find the stock market participation, that is the probability to own stock, and the investor risk-tolerance, that is the proportion of wealth invested in equity, are abnormally increasing with the volume of the IPOs inside the region where investors reside. The effect of the local IPOs weakens with the volume of the local listed firms, is similar for the volume of local listed firms, and reverse for the volume of the local delistings. Findings highlight that the large majority of the equity demand comes from the local investors demanding for local IPO stocks and that this demand component increases the fewer are the local listed firms.

To the extent the local investors provide abnormal demand in the local IPOs and this demand decreases with the volume of the local listed firms, listings of the private firms that are isolated from the listed firms should be especially favored. The isolated going public firms benefit from the superior additional demand that is provided by the local investors. All other things being equal, the superior abnormal demand by the local investors boosts the aggregate demand for the newly issued stocks. There are a few plausible reasons why a high pre-offer demand is expected to facilitate listings. Above all, a high pre-offer demand leads to high IPO prices (e.g., Derrien 2005; Cornelli and Goldreich 2003; Cornelli, Goldreich, and Ljungqvist 2006) and higher proceeds. Upon nearly the universe of the going public and private domestic manufacturing firms between 1999 and 2012, we provide consistent evidence. More in particular, we show the private firm likelihood to go public substantially decreases the more the private firm is clustered with the listed firms. On the other hand, the geographic location of firms is something endogenous in nature, and our results might be affected by simultaneity bias endogeneity (e.g., Roberts and Whited 2013). Against this endogeneity, we control the going public decision with the firm clustering with the private firms. We find consistent positive effect of private firm clustering on listings. The more the firm is clustered with the private firms the higher is the firm likelihood to go public, and this effect offsets the negative effect of listed firm clustering.

The firm location affects the firm decision to go public and therefore it should be somehow accounted in the IPO pricing process. However, the pricing of an IPO is a complex task (Lowry and Schwert 2004; Lowry, Officer, and Schwert 2010) and about 2 out of 3 IPOs are underpriced ending the first day of trading at a closing price greater than the offer price (e.g., Ritter and Welch 2002). On the one hand, the firm information asymmetries increase the underpricing preventing uninformed investors leaving the IPO market (e.g., Michaely and Shaw 1994; Beatty and Ritter 1986; Rock 1986). On the other hand, the information asymmetries affect the precision of the price-setting process (e.g., Ritter 1984; Sherman and Titman 2002) and the underpricing is the underwriter efficient response to the complexity of this valuation problem (e.g., Rock 1986; Welch 1992; Benveniste and Spindt 1989; Lowry and Schwert 2004). Consistently, Lowry, Officer, and Schwert (2010) show the volatility of the IPO initial returns increases with the fraction of difficult-to-value companies going public (young, small, and technology firms). More in particular, when pricing an IPO, the demand for the firm's shares is the most critical input. Although the issuer and its investment bank know considerably more about the firm's own prospects than any single market participant does, market participants as a whole know more than the firm about the aggregate demand for the firm's shares (e.g., Rock 1986). We posit the local investor extraordinary demand in the local IPOs further complicates the IPO pricing problem, which is particularly complex in the isolated IPOs where the abnormal demand by the local investors is especially sizable. Consistent with the underwriter difficulty to value the isolated IPOs, we provide evidence that the underpricing increases the less the IPO firm is clustered with the listed firms and that this effect is entirely attributable to the cross-sectional variability of IPO stocks initial returns, which reflects the complexity of the IPO pricing problem. These findings are robust to information asymmetries and further competing theories of the IPO underpricing, and hold after controlling for the endogeneity of the firm location into the decision to go public with IPO underpricing (selection bias to listing). Overall, though the local investor extra demand is accounted in the going public decision, findings highlight that underwriters significantly under-estimate such an additional demand component thus leaving unexpected money on the table.

The investor preference for the newly issued local stocks in IPOs becomes preference for the local stocks in the aftermarket (see also Massa and Simonov 2006; Bodnaruk 2009; Jacobs and Weber 2012; Shive 2012). In essence, investors disproportionately buy local stocks in local offerings and hold these stocks afterwards. On the other hand, the IPO stocks are usually discharged months after the listing (e.g., Field and Hanka 2001; Cao, Field, and Hanka 2004; Brav and Gompers 2003) and significantly under-perform in the long-run (e.g., Ritter 1991; Loughran and Ritter 1995; Brav and Gompers 1997). To the extent locally biased investors are more reluctant in discharging the IPO stocks after the listing, the long-run under-performance of the isolated IPOs, where the shareholder base of the local investors is more relevant, should be less pronounced than the long-run under-performance of the clustered IPOs. Consistently, we show the IPO long-run under-performance flattens the less the IPO firm is clustered with the listed firms. In fact, the more isolated IPO firms even do not underperform in the aftermarket.

Consistent opposite evidence holds for the local concentration of the investor wealth. More in particular, the private firm likelihood to go public, both the IPO underpricing cross-sectional average and volatility, and the IPO aftermarket performance increase the more the investor wealth clusters around the firm location. The economic effect of the local wealth in IPOs is surprisingly large in magnitude. Though in the path to listing the local investor wealth is discounted by underwriters to a larger extent compared to what is done with the local investor demand, findings indicate there is ample room for efficiency improvements in the IPO price setting even with respect to the local investor wealth dimension.

The analyses in this paper require a suitable metric for the local investor abnormal demand in local IPOs. The local investor abnormal demand in local IPOs is a firm-specific attribute related to the firm geographic location, and the quantification of these attributes is definitely not a trivial problem (e.g., Gao, Ng, and Wang 2008; Landier, Nair, and Wulf 2009; Baschieri, Carosi, and Mengoli 2015; García and Norli 2012; Bernile, Kumar, and Sulaeman 2015). In this paper, firm-specific attributes related to the firm geographic location are revealed in the geographic clustering around the firm location and the intensity of this clustering is quantified via a distance-based index centered in the issuing firm headquarters. Gainfully, this approach does not require exogenous assumptions about firm locality (e.g., local firms are the firms located within the same state) and uses all the information available without losing any in feasibility (e.g., indices of clustering are extremely easy to calculate for both the private and listed firms). Three types of firm-specific clustering are considered: the clustering of the listed firms, the clustering of investors' wealth, and the clustering of the private firms. The value of the firm clustering with the listed firms is the key variable. Listed firm clustering increases the more are the listed firms located around the firm location and it is inversely related with the local investor demand in that particular stocks. The clustering of investors' wealth is higher the richer is the area where the firm is located and controls for the local investor risk-tolerance (e.g., Hong, Kubik, and Stein 2008). Finally, the firm clustering with the private firms is high for firms headquartered in economically developed areas where several private firms are headquartered and addresses the local agglomeration effects arising from pure firm clustering (e.g., Dougal, Parsons, and Titman 2015).

Though IPO underpricing and long-run under-performance have generated considerable empirical research (see Ritter and Welch 2002, for a comprehensive review), evidence on the going public decision is very little, since privately held firms are typically not required to report their financial results and, consequently, the data required for this research are not readily available (especially with regard to U.S. firms). There are only few prominent pieces of direct research on the going-public decision to date; Lerner (1994) studies the timing of going public of a sample of 350 privately held venture-backed biotechnology firms and shows that these companies tend go public when equity valuations are high; Pagano, Panetta, and Zingales (1998) address the determinants of the going public decisions upon a sample of 19,817 Italian firms and relate the going public decisions to the industry buoyancy and firm characteristics mainly related to stage of the firm in its life-cycle (e.g., account rebalances after a period of high investments and change in ownership structure); Bodnaruk et al. (2008) investigate the probability to go public in 1,309 Swedish private firms and show the portfolio diversification of the controlling shareholders is among the reasons to list the company; finally, Chemmanur, He, and Nandy (2010) investigate the going public decision on 928,000 U.S. manufacturing firms and provide evidence the decision to go public is largely determined by the firm's product market characteristics, the firm information asymmetries, and the firm future investment opportunities. This paper also uses Italian data. Though the data needed to implement the analysis of the going-public decision are not generally available, they turn out to be available for Italy. Remarkably, we were able to collect data on 167,515 firm-years from 1999 and 2012, which represent about the entire universe of the domestic sizable manufacturing firms. Furthermore, also data on investors' equity holdings are not so commonly available, and this is especially true when we ask these data to span over time. On the other hand, these data too are available for Italy. The Bank of Italy Survey of Households Income and Wealth (SHIW) provides equity holdings data for 8,000 Italian households from 1989. To mention a few, papers which have used SHIW include Alvarez and Lippi (2009), Guiso, Sapienza, and Zingales (2004a, 2004b), Pelizzon and Weber (2008), Alvarez, Guiso, and Lippi (2012), Guiso and Jappelli (2005).

Our article relates to three strands of literature. First, our article is related to the stock market participation literature (e.g., Hong, Kubik, and Stein 2004; Georgarakos and Pasini 2011; Guiso, Sapienza, and Zingales 2008; Brown et al. 2008; Grinblatt, Keloharju, and Linnainmaa 2011; Guiso, Haliassos, and Jappelli 2003; Giannetti and Koskinen 2010), and, more in particular, to that strand of this literature consistent with investors that regard stocks as consumption goods rather than as investments (e.g., Keloharju, Knüpfer, and Linnainmaa 2012; Cao et al. 2011; Cohen 2009; Fama and French 2007; Grullon, Kanatas, and Weston 2004; Frieder and Subrahmanyam 2005; Lou 2014). Consistent with customer-investors, we show that the investor trading pattern, "if" and "how much" to trade, is largely shaped by the new entries in the stock market, that is the local and non-local IPOs, and the local and non-local delistings.

Second, our article is related to the literature studying the effects of geographical proximity on investing. Research has been increasingly emphasizing the importance of the firm geographic location in almost every aspect of the corporate finance (see Pirinsky and Wang 2010, for a review).[1]. In a large part of this literature, the firm location matters because investors have a strong preference for

[1] The most recent evidence spans from the firm tendency to engage in financial misconducts (e.g., Parsons, Sulaeman, and Titman 2014b) to access to credit (e.g., Parsons, Sulaeman, and Titman 2014a).

geographic proximate stocks, which in turn affects stock returns and corporate market values (e.g., García and Norli 2012; Hong, Kubik, and Stein 2008; Baschieri, Carosi, and Mengoli 2015; Pirinsky and Wang 2006; Kumar, Page, and Spalt 2012) and corporate financing and investment policies (e.g., Becker, Ivković, and Weisbenner 2011; Korniotis and Kumar 2013; Loughran 2008). We contribute by introducing the firm location and geography in IPOs.[2]

Finally, this paper is deep into the IPO literature. In their review article, Ritter and Welch (2002) conclude that behavioral explanations and, more in particular, micro-data on who purchases the IPO shares may be able to shed light on many important issues in the IPO research. Research takes this challenge and show that over-optimistic retail investors ready to over-pay the IPO shares affect IPO first-day return and after-market performance (e.g., Lowry (2003), Dorn (2009), Cornelli, Goldreich, and Ljungqvist (2006), Ljungqvist, Nanda, and Singh (2006), and Derrien (2005)). Differently, this paper deals with locally biased investors constrained on local stocks that affect the firm decision to go public, first-day returns, and long-run returns. More importantly, IPO data matched with investor micro-data allows us to provide the empirical micro-foundation of the behavioral mechanism explaining IPOs.

This paper contributes to the IPO literature along several specific dimensions. Consistent with recent evidence on new agglomeration economies (e.g., Dougal, Parsons, and Titman 2015), the positive effect of the private firm clustering on the likelihood to go public is rather new in the decision to go public literature. The set of firms actually going public is observed while the set of the private firms that could have gone public remain very often unknown, and the research on the IPO underpricing is most likely affected by a selection bias in nature (e.g., Li and Prabhala 2007). As per Bodnaruk et al. (2008) uniquely, we find the selection bias is important in determining IPO first-day returns. Furthermore, we find that the unobservable factors that make it easier (harder) for firms to go public, decrease (increase) the underpricing, and we interpret this evidence as consistent with lower information asymmetries in going public firms (e.g., Chemmanur and Fulghieri 1999) and traditional information-based explanations of underpricing (e.g., Rock 1986). Remarkably, the selection bias

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[2] An extensive review of the literature, lead us to few evidence. Kashian and Brooks (2004) posit underwriters' proximity decreases overall IPO information asymmetries and study the impact of local underwriters on IPO proceeds upon 1,692 US IPOs in 1996-2000. While the underwriter location emerges as unimportant, the IPO activity is found largely clustered in a few States as in volume as in value, suggesting the US firm decision to go public and money left on the table have both strong geographical patterns, which is consistent with our findings. In the same spirit, Wójcik (2009) documents a positive financial center bias (the proportions of listed firms headquartered "in" over "out" the financial centers) according to which firms nearby the financial centers and so, underwriters' location, are more likely to go public than their provincial counterparts; Acconcia, Monte, and Pennacchio (2011) show Italian, France and German IPOs in 1997-2009 are 5% more underpriced when located 100 kilometers or more far away from cities of Milan (Milan Stock Exchange), Paris (Euronext Paris), and Frankfurt (Frankfurt Stock Exchange); finally, Berns, White, and Zhang (2014) use a sample of 1,020 Chinese firms that went IPO between 2007 and 2012 and find that firms remote from major financial centers experience greater IPO underpricing. Though assumptions about underwriters' location are definitely issues not trivial in nature, both private and listed firms cluster in the main financial centers almost by definition and this evidence is consistent with our findings.

issue appears no more negligible in future empirical research on IPO underpricing and a promising field of future research in explaining the behavior of these data. Findings on the IPO underpricing cross-sectional average and volatility further shed light on underwriters' behavior and valuation skills. In addition to uncertainty at the firm- (e.g., Lowry, Officer, and Schwert 2010) and market-level (e.g., Pástor and Veronesi 2005; Pástor, Taylor, and Veronesi 2009; Edelen and Kadlec 2005), the complexity of the pricing problem and so the ability to raise equity capital, is also sensitive to uncertainty at the local-level. As such, our results further complement those of Parsons, Sulaeman, and Titman (2014a), which find the importance of the local corruption on the firm ability to obtain external financing.

The remainder of the paper is organized as follows. Section 2 describes the data. Section 3 is on investors and provides evidence of preference for local IPOs. Section 4 describes the geographical variables used in the subsequent analyses. Section 5 is on the firm likelihood to go public. Section 6 tests whether isolated IPOs are different from the clustered IPOs. Section 7 is on the IPO underpricing cross-sectional average and volatility. Section 8 investigates the IPO aftermarket performance. Section 9 concludes.

2. Data Description

We have three main data sources. The primary data for the empirical analysis consist of information about IPOs. IPO data are drawn from IPO prospectuses. We consider all IPOs at the Italian Stock Exchange (MSE) from 1999 to 2012.[3] Consistent with all the previous research on the investor preference for local stocks, we exclude IPOs of financial firms (SIC 6000–6999) throughout all the analysis. We end with 157 IPOs. Table 1 - Panel A reviews this IPO activity.

[Insert Table 1 about here]

The early 2000s saw intense IPO activity: about €400 million in issuing activity per year and about 75 new listings. In the middle 2000s, issuing volume roughly halved to €200 million per year during 2002 to 2007, even though in 2006 and 2007 a new IPO wave with about 40 new listings took place. In late 2000s, the financial crises determined the IPO activity newly decreased to about €150 million per year and 15 new listings solely during 2008 to 2012. Average first-day returns show a consistent pattern, decreasing from 9.5 percent in the early 2000s to 2.2 percent in the mid-2000s, and to 6.7 percent in 2006 and 2007. In the late 2000s, average first-day returns show the maximum variability and raises up to 11.2 percent. The long-run performance of IPOs also varies over time. Three-year market-adjusted buy-and-hold returns are negative in 1999-2001 and 2006-2007 sub-periods, but

[3] Bris, Koskinen, and Nilsson (2009) show the Euro's introduction in 1999 determined a structural break in the corporate market values in the whole Euro-area.

positive in 2002-2005 and 2008-2012. Three-year market-adjusted cumulative abnormal returns have the same pattern. In all the cases, average three-year market-adjusted returns in 1999-2012 are largely negative.

The second data set is the Survey of Households Income and Wealth (SHIW), which contains detailed social and economic information from a stratified sample of 8,000 households. The household wealth and equity holdings information used below is available since 1989. Consistently with IPO data, we merge the last eight waves (i.e., 1998, 2000, 2002, 2004, 2006, 2008, 2010 and 2012). There are 63,018 households in the database. Table 1 – Panel B reports summary statistics for this sample. In this data set, each household is asked to specify the amount of total wealth and wealth in shares issued by listed firms. We create the variable "equity in listed firms" if a household responds to the amount of wealth in shares issued by listed firms and zero otherwise. The 8.5 percent of the sample households has stocks issued by listed firms. The typical household holds a stock portfolio with an average size of €1,985 (median is 0) which corresponds to about the 0.8 percent (median is 0) of the household wealth.

The third data set contains information about the private firms. Data on private firms come from Amadeus (Bureau Van Dijk database). We were able to collect data on 167,515 firm-years, which represent the universe of the Italian manufacturing firms with available data in 1999-2012. We extract the observations on firms headquartered in Italy and with ROE within plus and minus one range. As per Pagano, Panetta, and Zingales (1998), the determinants of the decision to go public is addressed upon the subsample of the private firms with at least €5 million in total assets, that is firms that have at least a minimal probability of going public. We end with 95,588 private firms. Table 1 – Panel C reports the summary statistics for these data.

Several other standard data sets are used in this study. The analysis of the investor preference for the local IPOs is controlled for the volume of the local delistings, and local IPOs and delistings are defined at the regional level. To compute IPO firms long-run risk-adjusted performance, the data on seasoned firms listed at MSE is required. Data on Italian households disposable income is required to estimate investors' wealth clustering. Finally, the geographic variables of clustering are based on location data (i.e., latitude and longitude). Data on delistings come from Borsa Italiana S.p.A. (i.e., the MSE's managing company), while the NUTS codes are used to split Italy into geographical sub-areas (region, province)[4]; data on the MSE seasoned firms come from Consob (i.e., the Italian equivalent of the US SEC) and Datastream (Thomson Financial database); data on the Italian households come from the National Institute of Statistics (ISTAT) and the Centro Studi Unioncamere (i.e., the Research Centre of Regional Chambers of Commerce); Google Maps provides the location data.

[4] The Nomenclature of Territorial Units for Statistics (NUTS) is a geocode standard developed by the European Union for referencing the subdivisions of the member states for statistical purposes. NUTS codes split member states (NUTS0) into three nested sub-levels, namely geographical macro-areas (NUTS1), regions (NUTS2), and provinces (NUTS3).

3. The Investor Preference for Local IPOs

In this section we provide the empirical evidence of the local investor abnormal demand in local IPOs. We test whether the investors' trading in equity, in the two forms of the stock market participation, that is the likelihood to hold equity, and risk-tolerance, that is the portion of total wealth invested in equity, is abnormally increasing with the volume of the within region IPOs.

We build on the investor preference for local stocks literature. Information hedges (e.g., Hau 2001; Coval and Moskowitz 2001) and familiarity feelings towards the nearby companies (e.g., Grinblatt & Keloharju, 2001; Huberman, 2001), make that a portion of investor wealth is anyway invested in the geographically proximate stocks (e.g., Coval & Moskowitz, 1999; Ivković & Weisbenner, 2005). On the other hand, the local investor abnormal trading in the local stocks is more pronounced the more isolated is the issuing firm from the other listed firms: the fewer are the local firms to invest in, the higher is the local investor wealth invested in each local firm (e.g., Hong, Kubik, and Stein 2008). Similarly, we posit

H1: The likelihood to hold equity increases with the volume of the local IPOs and this effect is stronger than the effect of the non-local IPOs
H2: The positive effect of the volume of the local IPOs on the likelihood to hold equity weakens with the volume of the local listed firms

H3: The amount of wealth invested in equity increases with the volume of the local IPOs and this effect is stronger than the effect of the non-local IPOs
H4: The positive effect of the volume of the local IPOs on the amount of wealth invested in equity weakens with the volume of the local listed firms

We match data on household equity holdings from SHIW and data on IPOs to test H1-H4. We define an IPO as local (non-local) for the household *i* when the going public firm is headquartered in (out of) the same NUTS2 (region) where the household is resident. The count of the local and non-local IPOs in the 2 years of the wave *t* (*IN_NIPO* vs. *OUT_NIPO*), defines the volumes of the local and non-local IPOs at the household level. Table 2 summarizes the variable definitions. Table 3 presents the summary statistics of the stock market participation and equity risk-tolerance in our household sample for regions with no IPOs (No IPO Activity), regions with four or more IPOs (High IPO Activity), and regions experience from one to three IPOs (Low IPO Activity) in the two previous years throughout the IPO sample period (3 is the median of local IPOs in regions with at least one IPO).

[Insert Table 2 about here]

[Insert Table 3 about here]

These basic comparisons show both the likelihood to hold equity and the portion of wealth invested in equity are strongly increasing with the number of local IPOs. In regions that had four or more IPOs in the two previous years, the proportion of households that participate in the stock market is 12.1 percent (median is 0), which is significantly higher than the proportion of households that participate in the stock market in regions that had from one to three IPOs in the same period, which is around 6.5 percent (median is 0). Moreover, the proportion of wealth invested in equity in regions with four or more local IPOs in the two previous years is on average 0.01 (median is 0), while that of households with three to one IPOs is 0.004 (median is 0). The pattern is even more pronounced when we consider regions with no IPOs in the two past years. On the other hand, the household wealth is also increasing with the number of local IPOs.

More properly, we estimate model (1) to test H1–H2, and model (2) to test H3–H4

$$
\begin{aligned}
Pr(Equity_{i,t} = 1) = F(&\alpha_1 IN\_NIPO_{i,t} + \alpha_2 IN\_NIPO \times IN\_NListed_{i,t} + \alpha_3 IN\_NListed_{i,t} \\
&+ \alpha_4 IN\_NDelisting_{i,t} + \alpha_5 OUT\_NIPO_{i,t} + \alpha_6 OUT\_NDelisting_{i,t} \\
&+ \alpha_7 OUT\_NListed_{i,t} + \alpha_8 Age_{i,t} + \alpha_9 Male_{i,t} + \alpha_{10} Education_{i,t} \\
&+ \alpha_{11} Log(Wealth_{i,t}) + \gamma_t Wave_t) \qquad (1)
\end{aligned}
$$

$$
\begin{aligned}
Equity\text{-}To\text{-}Wealth_{i,t} = \beta_0 &+ \beta_1 IN\_NIPO_{i,t} + \beta_2 IN\_NIPO \times IN\_NListed_{i,t} + \beta_3 IN\_NListed_{i,t} \\
&+ \beta_4 IN\_NDelisting_{i,t} + \beta_5 OUT\_NIPO_{i,t} + \beta_6 OUT\_NDelisting_{i,t} \\
&+ \beta_7 OUT\_NListed_{i,t} + \beta_8 Age_{i,t} + \beta_9 Male_{i,t} + \beta_{10} Education_{i,t} \\
&+ \beta_{11} Log(Wealth_{i,t}) + \gamma_t Wave_t \qquad (2)
\end{aligned}
$$

where *Equity* is a dummy variable that equals 1 if the household *i* reports to own stock in SHIW wave *t* and 0 otherwise and *F(.)* is the cumulative distribution function of a standard normal variable, and *Equity-To-Wealth* is the ratio of the respondent value of the wealth invested in stocks to the overall wealth value. While *IN_NIPO* (*OUT_NIPO*) addresses the average effect of local (non-local) IPOs on the household likelihood to hold equity (*Equity*) and the proportion of wealth invested in equity (*Equity-To-Wealth*), *IN_NIPO x IN_NListed* estimates the additional effect of local IPOs (*IN_NIPO*) on *Equity* or *Equity-To-Wealth* that is influenced by the number of the local listed firms (*IN_NListed*).

Several control variables have been considered. First, we include controls for the volume of local and non-local listed firms (*IN_NListed* vs. *OUT_NListed*), and the IPO counterparts, that is local and non-local delistings (*IN_NDelisting* vs. *OUT_NDelisting*). Limited stock market participation is traditionally explained by the presence of fixed participation costs (e.g., Haliassos and Bertaut 1995; Vissing-Jorgensen 2004). Since the literature on fixed cost largely emphasizes the importance of wealth (e.g., Giannetti and Koskinen 2010; Brav, Constantinides, and Geczy 2002; Vissing-Jørgensen

2002), we include in regressions the value of household net wealth (*Log(Wealth)*) (see also Guiso, Sapienza, and Zingales 2008; Hong, Kubik, and Stein 2004; Georgarakos and Pasini 2011). Various demographic characteristics are also included to account for possible differences in participation costs. We control for the SHIW respondent age (Age), gender (*Male*), and education level (*Education*). These variables are expected to capture changes over the life cycle and differences across individuals that affect their attitude toward investment in stocks, such as variation in exposure to uninsurable risks (e.g., Kimball 1993), or that act as a barrier to participation in the stock market regardless of any participation cost, such as lack of awareness that a stock is an asset (e.g., Guiso and Jappelli 2005). Finally, against any possible cross-sectional correlation in the local investors' trading patterns that may arise from local factors such as social interactions (e.g., Hong, Kubik, and Stein 2004; Brown et al. 2008; Guiso, Sapienza, and Zingales 2004a) and local economic cycles (e.g., Korniotis and Kumar 2013), standard errors clustered by region and wave are considered (e.g., Petersen 2009; Thompson 2011).

The H1 implies $\alpha_1 > 0$ and $\alpha_1 > \alpha_5$, while H2 predicts $\alpha_2 < 0$. Cross-country evidence on stock market participation (e.g., Guiso, Sapienza, and Zingales 2008; Guiso, Haliassos, and Jappelli 2003; Giannetti and Koskinen 2010) suggests a positive relation between stock market participation rates and stock market size. Roughly speaking, the more are the listed firms and so the shares outstanding, the higher is the household probability to hold stocks. Therefore, local and non-local IPOs (*IN_NIPO* and *OUT_NIPO*), and local and non-local listed firms (*IN_NListed* and *OUT_NListed*), are anyhow expected to increase the household likelihood to take part to the stock market (i.e., α_1, α_3, α_5, and $\alpha_7 > 0$). By the same reasoning, local and non-local delistings (*IN_NDelisting* and *OUT_NDelisting*) should interact the opposite (i.e., α_4 and $\alpha_6 < 0$). The negative effects of local and non-local delistings (*IN_NDelisting* and *OUT_NDelisting*) on the stock market participation might be even suspected larger in magnitude than the positive effects of local and non-local IPOs (*IN_NIPO* and *OUT_NIPO*). Delistings are at times caused by firm's bankruptcy (e.g., Croci and Giudice 2014) when the salvage value for shareholders is often much less than the pre-distress value or even zero (e.g., Branch 2002). All these cases destroy the investor wealth and further reduce the chances that investors opt to re-take part of the stocks market, thus suggesting the effects of local and non-local delistings might be more pronounced than the boosting effects of the local and non-local IPOs. Finally, as investors have a strong preference for the local stocks, the volume of the local listed firms (*IN_NListed*) is predicted to increase the household likelihood to take part of the stock market more than the volume of the non-local listed firms (*OUT_NListed*) (i.e., $(\alpha_3 - \alpha_7)>0$). Predictions with investor risk tolerance (*Equity-To-Wealth*) are similar. H3 implies $\beta_1 > 0$ and $\beta_1 > \beta_5$, and H4 predicts $\beta_2 < 0$. All other things being equal, the higher is the number of listed firms available to invest in, the easier and more effective should be the portfolio diversification and risk reduction (e.g., Lau, Ng, and Zhang 2010; Statman 1987), and so the portion of wealth invested in equity. Therefore, the pattern of variables for local and non-local IPOs, local and non-local listed firms and local and non-local delistings should be unchanged from (1) to (2) (i.e., β_1, β_3, β_5, and $\beta_7 > 0$, β_4 and $\beta_6 < 0$).

Table 4 reports results of the multivariate analysis. Model 1 and 2 are on stock market participation, while model 3 and 4 are on equity risk tolerance. Model 1 and 3 report the estimates of the basic specification, and Model 2 and 4 include the control variables.

[Insert Table 4 about here]

Results confirm the testable hypotheses. Looking at stock market participation in Model 2, the household likelihood to hold stocks increases with the volume of the local IPOs (α_*IN_NIPO* = 0.075, p-value<0.01), but is not affected by the volume of the non-local IPOs (α_*OUT_NIPO* = -0.006, p-value>0.10). Furthermore, the positive effect of local IPOs on the likelihood to hold equity weakens with the volume of the local listed firms (α_ *IN_NIPO x IN_NListed* = -0.001, p-value<0.01). As predicted, the household stock market participation increases with the local and non-local listed firms (α_*IN_NListed* = 0.056, p-value<0.01; α_*OUT_NListed* = 0.043, p-value<0.05) and decreases with the local and non-local delistings (α_*IN_NDelisting* = -0.313, p-value<0.01; α_*OUT_NDelisting* = -0.310, p-value<0.01), the effect of local listed firms is stronger than the effect of non-local listed firms, and the negative effects of local and non-local delistings are stronger than the positive effects of local and non-local IPOs.

Results on equity risk-tolerance are less clear but still highly supportive. Looking at Model 4, the portion of the household wealth invested in equity is a positive function of the volume of the local IPOs, as predicted (α_*IN_NIPO* = 0.000, p-value<0.05). On the other hand, this effect is not affected by the volume of the local listed firms (α_ *IN_NIPO x IN_NListed* = -0.000, p-value>0.10). Surprisingly, the household wealth in equity is even decreasing with the volume of the non-local IPOs (α_*OUT_NIPO* = -0.000, p-value>0.01). The pattern of all other explanatory variables is as predicted and essentially unchanged. The portion of equity wealth is negatively affected by the local and non-local delistings (α_*IN_NDelisting* = -0.004, p-value<0.05; α_*OUT_NDelisting* = -0.004, p-value<0.05), and slightly positively affected by the local and non-local listed firms (α_*IN_NListed* = 0.000, p-value=0.12; α_*OUT_NListed* = 0.000, p-value=0.16).

Findings clearly highlight that the large majority of the equity demand comes from the local investors demanding for local IPO stocks and that this demand component is higher the fewer are the local listed firms.

4. The Firm Location and our Geographic Variables of Clustering

The local investors provide abnormal demand in the local IPOs and we predict this affects the firm decision to go public in the first place, and IPO first-day return and after-market performance, afterwards. To test for these hypotheses, a suitable metric for the local investor additional demand in local IPOs is required. More specifically, a firm-specific measure of 'how much local is the firm' (investor perspective) or 'how much sizable is the local investor trading on a particular stock' (firm perspective) is needed.

The quantification of the firm locality and any other firm-specific attribute related to the firm location is definitely not an easy task. The literature proposes a quite wide range of alternative approaches. Gao, Ng, and Wang (2008) and Landier, Nair, and Wulf (2009) define the corporate geographic dispersion by the number of regions where subsidiaries are located and the proportion of divisions in the firm home state, respectively; Baschieri, Carosi, and Mengoli (2015) distinguish the isolated firms from the clustered firms by using a distance-based spatial index of dispersion previously adopted in the ecology literature to measure the tendency of living organisms to form clusters; García and Norli (2012) and Bernile, Kumar, and Sulaeman (2015) even use the textual analysis of the firms' annual financial reports (10-K) and define a firm as local upon the number of U.S. states mentioned in a firm's 10-K.

In this paper, the firm attributes related to the firm location are proxied by using variables of the geographic clustering around the firm headquarters. In particular, three types of the geographic clustering are considered: the clustering of the listed firms (*GeoClustListed*), the clustering of investors' wealth (*GeoClustWealth*), and the clustering of the private firms (*GeoClustPrivate*).

In general, the geographic clustering of elements j around the firm i in the year t is defined as

$$GeoClust_{i,t} = \sum_{j=1}^{n} \frac{1}{Distance_{i,j}}$$

where $Distance_{i,j}$ is the shortest spherical distance between the headquarters of the firm i and the location of the generic element j. The more the j-elements are clustered around the firm i the higher is the value of *GeoClust*. *GeoClustListed* is *GeoClust* when js are the headquarters of the firms listed at MSE in year t; *GeoClustWealth* is *GeoClust* when js are the capitals of the Italian NUTS3 (province) and $Distance_{i,j}$ is multiplied by the provincial household disposable income of year t; and *GeoClustPrivate* is *GeoClust* when js are the headquarters of the private firms in year t. For instance, in an economy made by two private firms, a clustered one and an isolated one, and three listed firms headquartered 10 (100), 20 (200), and 30 (300) kilometers far away from the clustered (isolated) private firm, *GeoClustListed* is 0.061 (i.e., the average of 1/10, 1/20, and 1/30, corresponding to about 1/0.061 = 16 kilometers away from the three listed firms on average) for the clustered private firm, and 0.006 (i.e., the average of 1/100, 1/200, and 1/300, corresponding to about 1/0.006 = 164 kilometers of average distance) for the isolated private firm.

Table 5 describes our geographical variables of clustering for firms that go public (have an IPO) during our sample period and for firms remaining private throughout our sample period. The table reports the quartile distributions (the quartile minimum, average, and maximum values) of *GeoClustListed*, *GeoClustWealth*, and *GeoClustPrivate*, and the inner average values of the listed firms (*GeoClustListed*), investor wealth (*GeoClustWealth*), and private firms (*GeoClustPrivate*) located within a 100-, 300-, and 600-kilometer radius from the firm headquarters.

[Insert Table 5 about here]

GeoClustListed is in range 0.0006-0.1214, the cross-sectional average value of *GeoClustListed* is 0.0172, corresponding to a distance of about 1/0.0172 = 58 kilometers from the listed firms on average, while the median is 0.0077, or 130 kilometers of average distance. For instance, firms in the second quartile have *GeoClustListed* ranging from 0.0048 to 0.0077, and 0.0061 is the average value of *GeoClustListed* within the second quartile. For each firm, the number of the listed firms within a 100-, 300-, and 600-kilometer radius from the firm headquarters is counted and the within quartile average values have been taken. Therefore, firms in the second quartile of *GeoClustListed* have on average 10.3 percent of the domestic listed firms (7 firms out of about 223) within 100 kilometers, 62.8 percent (65 firms) within 300 kilometers (96.0 percent, and 214 firms, considering a radius of 600 kilometers from the firm headquarters). Similarly, firms in the second quartile of *GeoClustWealth* (0.0050-0.0060) have on average 10.7 percent of the overall domestic household disposable income (104,882 over about 975,715 euro millions) within 100 kilometers (46.3 percent and 452,201 euro millions within 300 kilometers, and 78.3 percent and 763,847 euro millions in a 600 km radius area), and firms in the second quartile of *GeoClustPrivate* (0.0057-0.0079) have on average 12.6 percent of the domestic private firms (1,930 firms out of about 15,301) within 100 kilometers (60.2 percent and 9,204 firms within 300 kilometers, and 91.3 percent and 13,967 firms in a 600 km radius area).

GeoClustListed measures the clustering of the listed firms around the firm headquarters and is our proxy for the local investor abnormal demand in the local IPOs. *GeoClustListed* is lower (higher) in firms isolated (clustered) from the listed firms when the local investor additional demand is more (less) important. *GeoClustWealth* is higher the more concentrated is the household disposable income around the firm headquarters and controls for the local investor risk-tolerance, which is assumed proportional to the investor wealth (e.g., Aabo, Pantzalis, and Sørensen 2013; Hong, Kubik, and Stein 2008; Baschieri, Carosi, and Mengoli 2015). Finally, *GeoClustPrivate* increases for firms located in areas populated by several private firms and captures effects from the local agglomeration economies. Effects of firm agglomeration have been investigated since Marshall (1890), spanning from "people-based" externalities like knowledge spillovers (e.g., Jaffe, Trajtenberg, and Henderson 1993) to pooling of labor markets that improve firm-worker matches (e.g., Rosenthal and Strange 2001).[5] The most recent evidence even shows substantial peer effects among firms located in the same economic area. For instance, the firm tendency to engage in financial misconduct and the corporate investment expenditures increase with the misconduct rates and the investments of the neighboring firms (e.g.,

[5] See Duranton and Puga (2004) for an excellent review of this literature.

Parsons, Sulaeman, and Titman 2014b; Dougal, Parsons, and Titman 2015). When included in regressions together with *GeoClustListed*, *GeoClustPrivate* disentangles the effects of pure firm clustering from the effect of listed firm clustering.

5. The Firm Location and the Likelihood to go Public

The local investors provide abnormal demand in the local IPOs and this demand increases the fewer are the local listed firms. The local investor abnormal demand boosts the aggregate demand for the IPO stocks. We predict this positively affects the firm decision to go public. More in particular, listings of private firms that are isolated from the listed firms should be especially favored. This section is devoted to test for this hypothesis.

We estimate a probit model of the firm probability to go public and include the geographic variables of clustering among the explanatory variables.[6] *GeoClustListed* is the key explanatory variable and is expected inversely related with the likelihood of a private firm to go public. All other things being equal, the demand provided by the local investors makes the aggregate demand for the newly issued stocks is larger the more isolated from the listed firms is the issuing firm. A high pre-offer demand facilitates the new listings for at least a couple of reasons. One the one side, the need of funds is among the main reasons why firms go public (e.g., Pagano, Panetta, and Zingales 1998) and a large pre-offer demand leads to higher IPO prices (e.g., Derrien 2005; Cornelli and Goldreich 2003; Cornelli, Goldreich, and Ljungqvist 2006) and, therefore, to higher IPO proceeds. On the other hand, the main cost of going public is money left on the table (e.g., Ritter 1987). All other things being equal, a large pre-offer demand should lead to larger offerings, which on average are less underpriced than smaller offerings (e.g., Ritter 1987; Michaely and Shaw 1994; Beatty and Ritter 1986). By the same but opposite dynamic, *GeoClustWealth* is expected to increase the likelihood to go public. The likelihood to take part of the market and the amount of wealth invested in equity is a direct proportion of the investor wealth (e.g., Guiso, Sapienza, and Zingales 2008; Hong, Kubik, and Stein 2004; Georgarakos and Pasini 2011; Hong, Kubik, and Stein 2008; Cohn et al. 1975). Therefore, private firms located in richer areas benefit of a wider and higher pre-offer demand which is expected to bring more firm to go public.

Against possible endogeneity, *GeoClustPrivate* is included among the explanatory variables of the going public decision model and it is predicted positively correlated with the firm probability to go public. The relation between *GeoClustListed* and the likelihood to go public is founded on the investor preference for local IPOs and it is predicted negative. On the other hand, positive performance effects arise from firm clustering (e.g., Jaffe, Trajtenberg, and Henderson 1993; Dougal, Parsons, and Titman 2015) and firms with better performances go more easily public (e.g., Pagano, Panetta, and Zingales 1998; Chemmanur, He, and Nandy 2010a), meaning that a positive relation

[6] We follow Pagano, Panetta, and Zingales (1998) in our specification.

between *GeoClustListed* and the probability to go public might be also equally in play and our going public decision model might be affected by simultaneity bias endogeneity (e.g., Roberts and Whited 2013). When *GeoClustPrivate* is included in regressions together with *GeoClustListed*, *GeoClustPrivate* disentangles the positive effect of pure firm clustering, i.e., being located in successful areas populated by several other private firms, from the negative effect of listed firms clustering, i.e., being located among several other suppliers of local stocks for the local equity-market. In essence, *GeoClustPrivate* ensures the effect of *GeoClustListed* on the likelihood to go public is related to the trading pattern of the local investors only.

More in particular, we estimate the following model of the probability of going public:

$$\begin{aligned} Pr(IPO_{i,t} = 1) = F(&\alpha_1 GeoClustListed_{i,t} + \alpha_2 GeoClustWealth_{i,t} + \alpha_3 GeoClustPrivate_{i,t} \\ &+ \alpha_4 Industry\ Median\ MTB_{i,t} + \alpha_5 Roa_{i,t-1} + \alpha_6 Leverage_{i,t-1} \\ &+ \alpha_7 Log(1+Age_{i,t}) + \alpha_8 Log(Assets_{i,t-1}) + \gamma_t Year_t) \qquad (3) \end{aligned}$$

where *IPO* is a dummy variable that equals 1 if the firm goes public in year *t* and 0 if the firm remains private and *F(.)* is the cumulative distribution function of a standard normal variable. At any time *t*, the sample includes all firms that are private at that point in time, and the firms that go public (had an IPO) in that year. After a firm goes public, it is dropped from the sample. Hereafter, the rationale for the control variables included in the likelihood to go public regression model is reported (with predictions in parentheses). Clustered by year and industry standard errors are considered to address further unobserved cross-sectional and time-series correlations.

The likelihood to go public regression model include controls for:

(+) Window of opportunity hypothesis (*Industry Median MTB*). *Industry Median MTB* is the median market-to-book ratio of the listed firms in the firm industry and measures the buoyancy of the relevant market. Entrepreneurs manage to exploit the overvaluation of their companies by investors and therefore company are more likely to go public when the market is particularly buoyant (e.g., Rajan and Servaes 1997; Lerner 1994). *Industry Median MTB* is a suitable proxy also for firm future investment opportunities, which is also expected positively related with the likelihood to go public (cf. Financial constraint hypothesis).

(+/-) Firm profitability and the window dressing hypothesis (*Roa*). In general, a more profitable company needs less external equity, suggesting a negative relation between *Roa* and the probability of an IPO. On the other hand, companies may time their issues to coincide with unusually high profitability (e.g., Window of opportunity hypothesis) or may either engage in "window-dressing" of their corporate accounts at the time of the IPO (Window dressing hypothesis) (e.g., Degeorge and Zeckhauser 1993; Teoh, Welch, and Wong 1998), hoping that investors will mistakenly perceive its high profitability as permanent and will overvalue its shares. In both of the cases, firm profitability increases the likelihood to go public (Pagano, Panetta, and Zingales, 1998) and declines after the IPO (e.g., Jain and Kini 1994; Mikkelson, Partch, and Shah 1997; Pástor, Taylor, and Veronesi 2009).

(+) Financial constraint hypothesis (*Leverage*). Firms go public to gain the access to an alternative (to banks and, in the U.S., to venture capital) source of funds. Therefore, the opportunity to tap public markets for funds is particularly appealing for companies with large present and future investments opportunities and high leverage (Pagano, Panetta, and Zingales, 1998).

(+) Adverse selection and moral hazard (*Log(1+Age)*). *Age* is the number of years since firm incorporation and it is predicted positively correlated with the likelihood to go public. In general, insiders (issuers and its investment banks) know considerably more about the companies going public than the outsider investors. This information asymmetries increase the outsiders' cost of production of information needed to evaluate the issuing firm which is borne by the issuing firms through lower share prices (e.g., Rock 1986; Leland and Pyle 1977). The trade-off between staying private and going public is likely to favor staying private the larger is the outsiders' evaluation cost or firm information asymmetries (Chemmanur and Fulghieri 1999). Younger firms face more severe information asymmetries than more established firms and are less likely to go public (Chemmanur, He, and Nandy 2010)

(+) IPO fixed costs and adverse selection (*Log(Assets)*). An IPO has considerable fixed costs (e.g., administrative expenses and fees) (e.g., Ritter 1987) which weigh relatively more on small companies. Furthermore, small firms are characterized by larger information asymmetries than more sizable companies (e.g., Banz 1981; Merton 1987). Therefore, small companies either are adversely selected towards the listing and the likelihood of an IPO is positively correlated with the company size (Chemmanur, He, and Nandy 2010; Pagano, Panetta, and Zingales 1998; Bodnaruk et al. 2008).

Table 6 presents the summary statistics for the firms that go public (have an IPO) during our sample period and for firms remaining private throughout our sample period. All reported statistics are firm-year observations, and for the sample of IPO firms only the years prior to the firm's IPO are included.[7]

[Insert Table 6 about here]

[7] We also tabulated the summary statistics of the IPO firms for all years before and after going public and found qualitatively similar results (Not reported).

GeoClustListed for firms that have an IPO is on average (median) equal to 0.021 (0.011) meaning that firms decide to go public are on average (median) 1/0.021 = 48 (1/0.011=91) kilometers away from the listed firms. On the other hand, *GeoClustListed* in firms remain private is on average (median) 0.017 (0.008), traslated into 59 (125) kilometers. Therefore, firms go public are more clustered with the listed firms than firms decide to remain private such as the tendency to go public is seemed increasing the more the area is populated by listed firms. This evidence would be contrary to our conjectures. On the other hand, *GeoClustWealth* and *GeoClustPrivate* are also significantly larger in firms that have an IPO (0.007 and 0.017 on average, and 0.006 and 0.009 in median, respectively) than in firms that stay private (0.006 and 0.013 on average, and 0.006 and 0.008 in median, respectively), suggesting that firms tend to go public in the richer areas where several private firms are headquartered. This evidence is consistent with our conjectures

The basic comparison of firms going public with firms remain private further show that firms going public during our sample period are on average significantly less profitable, more levered, and larger than firms that remain private. *Roa* is on average (median) equal to 5.7 (6.4) percent in IPO firms and raises equal to about 8.5 (7.2) percent in private firms; the pattern is reversed for the debt-financing: *Leverage* is equal to 30.9 (27.3) percent in IPOs and falls up to 15.4 (11.6) in firms remain private; finally, *Assets* is on average (median) € 1,369 (124,3) million in firms go public and € 78.5 (22.6) million in firms remain private. On the other hand, Italian IPOs seem to not time-the-market and unaffected by the firm length of stay. In fact, *Industry Median MTB* and *Age* are not statistically different across firms going public and firms remain private: *Industry Median MTB* is on average (median) 0.69 (0.70) in the IPO firms which last on average (median) about 16 (13) years from incorporation, and 0.72 (0.67) in the subsample of private firms which are on average (median) 21 (18) years from foundation. Overall, this evidence is consistent with the financial constraints theory of the decision to go public (e.g., Pagano, Panetta, and Zingales, 1998), which posits that high-debt firms with future profitable investments opportunities go public to overcome borrowing constraints, and with the adverse selection theories of going public (e.g., Ritter 1987; Chemmanur and Fulghieri 1999), which state that the larger and more established firms are more likely to go public thanks to the lower information asymmetries and the relative less relevant quotation fixed costs.

Table 7 reports results of the multivariate analysis of the firm likelihood to go public. Model 1 is the basic specification, Model 2 is augmented with *GeoClustListed* and *GeoClustWealth*, and Model 3 also includes *GeoClustPrivate* addressing possible endogeneity.

[Insert Table 7 about here]

Results on geographic variables are as predicted. Looking at Model 3, the likelihood of a private firm to go public decreases with the clustering of listed firms (β_*GeoClustListed* = -0.0103, p-value<0.05), and increases with the clustering of investor wealth (β_*GeoClustWealth* = 0.0172, p-value<0.10).

Consistent with positive effects from the local agglomeration economies, the likelihood to go public also increases with the private firm clustering (β_*GeoClustPrivate* = 0.0137, p-value<0.05). The multivariate analysis results also support the window of opportunity hypothesis as new issues are more likely in bullish market (β_*Industry Median MTB* = 0.0001, p-value<0.01), and highlight that small and young firms are indeed adversely selected towards new listings (β_*Log(Assets)* = 0.0002, p-value<0.01; β_*Log(1+ Age)* = 0.0002, p-value<0.01). Finally, the probability to go public is higher for more levered firms (β_*Leverage* = 0.0009, p-value<0.01), which is consistent with the financial constraint hypothesis. *Roa* is the only variable not statistically significant (β_*Roa* = -0.0001, p-value = -0.42).[8]

6. Isolated Versus Clustered IPOs: Descriptive Evidence

Table 8 presents the summary statistics for the firms that go public (have an IPO) during our sample period distinguishing the isolated IPOs, defined as the IPOs with *GeoClustListed* below the cross-sectional median, and the clustered IPOs, the IPOs with *GeoClustListed* equal or larger than the cross-sectional median.

[Insert Table 8 about here]

Newly issued stocks at MSE have first-day secondary market prices on average (median) 9.5 (3.4) percent higher than the IPO price (*Underpricing*). IPO stocks are largely underperforming in the aftermarket: the cross-sectional average (median) three year buy and hold abnormal return, Fama and French (1992) three factor model benchmarked, is -23.1 (-32.5) percent (*BHAR3y*); cumulative abnormal returns do not change the pattern, *CAR3y* is on average (median) -28.8 (-24.9) percent. This figures are consistent with previous evidence on Italian IPOs (e.g., Ljungqvist 2007; Vismara, Paleari, and Ritter 2012; Arosio, Paleari, and Giudici 2001).

The typical offer of our sample has underwriters with recent experience in IPOs at the MSE: on average (median), the managing underwriter has led 10.5 (3.1) percent of the overall value tendered in IPOs on MSE (*Reputation*). Consistent with positive information acquisition about demand during the book-building period (e.g., Hanley 1993; Lowry and Schwert 2004), IPO share prices are usually revised upward from the original estimates by 24.1 (29.4) percent on average

[8] Bodnaruk et al. (2008) find the same pattern. Differently, Pagano, Panetta, and Zingales (1998) document a positive and significant relation between ROA and the firm decision to go public. However, in the sample period covered by Pagano, Panetta, and Zingales (1998), positive earnings in the three years before the listing were required (for MSE listings from 1984 to 1998), such that profits may positively correlate with the likelihood to go public because of the selection effect of the listing requirements. Dealing with this issue, Pagano, Panetta, and Zingales (1998) further document a significant post-IPO fall in profitability and conclude that the overall pattern of ROA is more consistent with the window of opportunity hypothesis (Pagano, Panetta, and Zingales 1998, sec. IV.A).

(median) (*Revision*). Most of the IPO issue, on average (median) 64.8 (63.9) percent of the tendered shares, is allocated to institutional investors (*Institutional*). Taken together, this evidence is further consistent with institutional investors superior information in IPOs (e.g., Aggarwal, Prabhala, and Puri 2002). The typical offer raises on average (median) 389.2 (56.2) euro millions (*Proceeds*) and tenders 3.4 (2.8) million of shares (*Shares*). As widely documented (e.g., Habib and Ljungqvist 2001; Brennan and Franks 1997), the majority of the tendered shares are newly issued shares (*Dilution Factor* is higher than *Participation Ratio*): in our sample, on average (median) 35.4 (23.6) percent of the tendered shares are by the existing pre-issue shareholders (*Second*), which is also consistent with previous evidence on Italian offerings (e.g., Rigamonti 2007). Not surprisingly in light of the recent dynamics in the European IPO market (e.g., Ritter 2003; Vismara, Paleari, and Ritter 2012), the majority of our IPOs sample is of listings on the MSE segments with minimal regulations and dedicated to high-growth and high-tech fledgling companies (*AIM*).

The basic comparison of IPOs isolated from the listed firms with IPOs clustered with listed firms show that the isolated IPOs have on average higher, but not statistically significant, first-day initial returns, and significantly less pronounced under-performance in the long-run. In isolated IPOs (on average about 150 kilometers far away from the closest listed firm), the average *Underpricing* is 10.7 percent (median is 2.3 percent), while that of clustered IPOs is 8.2 percent (median is 3.6). Moreover, the average (median) *BHAR3y* in isolated IPOs is -12.0 (-23.9) percent, which is significantly higher than the average (median) *BHAR3y* in clustered IPOs, which is -33.9 (-42.7) percent. This pattern is even more pronounced when the cumulative abnormal returns are considered (*CAR3y*).

With the exception of their geographical features, the isolated IPOs are very similar with the clustered IPOs. In addition, the few non-geographical features that make the isolated IPOs different from the clustered IPOs do not provide a unique pattern with respect to expected first-day returns. First, the isolated IPOs are headquartered in areas characterized by a lower concentration of the investor wealth: the average (median) *GeoClustWealth* in isolated IPOs is 0.005 (0.005), which is significantly lower than the average (median) *GeoClustWealth* in clustered IPOs, which is 0.007 (0.007). Second, the isolated IPOs are also located in areas significantly less populated by private firms: in isolated IPOs, the average (median) *GeoClustPrivate* is 0.007 (0.006), while that of clustered IPOs is 0.025 (0.017). Therefore, it's easier to observe an IPOs the richer is the area, and the more the area is populated by private firms. This evidence provides strong ex-post confirmation to our previous evidence on the geographical features that favor private firms to go public.

Third, the isolated IPOs are less affected by the within-industry recent market movements. In isolated IPOs, the average of daily industry-specific index returns in the sixty trading days before the offering date (*mMRK_Before60dd*) is on average (median) 0.009 (0.008), which is significantly lower than the average (median) *mMRK_Before60dd* in clustered IPOs, which is 0.010 (0.009). This evidence suggests that the isolated IPOs are less affected by the so-called hot IPO markets phenomenon (e.g., Ibbotson and Jaffe 1975; Ibbotson, Sindelar, and Ritter 1988; Ibbotson, Sindelar, and Ritter 1994) and less underpriced (e.g., Logue 1973; Hanley 1993) than the clustered IPOs. Fourth, the isolated IPOs are significantly more participated by the insiders than the clustered IPOs (*Participation Ratio* and *Second*). In isolated IPOs, the proportion of the tendered shares by the existing pre-issue shareholders is on average (median) 40.8 (33.3) percent, which is significantly larger than the average (median) *Second* in the clustered IPOs, which is 30 (12.4) percent. The number of the old shares sold in IPO defines the entrepreneurial wealth losses and the incentive to underprice. Therefore, this evidence also suggests that the isolated IPOs should be less underpriced than the clustered IPOs (e.g., Habib and Ljungqvist 2001; Ljungqvist and Wilhelm 2003). On the other hand, the proportion of AIM listings is significantly larger in the isolated IPOs than that in the clustered IPOs: in isolated IPOs, *AIM* is on average 66.7 percent (median is 1), which is significantly larger than the average *AIM* in the clustered IPOs, which is 45.0 percent (median is 0). Small, young, high-tech firms tend to list on the less regulated circuits. This evidence would support a larger underpricing in the isolated IPOs than in the clustered IPOs (e.g., Chambers and Dimson 2009). There is weak evidence that the isolated IPO stocks are less risky than the clustered IPO stocks in the aftermarket (*σIPO_After255dd*) (statistical significance in the median difference, only), that the isolated IPO firms are older (*Age*) (in median, only) but smaller (*Assets*) (on average, only) than the clustered IPO firms, and that the isolated IPOs raise less capital than the clustered IPOs (*Proceeds*) (on average, only; in median the pattern is reversed, but not significant). While *Assets*, and *Proceeds* suggest that the isolated IPOs are more underpriced than the clustered IPOs (e.g., Beatty and Ritter 1986; Ritter 1987), evidence on *σIPO_After255dd* and *Age* would support the opposite (e.g., Carter, Dark, and Singh 1998; Ritter 1984). Further variables commonly used in investigating IPOs, such as the IPO stocks volatility right after the offer (*σIPO_After255dd*), the proportion of high-tech firms (*Tech*), the indicative IPO price range (*Range*), and the share offer size (*Shares*), do not exhibit any specific pattern across isolated and clustered IPOs.

7. The Firm Location and the IPO Underpricing

The firm location affects the firm decision to go public. On the other hand, with the exceptions of few features, such as the sensitivity to the market movements and the insiders' participation, the firm location seems to affect the offer characteristics only marginally. This section relates the firm location with the IPO underpricing. More specifically, we posit the IPO first-day returns increase the less (more) the IPO firm is clustered (isolated) with the listed firms. In our framework, this means the IPO underpricing decreases with *GeoClustListed*.

The underpricing has been traditionally related to the information asymmetries surrounding the company (e.g., Rock 1986; Michaely and Shaw 1994; Beatty and Ritter 1986), and isolated (rural) firms are argued with larger information asymmetries than clustered (urban) firms (e.g., Loughran and Schultz 2005; Loughran 2008; Loughran 2007). Therefore, one might advance that the larger information asymmetries in the isolated firms drive the negative relation between underpricing and the IPO firm clustering we posit (*information asymmetries hypothesis*). Differently, we posit that IPOs of isolated firms are more underpriced than IPOs of clustered firms as issuers and underwriters under-estimate the local investors additional demand in the local IPOs. The un-fulfilled local investor demand pushes the IPO firm first-day market prices up thus increasing the observed underpricing. The local investor additional demand is lower in the clustered IPOs than in the isolated IPOs, which, ultimately, remain associated with larger underpricing (*miss-valuation hypothesis*). In the *miss-valuation hypothesis*, the local investor additional demand complicates the IPO valuation process faced by issuers and underwriters and the valuation of the isolated IPOs is more complicated than the valuation of the clustered IPOs. This leads the isolated IPOs to be more underpriced than the clustered IPOs (e.g., Rock 1986; Welch 1992; Benveniste and Spindt 1989; Lowry and Schwert 2004; Sherman and Titman 2002). The complexity of the IPO pricing problem is reflected in the cross-sectional variability of IPO stocks initial returns (Lowry, Officer, and Schwert 2010). To the extent the relation between the IPO underpricing and the firm location is rooted in the miss-valuation of the isolated IPOs, the firm location affects the underpricing via its cross-sectional volatility.

In this section, we investigate the effects of *GeoClustListed* and *GeoClustWealth* on the IPO underpricing and on the cross-sectional variability of IPO stocks initial returns. To rule out any possible underpricing caused by IPO information asymmetries, the issue ex ante uncertainty has been severally addressed using a wide range of proxies. In addition, results are controlled for the unobservable factors that affect the firm decision to go public (selection bias to listing). As we will see, the underpricing decreases the more the listed firms are clustered around the IPO headquarters, increases the more the investor wealth is clustered around the IPO headquarters, and these effects are almost entirely attributable to similar variations in the cross-sectional variability of IPO stocks initial returns.

7.1. The Firm Location and the IPO Initial Returns

The percentage difference between the first trading-day market price and the offer price (*Underpricing*) is the left-hand side variable. *GeoClustListed* and *GeoClustWealth* are the geographical variables included in the underpricing regression model.[9] The relation between the firm location and the underpricing can be rooted in the larger information asymmetries surrounding the isolated firms (*information asymmetries hypothesis*). In this framework, *GeoClustListed* is predicted

[9] A couple of reasons lead us to exclude *GeoClustPrivate* from this analysis. First, any possible performance enhancing effects related to the local agglomeration of the private firms that might affect the underpricing is already discounted in the firm decision to go public. Second, the underpricing phenomenon is essentially related to insiders' firm valuation and investors trading and we don't see any correlation to include *GeoClustPrivate* among underpricing determinants. Rather, by including *GeoClustPrivate* among underpricing regressors, we would confound the effect of *GeoClustListed*. Nevertheless, we run all our analyses also with *GeoClustPrivate* with unchanged results: *GeoClustPrivate* has positive and statistically not significant coefficients. The same considerations hold for the analysis of the IPO aftermarket performance.

negatively correlated with *Underpricing*. However, the relation between *Underpricing* and *GeoClustWealth* is quite less predictable. In fact, we find any reason why the firm information asymmetries and the underpricing should vary with the local concentration of the investor wealth (*GeoClustWealth*).

The relation between the firm location and the underpricing can be rooted in the underwriters' miss-valuation of the IPO firm market value (*miss-valuation hypothesis*). In this framework, *GeoClustListed* is predicted negatively correlated with *Underpricing* and *GeoClustWealth* is predicted positively correlated with *Underpricing*. The corporate market values increase with the local investor demand (e.g., Hong, Kubik, and Stein 2008). More in particular, firms trade at premium the higher is the local investor unfulfilled demand for local stocks (i.e., in inverse relation with *GeoClustListed*) and the local investor risk-tolerance (i.e., directly with *GeoClustWealth*). Though *GeoClustListed* and *GeoClustWealth* are accounted in the firm decision to go public and presumably discounted in the IPO price, we posit issuers and underwriters largely under-estimate the local investor additional demand in the local IPOs, the value premium for the local investors trading, and, ultimately, the IPO firm market value. Therefore, the isolated IPOs, when the local investor additional demand is especially high, are brought to listing with a particularly low IPO price, which may even reflect the larger information asymmetries in the isolated firms, but which is not adjusted upward by the superior local investors' abnormal demand and the higher premium related to the firm location. At the initiation of trading, market values are pushed up by the local investors and the isolated IPOs remain more underpriced than the clustered IPOs by the differential location premium, that is in inverse relation with *GeoClustListed* and directly with *GeoClustWealth*.

We control for potential self-selection bias (e.g., Li and Prabhala 2007). Researchers only observe the set of firms actually going public and they do not observe how many private firms could have gone public (Chemmanur, He, and Nandy 2010, 1857). Therefore, the IPO research is most likely affected by a selection bias in nature. Bodnaruk et al. (2008) is the unique article that had previously addressed the effect of the firm likelihood to go public on underpricing and find consistent evidence. On the other hand, the significant differences for the firms that go public (have an IPO) and for the firms remaining private evidenced in our sample (cf. Table 6), provide the empirical support for self-selection in this analysis of the IPO underpricing. In this paper, controlling for self-selection is further helpful for at least two reasons. First, it allows us to address the possible endogeneity of underpricing with the firm location as, for instance, the isolated firms located in more wealthy areas have a higher probability to go public (as by the likelihood to go public model) and, likely, lower underpricing. Secondly, controlling for self-selection allows us to control for the unobservable factors that may affect the firm decision to go public and the underpricing: the information asymmetries above all (e.g., Chemmanur and Fulghieri 1999; Rock 1986). Against potential self-selection bias which may affect firms going public, the Heckman (1979)'s λ (*Inverse Mills Ratio*) from the likelihood to go public regression model is included in the *Underpricing* regression model. A significant and positive (negative) coefficient on *Inverse Mills Ratio* indicates that the selection bias is important in IPO underpricing and that the unobservables in the selection model (i.e., the decision to go public) are positively (negatively) correlated with the unobservables in the stage two model (i.e., the underpricing). When the information asymmetries is the unobservable, this is negatively related to the firm probability to go public and increases the underpricing, and a negative coefficient on *Inverse Mills Ratio* is predicted.

The model we introduce for underpricing is the following (and clustered by year and industry standard errors are considered):

$$
\begin{aligned}
Underpricing_{i,t} = {} & \beta_0 + \beta_1 GeoClustListed_{i,t} + \beta_2 GeoClustWealth_{i,t} + \beta_3 \sigma IPO\_After30dd_i \\
& + \beta_4 mMRK\_Before60dd_i + \beta_5 Revision_i + \beta_6 Range_i + \beta_7 Reputation_i \\
& + \beta_8 Institutional_i + \beta_9 Participation\ Ratio_i + \beta_{10} Dilution\ Factor_i \\
& + \beta_{11} Log(Proceeds_i) + \beta_{12} Log(1+Age_{i,t}) + \beta_{13} Log(Assets_{i,t}) \\
& + \beta_{14} Inverse\ Mills\ Ratio_i + \gamma_t Year_t \qquad (4)
\end{aligned}
$$

Hereafter, control variables included in the underpricing regression model are discussed (with predictions in parentheses):

(+) Hot IPO markets (*mMRK_Before60dd*). *mMRK_Before60dd* is the average of daily industry-specific index returns in the sixty trading days before the offering date. Cycles in new issues initial return and volume (hot IPO markets phenomenon) (e.g., Ibbotson and Jaffe 1975; Ibbotson, Sindelar, and Ritter 1988; Ibbotson, Sindelar, and Ritter 1994) and the ability of recent market movements to predict first-day returns (e.g., Logue 1973, Table 1; Hanley 1993, Table 3) have been documented for decades. Loughran and Ritter (2002)'s prospect theory explanation says that initial returns are related to public information that becomes available during the registration period. Prospect theory predicts that issuers sum the wealth loss from leaving money on the table with the larger wealth gain on the retained shares from a price jump. Therefore, public information made available during the registration period is only partially incorporated into the offer price and offerings whose registration periods coincide with periods of high market-wide returns will tend to be especially underpriced producing a larger net increase in wealth for pre-issue shareholders. Because the registration periods of IPOs close to one another in time overlap, this generates cycles in initial returns.

(+) Premarket information and interests (*Revision*). *Revision* is the percentage difference between the offer price and the mean of the indicative price range. Price revisions are assumed to reflect information acquired from investors during the roadshow. The truthful revelation of positive information requires favoring cooperative investors with preferential allocations of underpriced shares (e.g., Benveniste and Spindt 1989; Benveniste and Wilhelm 1990; Spatt and Srivastava 1991). Thus, underwriters only partially adjust the offer price to the information they acquire (e.g., Cornelli and Goldreich 2001; Lowry and Schwert 2004; Ljungqvist, Jenkinson, and Wilhelm 2003; Bradley and Jordan 2002), and when underwriters revise the share price upward from their original estimate, underpricing tends to be higher (e.g., Hanley 1993; Ljungqvist and Wilhelm 2002).

(-/+) Underwriter reputation, certification vs. spinning hypothesis (*Reputation*). *Reputation* is the Megginson and Weiss (1991)'s measure of underwriter reputation (underwriter relative market share). Underpricing compensates uninformed investors for the risk of trading against superior information and is costly to the issuing firm (e.g., Rock 1986b). Therefore, low risk firms attempt to "certificate" their low risk characteristic to the market by selecting high prestige underwriters which, in turn, remain associated to less underpriced IPOs (certification hypothesis) (e.g., Carter, Dark, and Singh 1998; Carter and Manaster 1990; Beatty and Ritter 1986; Titman and Trueman 1986; Maksimovic and Unal 1993; Logue 1973; Johnson and Miller 1988). On the other hand, this relation reversed in the early 1990s (Beatty and Welch 1996; Cooney et al. 2001) and more underpriced IPOs are revealed highly beneficial for the issuing firm managers' personal wealth (Loughran and Ritter 2002). In fact, in exchange of side payments, such as allocations of other hot offerings from the bookrunner, issuing firm decision-makers hire low prestige underwriters with a history of underpricing (spinning hypothesis) which, therefore, are associated with more underpriced IPOs (Loughran and Ritter 2004; Liu and Ritter 2010).[10]

(+) Institutional allocation (*Institutional*). *Institutional* is the percentage of the IPO issue allocated to institutional investors. Institutional investors are the primary source of information in the course of a bookbuilding effort (Cornelli and Goldreich 2003; Lee, Taylor, and Walter 1999) and underwriters compensate the truthful revelation of information by allocating more shares to institutions in issues in which they obtain more favorable pre-market demand information (e.g., Cornelli and Goldreich 2001; Benveniste and Spindt 1989; Lee, Taylor, and Walter 1999; Maksimovic and Pichler 2006). Because of the partial adjustment phenomenon, institutional allocation remains associated to more underpriced IPO (Aggarwal, Prabhala, and Puri 2002; Hanley and Wilhelm 1995).

(-) Entrepreneurial wealth losses and incentive to underprice (*Participation Ratio* and *Dilution Factor*). *Participation Ratio* is the number of secondary (old) shares sold relative to pre-IPO share outstanding while *Dilution Factor* is the number of primary (new) shares sold relative to pre-IPO share outstanding: both *Participation Ratio* and *Dilution Factor* are predicted

[10] Besides Megginson and Weiss (1991)'s, several proxies for underwriter reputation have been developed in the IPO literature (e.g., Carter and Manaster 1990; Johnson and Miller 1988; Logue 1973; Beatty and Ritter 1986). For robustness purposes we re-run all of our analyses using Carter and Manaster (1990)'s underwriter reputation measure and none of our results is affected.

negatively correlated with *Underpricing*. Owners care about underpricing to the extent that they stand to lose from it. Such losses are proportional to the number of new shares issued at the IPO, because new shares sold at a discount dilute the owners' stake, and to the number of old shares being sold, because of the per share money left on the table. Therefore, both *Participation Ratio* and *Dilution Factor* are negatively correlated with *Underpricing* (e.g., Habib and Ljungqvist 2001; Ljungqvist and Wilhelm 2003).

The explanatory variables that are in the underpricing model but not yet discussed so far, further tackle the ex ante uncertainty about the issue, that is the information asymmetries surrounding the offer.[11] Controls for information asymmetries are (with predictions):

(-) IPO gross proceeds (*Log(Proceeds)*). Smaller offerings are more speculative than larger offerings (Ritter 1987a, Table 6). Therefore, an inverse relation exists between underpricing and gross proceeds (*Proceeds*) (papers which have used gross proceeds in explaining underpricing include Beatty and Ritter 1986; Megginson and Weiss 1991; Michaely and Shaw 1994). On the other hand, the dilution effect on post-issue price of the underpriced newly issued shares may generate an inverse relation between underpricing and gross proceeds even absent any change in uncertainty (Habib and Ljungqvist 1998).

(+) IPO aftermarket volatility (*σIPO_After30dd*). *σIPO_After30dd* is the daily standard deviation of returns in the thirty trading days after the offering date (in the aftermarket). It seems likely that firms with volatile stock prices are firms whose market value was highly uncertain before public trading began (e.g., Ritter 1987). To calculate the daily standard deviation of returns, we use the first 30 daily closing bid prices in the aftermarket but estimation periods 10 trading days longer or shorter do not affect our results.

(-) Firm size and age (*Log(Assets)* and *Log(1+Age)*). Since Banz (1981) and Barry and Brown (1984), firm information asymmetries have been proxied using firm size. For instance, firm size generally increases in more mature firms for which, presumably, more information is in the public domain. Therefore, more mature firm discounts could be smaller if discounts are compensation, at least in part, for private information. By the same reasoning, younger firms are consistent with larger information asymmetries and thus carry higher initial returns (e.g., Carter and Manaster 1990; Ritter 1984).

(+) IPO prospectus offering price range (*Range*). In the revelation of information framework outlined by Benveniste and Spindt (1989) and Hanley (1993), the mean of the indicative price range is the underwriter-issuer unconditional expectation of the issuer's share value (the offer price

[11] The cross-correlations among different measures of the issue ex ante uncertainty might eventually affect our results. To control for possible confounding effects, we re-run our analysis using one of these variables at time, and none of our results is affected.

represents its conditional estimate). Therefore, the indicative price range measures the ex ante uncertainty about the issue from the insider perspective.

Table 9 reports results from multivariate analysis of *Underpricing*. Model 1 is the basic specification, Model 2 includes *GeoClustListed* and *GeoClustWealth*, and Model 3 is augmented with the Heckman's λ based on Model 3 of Table 3 controlling for self-selection bias of going-public firms.

[Insert Table 9 about here]

Results on geographic variables are as predicted. In Model 3, *Underpricing* decreases with the clustering of listed firms around the IPO headquarters (β_*GeoClustListed* = -1.2128, p-value<0.05) and increases with the clustering of the investor wealth (β_*GeoClustWealth* = 14.1455, p-value<0.01). As per Bodnaruk et al. (2008), the selection bias seems to be important in *Underpricing*, since the coefficient of Heckman's *λ* has statistical significance (β_*Inverse Mills Ratio* = -0.0016, p-value<0.05). Differently to previous evidence, we document a negative pattern. This is consistent with unobserved factors that increase (decrease) the firm likelihood to go public and lower (higher) the underpricing. We interpret these findings as consistent with the role exerted by information asymmetries in the path to listing.

Further control variables exhibit the expected pattern. More specifically, *Underpricing* significantly increases with the IPO volatility after the listing (β_*σIPO_After30dd* = 4.5077, p-value<0.01) and the market return before the listing (β_*mMRK_Before60dd* = 0.7663, p-value<0.01). While the former evidence is also consistent with the information asymmetry theories of underpricing (e.g., Ritter 1987), the latter support the hot issue markets hypotheses (e.g., Ibbotson and Jaffe 1975). On the other hand, *Underpricing* significantly decreases the more pre-IPO shareholders sell shares in IPO (β_*Participation Ratio* = -0.1239, p-value<0.05) or the greater the increase in shares outstanding as a result of the issuance of primary stock (β_*Dilution Factor* = -0.1479, p-value<0.01). Therefore, the entrepreneurial wealth losses in IPOs are largely determinants in Italian IPOs underpricing (e.g., Habib and Ljungqvist 2001). This evidence is not surprising in light of the Italian corporate environment which is characterized by firms with extremely high concentrated ownership structures (e.g., Faccio and Lang 2002).

7.2. The Firm Location and the Variability of IPO Initial Returns

Previous findings show that the firm location affects the IPO underpricing, such as the isolated IPOs are systematically more underpriced than the clustered IPOs. We posit the firm location primarily affects the complexity of the IPO pricing problem, which is more complicated in the isolated IPOs than in the clustered IPOs. The pricing problem is more complicated in the isolated IPOs than in the clustered IPOs due to the superior abnormal demand provided by the local investors for the newly issued stocks. More specifically, we posit underwriters under-estimate the local investors demand in the local IPOs and the IPO firm market value. At the initiation of trading, market values are pushed up by the local investors and the isolated IPOs remain more underpriced than the clustered IPOs.

The complexity of the IPO pricing problem is reflected in the cross-sectional volatility of the IPO stocks initial returns (*σIPO_IR*): when the sample of firms going public contains a larger fractions of highly uncertain firms (e.g., young, small, and technology firms), greater pricing errors are made, and this increases the range of the observed underpricing (Lowry, Officer, and Schwert (2010)). To verify whether the firm location affects the complexity of the IPO pricing problem, *GeoClustListed* and *GeoClustWealth* are investigated as determinants of *σIPO_IR*. We expect *σIPO_IR* decreases with *GeoClustListed* and increases with *GeoClustWealth*. Because of the local investors' abnormal trading in the local stocks, corporate market values decrease with *GeoClustListed* and increase with *GeoClustWealth* (e.g., Hong, Kubik, and Stein 2008). To the extent underwriters under-estimate the local investors demand in the local IPOs, the IPO firm market value will be consistently miss-estimated, and positive pricing errors (the actual firm value is systematically higher than the value estimated by the underwriters) will follow. The pricing errors are also decreasing with *GeoClustListed* and increasing *GeoClustWealth*. Consistently, the same pattern is predicted for the cross-sectional volatility of the IPO stocks initial returns. In other words, when the sample of firms going public contains a large fraction of isolated firms, greater pricing errors are made, and this increases the range for the observed underpricing.

Formally, we augment the Lowry, Officer, and Schwert (2010)'s model with *GeoClustListed* and *GeoClustWealth*, and test the following:

$$IPO\_IR_{i,t} = \beta_0 + \beta_1 GeoClustListed_{i,t} + \beta_2 GeoClustWealth_{i,t} + \beta_3 Reputation_i + \beta_4 Log(Shares_i) + \beta_5\, Tech_i + \beta_6 AIM_i + \beta_7 Log(1+Age_{i,t}) + \beta_8 |Revision_i| + \varepsilon_{i,t} \quad (5)$$

$$\sigma IPO\_IR_{i,t} = Log(\sigma^2(\varepsilon_{i,t})) = \gamma_0 + \gamma_1 GeoClustListed_{i,t} + \gamma_2 GeoClustWealth_{i,t} + \gamma_3 Reputation_i + \gamma_4 Log(Shares_i) + \gamma_5 Tech_i + \gamma_6 AIM_i + \gamma_7 Log(1+Age_{i,t}) + \gamma_8 |Revision_i| \quad (6)$$

As per Lowry, Officer, and Schwert (2010), the Maximum Likelihood Estimation (MLE) of (5) and (6) allows to estimate the influence of each explanatory variable on both the level (IPO_IR_i) and the uncertainty ($\sigma IPO\_IR_i = Log(\sigma^2(\varepsilon_i))$) of firm-level initial returns, and OLS regression of initial returns on this same set of explanatory variables (that is, equation (5)) is the benchmark against which compare the MLE results. In addition, initial returns to IPO stocks (*IPO_IRs*) are measured as the percentage change from the offer price to the closing price on the 21st day of trading to avoid the effects of underwriter price support (e.g., Hanley, Kumar, and Seguin 1993; Ruud 1993; Lewellen 2006; Aggarwal 2000), while firm- and offer-specific characteristics controls for firm information asymmetries or underwriter ability to estimate firm value.[12] More in particular, the volatility of IPO initial return regression model includes controls for (predictions):

(-/+) Underwriters reputation (*Reputation*). Highly ranked underwriters are expected more skilled and to be better able to estimate firm value. Therefore, a negative relation between *Reputation* and σIPO_IR_i is predicted. However, Loughran and Ritter (2004) note that, in exchange of side payments issuers accept lower offer prices and greater underpricing to obtain the best analyst coverage (cf. Spinning hypothesis). Because of highly ranked underwriters tend to have the best analysts, this suggests a positive relation between underpricing and σIPO_IR_i, and *Reputation*.

(-) Offer size (*Log(Shares)*). *Shares* is the number of shares (in millions) offered in the IPO. Less information tends to be available about smaller offerings which are therefore supposed more difficult to be evaluated by underwriters.

(+) IPO of high-tech firms (*Tech*). *Tech* equals one if the firm is in a high-tech industry and zero otherwise. The value for technology firms tend to be much harder to estimate precisely because it depends on growth options and therefore positive relation between *Tech* and σIPO_IR_i is predicted.

(+) IPOs of AIM firms (*AIM*). *AIM* equals one if the IPO is listed on the MSE segments (*Nuovo Mercato*, *Mercato Expandi*, Alternative Investment Market) with minimal regulations and zero otherwise. .Small, young, high-tech firms tend to list on the MSE segments with minimal regulations suggesting that underwriters will find it more difficult to value these firms.

(-) IPOs by younger firms (*Log(1+Age)*). More uncertainty is expected regarding the secondary market pricing of the stocks of young firms.

(+) Offer price update (|*Revision*|). *Revision* is a proxy for the amount of learning that occurs during the registration period when the IPO is first marketed to investors. Substantial learning (that is, a higher absolute value of price update) is more likely for firms whose value is more certain.

Table 10 reports results for σIPO_IR. Models 1-3 are the basic specifications, while Models 4-6 include *GeoClustListed* and *GeoClustWealth*; OLS is the benchmark for MLE, which models both the mean and the variance of IPO initial return (*IPO_IR*).

[Insert Table 10 about here]

[12] The stabilization activity in Italian IPOs is detailed in Boreiko and Lombardo (2011).

Results are consistent with underwriters' difficulty to estimate the IPO value related to the firm location. Figures in Model 4 confirm the previous findings on the relations between the geographical variables and the IPO underpricing (cf. Table 9, Model 3): the IPO initial returns decrease with the listed firm clustering (β_*GeoClustListed* = -2.0871, p-value<0.05) and increase with wealth clustering (β_*GeoClustWealth* = 18.0109, p-value<0.05) around the IPO headquarters. On the other hand, *GeoClustListed* and *GeoClustWealth* are no longer significant in the Model 5 and are even more significant than before in Model 6. More specifically, the significance of the relations between *GeoClustListed* and *GeoClustWealth* and the IPO initial returns shifts from the mean equation (Model 5: β_*GeoClustListed* = -0.4527, p-value>0.10; β_*GeoClustWealth* = 17.3240, p-value<0.10) to the variance equation of the error terms (Model 6: β_*GeoClustListed* = -12.4110, p-value<0.05; β_*GeoClustWealth* = 160.4383, p-value<0.05). Therefore, *GeoClustListed* and *GeoClustWealth* affect the underpricing mainly via its volatility (uncertainty).

In the analysis of IPO stocks initial returns, the pattern of the control variables is as expected and mimics previous evidence by Lowry, Officer, and Schwert (2010).[13] Focusing first on the mean effect in the MLE results, all control variables have the predicted sign and findings are consistent with OLS regressions. More specifically, consistent with the prior literature (e.g., Ritter 1984; Ritter 1987; Rock 1986), we find that smaller offerings have the most underpricing. Firm age has a significant negative coefficient in the OLS specification, which is also consistent with traditional explanations of underpricing based on information asymmetries, but it becomes insignificant in the MLE. Similarly, even though this effect is no longer significant in the MLE mean equation, we find the absolute value of the price update has significant positive effect on initial return in the OLS specification. This is consistent with the effect of learning about unexpected investor demand during the book-building period. Turning to the variance portion of the MLE, we find that firm and offer characteristics that predict underpricing are greatly strongly related with the volatility of underpricing. The sings of the coefficients in the mean equations are always the same as in the variance equation, and the asymptotic test statistics are much larger in the variance equation. In fact, with the exception of firm age, which remains not significant as in the MLE mean equation, all other variables included in the IPO initial returns regression model turn out significant, meaning that they affect IPO initial returns mainly via its cross-sectional volatility. As per Lowry, Officer, and Schwert (2010), comparison of the log-likelihoods of the OLS regressions with the maximum likelihoods estimates that account for differences in the variability of IPO initial returns, shows that modeling the uncertainty of IPO initial returns is a substantial improvement in explaining the behavior of these data.

Overall, findings are consistent with our conjectures and support that the firm location affects the IPO underpricing by affecting the precision of the price-setting process. In particular, the isolated

[13] As in Lowry, Officer, and Schwert (2010), for robustness purposes we re-run our analyses adding an indicator variable (Bubble dummy) that equals one if the IPO occurs between September 1998 and August 2000 and zero otherwise. Results are unchanged (not reported).

IPOs (and headquartered in wealthy areas) are more underpriced than the clustered IPOs (and located in less wealthy areas). This evidence is almost fully related to the complexity of IPO pricing problem, which is also higher in the isolated IPOs (and headquartered in wealthy areas) than in the clustered IPOs (and located in less wealthy areas). This means that the more sizable is the local investor demand in the local IPOs, the higher is the IPO pricing error. To put all this in a comparison perspective: as the value for technology firms tend to be much harder to estimate because it heavily depends on growth options, the value for the isolated firms tend to be harder to estimate because it heavily depends on the additional demand provided by the local investors for local stocks. Together with the evidence that the isolated IPOs are systematically more underpriced than the clustered IPOs, this evidence points out than insiders systematically under-estimate the IPO firm value related to the local investor demand.

8. The Firm Location and the IPO Long-run Performance

According to the efficient market hypothesis (e.g., Fama 1965), once an IPO is publicly traded, it is just like any other stock and the aftermarket stock price reflects the shares' intrinsic value. Therefore, the risk-adjusted post-IPO price performance should not be predictable, or, more easily, it should not be different from the risk-adjusted performance of similar seasoned companies. However, the IPO stocks are usually discharged months after the listing (e.g., Field and Hanka 2001; Cao, Field, and Hanka 2004; Brav and Gompers 2003) and IPOs of common stocks significantly underperform in the long-run (3-5 years) (e.g., Ritter 1991; Loughran and Ritter 1995; Loughran, Ritter, and Rydqvist 1994; Brav and Gompers 1997; Keloharju 1993).[14] Rational and semi-rational explanations for the long-run under-performance of IPOs have been provided (e.g., Miller 1977; Schultz 2003; Derrien 2005), and consistent patterns have been evidenced (e.g., Jain and Kini 1994; Mikkelson, Partch, and Shah 1997; Teoh, Welch, and Wong 1998; Purnanandam and Swaminathan 2004; Pástor, Taylor, and Veronesi 2009; Kutsuna, Smith, and Smith 2009).[15] Nevertheless, the IPO long-run under-

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[14] Field and Hanka (2001), Cao, Field, and Hanka (2004), Brav and Gompers (2003), Brau, Lambson, and McQueen (2005), Courteau 1995, and Yung and Zender (2010) among others, investigate lockup agreements: contracts between underwriters and the pre-IPO shareholders that bar share sales for a specified period after the IPO. Nearly all IPOs feature lockup agreements. The typical lockup lasts for 180 days and the locked-up shares constitute two-thirds of the public float, and more than 80% of the locked-up shares are owned by insiders (e.g., Brav and Gompers 2003). Field and Hanka (2001) find that lockup expirations result in a permanent 40% increase in trading volume, and statistically significant stock price declines of about 1.5%. The lockup clauses in Italian IPOs are detailed in Boreiko and Lombardo (2013).

[15] In Miller (1977), the IPO stocks are acquired by the most optimistic investors. Over time, the variance of opinions decreases and the marginal investor's valuation converge towards the mean valuation. As a consequence, IPO stock prices decline in the aftermarket. Schultz's (2003) pseudo market timing hypothesis states that more IPOs follow the successful IPOs; the last group of IPOs underperforms and, being the relative larger fraction of the sample, determines the average cross-sectional under-performance. In Derrien (2005), bullish noise traders are ready to pay high prices (with respect to the intrinsic value) for the IPO shares but underwriters only partially adjust the IPO prices. Since the underwriter sets an IPO price that is between the

performance is still the most controversial area of the IPO research (e.g., Ritter and Welch 2002). This section contributes to the debate and relates the IPO long-run under-performance to the firm location.

Investors do not only disproportionately buy the local stocks in the local IPOs, but they also hold the local stocks afterwards (e.g., Massa and Simonov 2006; Huberman 2001; Ivković and Weisbenner 2005; Grinblatt and Keloharju 2001). The tendency of the local investors to hold the local stocks is so relevant even to shape the dividend policies of corporations (e.g., Becker, Ivković, and Weisbenner 2011). Consistently, one might advance that the local investors are reluctant to discharge the IPO stocks after the listing. As such, the long-run under-performance of the isolated IPOs, when the shareholder base of the local investors is more relevant, should be less pronounced than the long-run under-performance of the clustered IPOs. This section tests for this hypothesis. In particular, we posit that the IPO aftermarket performance increases the less (more) the IPO firm is clustered (isolated) with the listed firms because the local investors have strong preference for the local stocks. In our framework, this means the IPO long-run under-performance increases with *GeoClustListed* (and decreases with *GeoClustWealth*).

The IPO aftermarket performance is measured by the cross-sectional average buy-and-hold abnormal returns, Fama and French (1992) three factor model benchmarked, over a post-IPO three years horizon (offering day +6 through day +756) (BHARs). The measurement issues are not trivial in all long-term performances studies (e.g., Brav 2000), and, especially, when dealing with IPOs (e.g., Brav and Gompers 1997; Loughran and Ritter 2000; Ritter and Welch 2002; Gompers and Lerner 2003). On the other hand, cumulative abnormal returns (CARs), alternative time windows (e.g., starting 1, 2, or 3 trading days after the offer), non-parametric cross-sectional values (e.g., median), and alternative benchmarking (e.g., CAPM, size control portfolio), have been tested and none of our results is affected (not reported).

Table 11 reports BAHRs for firms that go public (have an IPO) during our sample period distinguishing the isolated IPOs, i.e., the IPOs with *GeoClustListed* below the cross-sectional median, and the clustered IPOs, i.e., the IPOs with *GeoClustListed* equal or larger than the cross-sectional median. The table reports BHARs for the periods between 1 month and 3 years. Figure 1 depicts these data: the dashed blue line is for the isolated IPOs (on the top), the continuous line is for all IPOs (in the middle), and the dashed red line is for the clustered IPOs (on the bottom).

[Insert Figure 1 about here]

[Insert Table 11 about here]

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company's intrinsic value and the price noise traders are ready to pay, IPO shares are overpriced with respect to their long-run intrinsic value.

The average IPO in our sample exhibits significant 1- and 6-month BAHR of 9.5, and 16.1 percent, respectively. After 1 year, BAHR is 5.3 percent, but no longer significantly different from zero. Finally, 2- and 3-year BHAR is significant equal to -13.1 percent and -23.1 percent, respectively. Therefore, the IPO firms in our sample over-perform at the very beginning after the listing (1 month – 6 month). However, the aftermarket performance decreases seriously with the performance period: when the performance period is extended to 2 and 3 years, our IPOs largely underperform. This evidence is consistent with previous country-specific and international evidence (e.g., Arosio, Paleari, and Giudici 2001; Derrien and Womack 2003).

The comparison of the isolated IPOs with the clustered IPOs shows that, in the isolated IPOs, the aftermarket performance is much less decreasing in time. Over a 3 years horizon, the isolated IPOs even do not significantly under-perform the market. More in particular, in the isolated IPOs, the 1-month BHAR is 10.7 percent, while that of clustered IPOs is 8.2 percent. On the other hand, the 6-month BHAR in the isolated IPOs is 30.6 percent, which is significantly higher that the 6-month BHAR in clustered IPOs, which is 1.8 percent but no longer significant. The pattern is reversed afterwards. The 1-year BHAR is not significant in both the isolated and the clustered IPOs, equal to 9.5 and 1.1 percent, respectively. On the other hand, in the isolated IPOs the 2-year BHAR is -10.1 percent, while that of clustered IPOs is -16.1 percent. In addition, while in the isolated IPOs the 3-year BHAR is -12.0 percent no longer significant, in the clustered IPOs the 3-year BHAR is -33.9 percent and significant. Therefore, when the first month of trading is excluded (when the underwriter stabilization activity has place), while the positive aftermarket performance right after the listing is almost entirely attributable to the isolated IPOs, the aftermarket under-performance in the long-run is almost entirely attributable to the clustered IPOs. This evidence supports our conjectures on the relation between the firm location and the IPO aftermarket performance.

We further test the relation between the firm location and the IPO aftermarket performance in a multivariate setting. The three-year buy-and-hold abnormal return (*BHAR3y*) is the dependent variable, and *GeoClustListed* and *GeoClustWealth* are newly kept as the main explanatory variables, addressing the intensity of the local investor trading in the IPO firm. *GeoClustListed* is the proxy for how much sizable is the local investor trading on a particular stock given the firm location and it is predicted negatively correlated with *BHAR3y*, *GeoClustWealth* is the proxy for the local wealth and is predicted positively correlated with *BHAR3y*. More in particular, the following model of the IPO long-run performance is estimated (clustered by year and industry standard errors are considered)[16]:

$$BAHR3y_{i,t} = \beta_0 + \beta_1 GeoClustListed_{i,t} + \beta_2 GeoClustWealth_{i,t} + \beta_3 \sigma IPO\_After255dd_i + \beta_4 Reputation_i + \beta_5 Second_i + \beta_6 Log(1+Age_{i,t}) + \beta_7 Log(Proceeds_i) + \beta_8 Inverse\ Mills\ Ratio_i \quad (7)$$

[16] We follow Carter, Dark, and Singh (1998) in our specification.

Hereafter, the rational for the control variables is reported (with predictions):

(-) Riskiness of future cash flows (*σIPO_After255dd*). *σIPO_After255dd* is the daily standard deviation of the post-IPO stock raw returns (offering day +6 through day +255) and reflects the riskiness of future cash flows. As such, *σIPO_After255dd* is positively correlated with the IPO underpricing (e.g., Johnson and Miller 1988), and negatively correlated with the IPO long-run performance (e.g., Carter, Dark, and Singh 1998). On the other hand, the higher are the IPO ex-ante uncertainty and the IPO first-day return, the worse is the IPO long-run performance (e.g., Ritter 1991; Levis 1993; Spiess and Affleck-Graves 1995; Agarwal, Liu, and Rhee 2008; Purnanandam and Swaminathan 2004). For robustness purposes, we re-run our analysis including among the explanatory variables the IPO first-day return (*Underpricing*), IPO initial return (*IPO_IR*), and alternative measures of IPO ex-ante uncertainty (e.g., *σIPO_After30dd*, *Log(Assets)*, and *Range*), and all of our results are unchanged (not reported).

(+) Underwriters reputation (*Reputation*). Higher quality underwriters are presumed to attempt to market IPOs with the lower long-run under-performance. More specifically, investors are argued to use investment banks' past performance, measured as the quality of firms in which they have previously sold equity, to asses investment banks' credibility (Chemmanur and Fulghieri 1994). On the other hand, investment bank protect their reputation by marketing IPOs that have relatively better long-term performance. Consistently, IPOs managed by high prestige investment bankers/underwriters exhibit less negative long-run returns than do IPOs handled by lower reputation underwriters (e.g., Michaely and Shaw 1994; Carter, Dark, and Singh 1998).

(+/-) Pre-offer demand and insider ownership (*Second*). *Second* is the fraction of the total issue offered by existing pre-issue shareholders. Hanley (1993) suggests that if there is a strong pre-offer demand for an IPO, the number of shares being offered by existing shareholders is frequently revised upward. When the demand is weak, secondary shares are often the first to be cut back. Therefore, the number of shares offered by existing shareholders is a direct proxy for pre-offer demand and a positive relation between *Second* and the IPO long-run performance is expected (e.g., Carter, Dark, and Singh 1998). On the other hand, consistent with the agency theory (e.g., Jensen and Meckling 1976) and the signaling hypothesis (e.g., Leland and Pyle 1977), Jain and Kini (1994) and Mikkelson, Partch, and Shah (1997), find relatively superior post-IPO operating performance from firms with higher ownership retained by insiders in comparison to firms with lower ownership retained. If this is the case, a negative relation between *Second* and the IPO long-run performance is expected (e.g., Peristiani and Hong 2004).

(-) Offer size and overreaction hypothesis (*Log(Proceeds)*). Smaller offers have the worst aftermarket performance (e.g., Ritter 1991; Brav and Gompers 1997; Brav, Geczy, and Gompers 2000). On the other hand, the market overreacts on low-capitalization stocks where past and subsequent year abnormal returns are systematically negatively correlated (e.g., De Bondt and Thaler 1985; De Bondt and Thaler 1987). Consistent with the market overreaction hypothesis, IPO firms with high adjusted initial returns tend to have the worst aftermarket performance and this tendency is stronger for smaller issues than larger issues (e.g., Ritter 1991).

(+) Firm age (*Log(1+Age)*). Ritter (1991) documents a positive relation between the firm age and the IPO aftermarket performance, and interprets this evidence as being consistent with over-optimism. According to the window of opportunity and the hot IPO markets hypotheses, firms go public when investors are willing to pay high multiples (price-earnings or market-to-book) reflecting optimistic assessments of the net present value of growth opportunities. In Ritter (1991), the negative IPO aftermarket performance is due to disappointing realizations of irrationally over-optimistic forecasts of subsequent net cash flows. Younger IPOs typically have higher market-to-book ratios than more established firms. Therefore, the positive relation between age and the IPO aftermarket performance is consistent with the over-optimism story.

(+/-) Self-selection bias (*Inverse Mills Ratio*). Though the self-selection bias of the going-public firms is less likely to affect the IPO aftermarket performance (which is measured with respect the seasoned firms), endogenous effects with the firm location might be in play. For instance, the firm likelihood to go public is positively affected by the firm agglomeration economies. The recently listed firms might benefit of more important agglomeration economies compared to the firms went public years ago, and the aftermarket performance might be affected. The inclusion among the explanatory variables of *Inverse Mills Ratio* allows to control for all the confounding effects that might be related to the firm location of the firms go public.

Table 12 reports the results of the multivariate analysis of *BHAR3y*. Model 1 is the basic specification, Model 2 includes *GeoClustListed* and *GeoClustWealth*, and Model 3 is augmented with the Heckman's λ based on Model 3 of Table 3 controlling for self-selection bias of going-public firms.

[Insert Table 12 about here]

The IPO long-run performance is affected by the firm location as predicted. *BHAR3y* decreases with the geographical clustering of the listed firms (β_*GeoClustListed* = 0.7562, p-value<0.01) and increases with the clustering of the investor wealth (β_*GeoClustWealth* = 6.9435, p-value<0.01). The control variables exhibit the expected pattern. More in particular, as per Carter, Dark, and Singh (1998), the IPO firms aftermarket performance significantly increases with the riskiness of future cash flows (β_*σIPO_After255dd* = 0.8043, p-value<0.05), and with the fraction of the total issue offered by existing pre-issue shareholders (β_*Second* = 0.0408, p-value<0.05). This evidence is consistent with prior evidence of a positive relation between investor demand and IPO performance (e.g., Cornelli and Goldreich 2003; Hanley 1993; Kandel, Sarig, and Wohl 1999). Finally, the going public self-selection effects disappear in the aftermarket (β_*Inverse Mills Ratio* = 0.0085, p-value>0.10).

9. Conclusions

This article documents that the firm geographic location matters in IPOs. The firm location matters in IPOs because investors have a strong preference for the newly issued local stocks and provide abnormal demand in the local equity offerings. The local investor abnormal demand in local IPOs is especially higher in the IPOs isolated from the listed firms. The clustering of the listed firms around the firm headquarters i) is negatively related with the firm likelihood to go public, that is isolated private firms have more chances to go public, ii) is negatively related with the IPO underpricing, but this effect is entirely attributable to corresponding variations in the IPO initial returns cross-sectional volatility, that is the pricing of the isolated IPOs is a more complicated task, and iii) is negatively related with the IPO long-run under-performance, that is isolated IPO firm do better in the after-market. Consistent opposite evidence holds for the concentration of the investor wealth around of the firm headquarters. Above all, findings in this article suggest underwriters significantly under-estimate the local dimension in evaluating IPOs thus leaving unexpected money on the table.

A new rationale for the IPO waves and long-run under-performance seems to follows. Almost by design, findings in this article suggest that the IPO waves have a strong geographic component. Recent evidence finds that periods of high initial returns are followed by periods of high volume of IPOs, which are themselves followed by periods of lower initial returns, and supports spillover of information as a primary source of the IPO waves (e.g., Lowry and Schwert 2002; Benveniste et al. 2003). In essence, the information generated in valuing a set of pioneers makes the valuation of followers easier and hence triggers the IPO wave (e.g., Alti 2005). When first in the area a private firm goes public, let say upon some sort of competitive advantages (e.g., Hsu, Reed, and Rocholl 2010), underwriters under-estimate the local investor additional demand on the newly issued stocks and the company turns out largely underpriced. On the other hand, the outcome of the pioneer local IPO reveals the local investor additional demand for the local stocks. This makes that the local private firm valuations are revised upward and the pricing of subsequent issues relatively less uncertain, and attracts more local firms to the IPO market. Local and increasingly less underpriced IPOs will follow up to saturate the area. On the other hand, local IPO by local IPO, the base per firm of the local investors decrease and the IPO stocks are increasingly discharged after the listing. Ultimately, the average IPO result under-performing.

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Table 1
Summary Statistics for the Samples Used in Estimation

Panel A. The equally weighted (EW) average first-day return is measured from the offer price to the first MSE-listed closing price. Gross proceeds is the amount raised from investors in euro millions (2012 purchasing power using the CPI, global offering amount, excluding overallotment options). Money left on the table (millions of euros, 2012 purchasing power) is calculated as the number of shares issued times the change from the offer price to the first-day closing price. EW average three-year buy-and-hold percentage returns (capital gains plus dividends) are calculated from the first closing market price to the earlier of the three-year anniversary price, the delisting price, or December 31, 2012. Cumulative abnormal returns and buy-and-hold returns for initial public offerings (IPOs) occurring after December 31, 2011 are not calculated. Abnormal returns are calculated using Fama and French (1973) 3 factor models.

Panel B. Equity is one if the household holds either private or listed firms stocks by the end of the wave year and zero otherwise. Equity Wealth is the amount of wealth invested in listed firm stocks. Equity-To-Wealth is the proportion of household net total wealth in listed firm stocks. Equity-To-Income is the proportion of household disposable income in listed firm stocks. Age is the age of the SHIW respondent. Male is one if the SHIW respondent is male and zero otherwise. Education is the SHIW respondent education level. Net Income is the household disposable income. Wealth is the household net total wealth.

Panel C. Roa is the return on asset. Leverage is the ratio of financial debt to equity book value. Age is the number of years since firm foundation. Assets is the value of total asset in euro millions.

Table 1 – continued

Panel A - Number of IPOs, First-day Returns, Gross Proceeds, Amount of Money Left on the Table, and Long-run Performance, by Cohort Year, 1999 to 2012

Year	Number of IPOs	Average First-Day Return	Average Gross Proceeds (€ Millions)	Aggregate Money Left on the Table (€ Millions)	Average 3-Year Return		
					IPOs	CARs	BHARs
1999	22	17.3%	853	5.7	-8.8%	-31.8%	-54.2%
2000	40	13.2%	150	8.9	2.6%	-52.5%	-36.3%
2001	14	-2.0%	231	-0.1	4.7%	-51.0%	-28.7%
2002	5	0.3%	3,796	0.0	-0.2%	10.9%	18.6%
2003	4	-1.4%	138	-0.1	6.5%	15.9%	-10.0%
2004	6	3.8%	374	0.6	3.3%	10.6%	37.3%
2005	9	8.8%	150	1.1	-4.2%	-15.0%	-5.0%
2006	20	9.9%	225	1.3	8.0%	-16.9%	-11.7%
2007	22	3.5%	170	1.0	-0.3%	-8.0%	2.5%
2008	5	5.9%	16	0.0	8.0%	17.7%	-1.7%
2009	3	31.3%	40	1.6	-0.3%	14.3%	39.7%
2010	4	1.2%	628	3.2	-3.5%	-68.0%	-88.3%
2011	3	17.6%	129	2.5	-3.1%	48.1%	59.5%
2012	0	0.0%	0	0.0	0.0%	0.0%	0.0%
1999-2012	157	9.2%	398	3.8	0.8%	-28.8%	-23.1%

Panel B - Individuals in the household samples (N = 63,018)

	Mean	Median	Standard Deviation	1st percentile	99th percentile
Equity	0.085	0.072	0.113	-0.145	0.383
Equity Wealth (€)	1,985	0	22,582	0	40,720
Equity-To-Wealth	0.005	0.000	0.051	0.000	0.121
Equity-To-Income	0.029	0.000	0.227	0.000	0.692
Age (Years)	50	52	23	2	89
Male	1.5	2.0	0.5	1.0	2.0
Education	3	3	1	1	5
Net Income (€)	36,205	28,907	31,145	3,600	144,545
Wealth (€)	256,797	156,838	514,834	-5,950	1,875,000

Panel C - Private Firms: firm's balance sheet database (N = 95,588)

	Mean	Median	Standard Deviation	1st percentile	99th percentile
Roa	0.085	0.072	0.113	-0.145	0.383
Leverage	0.154	0.116	0.136	0.004	0.637
Age (Years)	21	18	15	2	88
Assets (€ Millions)	78,650	22,630	771,673	5,602	935,559

Table 2
Variable Definitions

Variable	Definition
σIPO_After255dd	The daily standard deviation of the IPO stock raw returns in the 255 trading days commencing 6 trading days after the offer
σIPO_After30dd	The daily standard deviation of the IPO stock raw returns in the 30 trading days after the offer
σIPO_IRs	The variance of IPO_IR
Age_Household	The SHIW respondent age
Age	The number of years of a firm's life since foundation
Assets	Total assets
BHAR	The buy-and-hold abnormal return computed according to the Fama and French (1992) three factor model. It is computed over a 1 month, 6 months, 1 year, 2 years and 3 years time window
CAR	The cumulative abnormal return computed according to the Fama and French (1992) three factor model. It is computed over a 1 month, 6 months, 1 year, 2 years and 3 years time window
Dilution Factor	The number of primary shares in IPO relative to pre-IPO shares outstanding
Education	The SHIW respondent educational qualification. It considers i) no qualification, ii) elementary school, iii) middle school, iv) high school, v) bachelor's degree, and vi) post-graduate qualification
Equity	Equals one if the household reports to own stock in SHIW wave *t* and zero otherwise
Equity-To-Wealth	The ratio of *Equity Wealth* to *Wealth*
Equity-To-Income	The ratio of *Equity Wealth* to *Net Income*
Equity Wealth	The amount of shares (of listed and unlisted companies) held at the end of the year by the SHIW respondent
Family Size	Number of household members of the SHIW respondent
GeoClust	The geographic clustering of elements *j* around the firm *i* in the year *t*, defined as $$GeoClust_{i,t}=\sum_{j=1}^{n}\frac{1}{Distance_{i,j}}$$ where $Distance_{i,j}$ is the shortest spherical distance between the headquarters of the firm *i* and the location of the generic element *j*. The more the j-elements are clustered around the firm *i* the higher is the value of *GeoClust*.
GeoClustListed	The yearly geographic clustering index computed on the geographical locations (i.e., latitude and longitude) of the issuing firm headquarters and the headquarters of all sampled listed firms. Formally, *GeoClustListed* is *GeoClust* where $Distance_{i,j}$ is the shortest spherical distance between the headquarters of the firm *i* and the location of the *j* headquarters of the firms listed at MSE in year *t*, and $w_{j,t}$ is equal to one.
GeoClustPrivate	The yearly geographic clustering index computed on the geographical locations (i.e., latitude and longitude) of the issuing firm headquarters and the headquarters of all sampled private firms. Formally, *GeoClustPrivate* is *GeoClust* where $Distance_{i,j}$ is the shortest spherical distance between the headquarters of the firm *i* and the location of the *j* headquarters of the private firm in year *t*, and $w_{j,t}$ is equal to one.
GeoClustWealth	The yearly geographic clustering index computed on the geographical locations (i.e., latitude and longitude) of the issuing firm headquarters and all provincial capital cities, with weights equal to the normalized provincial per capita *Net Income*. Formally, *GeoClustWealth* is *GeoClust* where $Distance_{i,j}$ is the shortest spherical distance between the headquarters of the firm *i* and the *j* capitals of the Italian provinces in year *t*, and $w_{j,t}$ is equal to the normalized provincial household *Net Income* in year *t*.
IN_NDelisting	Number of delisting made by firms headquartered in the NUTS2 region where the household is resident
IN_NIPO	Number of IPOs headquartered in the NUTS2 region where the household is resident
IN_NListed	Number of listed firms headquartered in the NUTS2 region where the household is

	resident
Industry Median MTB	The median market-to-book ratio of the listed firms in the firm industry
Inverse Mills Ratio	The inverse of the Mills' ratio used to correct for self-selection bias (Heckman, 1979) and estimated from the likelihood to go public regression model
Institutional	The percentage of the IPO issue allocated to institutional investors
IPO_IR	The percent difference between the IPO aftermarket price on the 21st day of trading and the IPO offer price
Leverage	The debt-to-asset ratio
Male	Equals one if the SHIW respondent is a male and zero otherwise
mMRK_Before60dd	The average of daily industry-specific index returns in the sixty trading days before the offering date
Money Left on the Table	The number of shares issued in IPO times the change from the offer price to the first-day closing price
Net Income	Net disposable income. For every SHIW respondent, it is computed as follows: Net Income = Total Consumption + Savings
NM	Equals one if the IPO is listed on New Market (MSE segment) and zero otherwise
OUT_NDelisting	Number of delisting made by firms headquartered out of the NUTS2 region where the household is resident
OUT_NIPO	Number of IPOs headquartered out of the NUTS2 region where the household is resident
OUT_NListed	Number of listed firms headquartered out of the NUTS2 region where the household is resident
Participation Ratio	The number of secondary shares in IPO relative to pre-IPO shares outstanding
Proceeds	IPO gross proceeds
Roa	The ratio of EBITDA to total assets
Revision	The percentage difference between the offer price and the mean of the indicative price range
Range	IPO prospectus offer price range
Reputation	Underwriter relative market share
Shares	The number of shares offered in the IPO
Second	The fraction of the total issue offered by existing pre-issue shareholders
Tech	Equals one if the firm is in a high-tech industry and zero otherwise
Underpricing	The percentage difference between the IPO first trading-day market price and the offer price
Wave	Equals one in the first considered SHIW wave (1998) and increments by one each succeeding SHIW wave
Wealth	Net wealth. For every SHIW respondent, it is computed as follows: Wealth = Real Assets + Financial Assets – Financial Liabilities

Table 3
Summary Statistics for Household Stock Market Participation and Equity Risk-Tolerance by Local IPO Activity

This table presents summary of stock market participation and equity risk-tolerance in the household sample for regions with no IPOs (*IN_NIPO* = 0), 4 or more IPOs (*IN_NIPO* ≥ 4), and less than 4 IPOs (*IN_NIPO* < 4), in the two previous years throughout the IPO sample period (3 is the median of local IPOs upon regions with at least one IPO). *Equity* is one if the household holds either private or listed firms stocks by the end of the wave year and zero otherwise. *Equity Wealth Listed & Private* is the amount of household wealth invested in listed and private firm stocks. *Equity Wealth Listed* is the amount of household wealth invested in listed firm stocks. *Wealth* is the household net total wealth. *Net Income* is the household disposable income. *Equity All-To-Wealth* is the proportion of household net total wealth in listed and private firm stocks. *Equity All-To-Income* is the proportion of household disposable income in listed and private firm stocks. *Equity-To-Wealth* is the proportion of household net total wealth in listed firm stocks. *Equity-To-Income* is the proportion of household disposable income in listed firm stocks. *IN_NListed* is the number of listed firms headquartered in the region (NUTS2) where the household is resident by the end of the wave year. *OUT_NListed* is the number of listed firms headquartered out of the region (NUTS2) where the household is resident by the end of the wave year. *IN_NIPO* is the number of IPOs headquartered in the region (NUTS2) where the household is resident in the two previous years. *OUT_NIPO* is the number of IPOs headquartered out of the region (NUTS2) where the household is resident in the two previous years. *IN_NDelisting* is the number of delistings headquartered in the region (NUTS2) where the household is resident in the two previous years. *OUT_NDelistings* is the number of delistings headquartered out of the region (NUTS2) where the household is resident in the two previous years. *Age* is the age of the SHIW respondent. *Male* is one if the SHIW respondent is male and zero otherwise. *Education* is the SHIW respondent education level. The last two columns report the *t*-statistics and the *z*-statistics for the test of difference in means and the distribution between the sample of households with 4 or more IPOs (*IN_NIPO* ≥ 4) and less than 4 IPOs (*IN_NIPO* < 4) in the two previous years, respectively. ***, **, * indicate significance at the 1%, 5%, and 10% levels, respectively.

Table 3 – continued

	No IPOs (*IN_NIPO* = 0)			High IPOs (*IN_NIPO* ≥ 4)			Low IPOs (*IN_NIPO* < 4)			Tests of differences: High IPOs - Low IPOs	
	N	Mean	Median	N	Mean	Median	N	Mean	Median	Mean difference *t*-test	Kruskal-Wallis test
Equity	26,029	0.044	0	13,610	0.121	0	16,232	0.067	0	16.26***	65.26***
Equity Wealth Listed & Private	26,029	975	0	13,610	4,039	0	16,232	2,310	0	4.55***	67.27***
Equity Wealth Listed	26,029	892	0	13,610	3,755	0	16,232	1,812	0	5.7***	60.99***
Wealth	26,029	212,159	133,928	13,610	305,192	184,000	16,232	266,332	167,143	6.09***	58.48***
Net Income	26,029	29,842	23,877	13,610	43,085	34,657	16,232	34,328	28,427	23.74***	708.71***
Equity-To-Wealth	25,393	0.003	0	13,461	0.01	0	15,869	0.004	0	8.33***	60.16***
IN_NListed	26,029	2.74	2	13,610	48.13	29	16,232	21.7	18	83.03***	5,003.58***
OUT_NListed	26,029	220.08	233	13,610	169.57	175	16,232	207.91	210	-115.7***	9592.8***
IN_NIPO	26,029	0	0	13,610	9.59	9	16,232	1.55	1	167.07***	22,207.98***
IN_NDelisting	26,029	0.42	0	13,610	6.28	4	16,232	2.28	2	88.63***	6,269.15***
OUT_NIPO	26,029	28.27	16	13,610	34.06	28	16,232	24.92	15	40.59***	1,049.13***
OUT_NDelisting	26,029	27.75	27	13,610	18.7	18	16,232	24.59	24	-114.99***	10,187.25***
Age	26,029	50.25	53	13,610	49.94	52	16,232	51.36	55	-5.48***	40.24***
Male	26,029	0.45	0	13,610	0.47	0	16,232	0.46	0	1.18	1.04
Education	26,029	2.86	3	13,610	3.05	3	16,232	2.96	3	6.62***	42.6***

Table 4
Investor Preference for Local IPOs

This table reports results of the multivariate analysis of stock market participation, that is the likelihood to hold equity, and the equity risk tolerance, that is the portion of total wealth invested in equity, in the household sample. *Equity* is one if the household holds either private or listed firms stocks by the end of the wave year and zero otherwise. *Equity-To-Wealth* is the proportion of household net total wealth in listed firm stocks. *IN_NIPO (OUT_NIPO)* is the number of IPOs headquartered in (out of) the region (NUTS2) where the household is resident in the two previous years. *IN_NListed* (*OUT_NListed*) is the number of listed firms headquartered in (out of) the region (NUTS2) where the household is resident in the two previous years. *IN_NDelisting* (*OUT_NDelisting*) is the number of delistings headquartered in (out of) the region (NUTS2) where the household is resident in the two previous years. *Age* is the age of the SHIW respondent. *Male* is one if the SHIW respondent is male and zero otherwise. *Education* is the SHIW respondent education level. Wave dummies for time trends are included in regressions (but not shown). *t*-statistics are reported in parentheses. Standard errors clustered by wave and region have been considered. ***, **, * indicate significance at the 1%, 5%, and 10% levels, respectively.

	Equity		*Equity-To-Wealth*	
	(1)	(2)	(3)	(4)
IN_NIPO	0.080***	0.075***	0.001***	0.000**
	(7.18)	(6.33)	(3.97)	(2.06)
IN_NIPO x IN_NListed	-0.001***	-0.001***	-0.000	-0.000
	(-6.68)	(-6.61)	(-0.62)	(-0.55)
IN_NListed	0.013***	0.056***	0.000*	0.000
	(11.22)	(3.20)	(1.73)	(1.52)
IN_NDelisted		-0.313***		-0.004**
		(-2.82)		(-2.24)
OUT_NIPO		-0.006		-0.000***
		(-1.22)		(-3.05)
OUT_NDelisted		-0.310***		-0.004**
		(-2.81)		(-2.25)
OUT_NListed		0.043**		0.000
		(2.49)		(1.40)
Age	-0.008***	-0.008***	-0.000**	-0.000**
	(-7.73)	(-7.73)	(-2.56)	(-2.56)
Male	0.197***	0.197***	0.001***	0.001***
	(5.24)	(5.24)	(2.78)	(2.78)
Education	0.322***	0.322***	0.002***	0.002***
	(16.27)	(16.27)	(6.81)	(6.81)
Log(Wealth)	0.740***	0.740***	0.000	0.000
	(28.89)	(28.85)	(0.36)	(0.36)
Constant	-12.638***	-14.975***	0.000	0.021*
	(-38.52)	(-10.19)	(0.24)	(1.80)
Observations	53,372	53,372	53,372	53,372
χ^2-test (*F*-test)	2,268***	2,268***	37.21***	34.63***

Table 5
Geographic Variables of Clustering Description

This table describes the geographical variables of clustering (GeoIndex). The table reports the quartile minimum, average, and maximum values of *GeoClustListed*, *GeoClustWealth*, and *GeoClustPrivate*, and the inner average values of the listed firms (*GeoClustListed*), investor wealth (*GeoClustWealth*), and private firms (*GeoClustPrivate*) located within a 100-, 300-, and 600-kilometer radius from the firm headquarters. The sample is of firms that went public and firms that remained private between 1999 and 2012. The going-public firms are those firms in the manufacturing sector that went public at MSE between 1999 and 2012. The firms remaining private are all the firms in Amadeus (Bureau Van Dijk database) that did not have an IPO between 1999 and 2012, headquartered in Italy, with ROE within plus and minus one range, and with at least €5 million in total assets. *GeoClustListed* is the index of geographic clustering of the listed firms around the firm headquarters. *GeoClustWealth* is the index of geographic clustering of the investor wealth around the firm headquarters. *GeoClustPrivate* is the index of geographic clustering of the private firms around the firm headquarters.

GeoIndex	*n*th-quartile	Min	Average	Max	< 100km		< 300 km		< 600km		All
					N	%	N	%	N	%	All
GeoClustListed	1	0.0006	0.0032	0.0048	7	3.1%	65	29.0%	155	69.2%	224
	2	0.0048	0.0061	0.0077	23	10.3%	140	62.8%	214	96.0%	223
	3	0.0077	0.0106	0.0161	53	23.7%	146	65.2%	214	95.5%	224
	4	0.0161	0.0489	0.1214	75	33.9%	142	64.3%	210	95.0%	221
	Total	0.0006	0.0172	0.1214	40	17.9%	123	55.2%	198	88.8%	223
GeoClustWealth	1	0.0010	0.0040	0.0050	59,006	6.0%	278,744	28.6%	687,602	70.4%	976,200
	2	0.0050	0.0050	0.0060	104,882	10.7%	452,201	46.3%	763,847	78.3%	975,715
	3	0.0060	0.0060	0.0070	130,050	13.4%	467,944	48.2%	753,128	77.5%	971,656
	4	0.0070	0.0090	0.0160	131,028	13.6%	455,491	47.1%	751,571	77.8%	966,567
	Total	0.0010	0.0060	0.0160	106,249	10.9%	413,611	42.5%	739,043	76.0%	972,533
GeoClustPrivate	1	0.0012	0.0039	0.0057	632	4.1%	4,722	30.4%	10,956	70.4%	15,554
	2	0.0057	0.0068	0.0079	1,930	12.6%	9,204	60.2%	13,967	91.3%	15,301
	3	0.0079	0.0100	0.0130	2,826	18.6%	9,391	61.9%	13,706	90.4%	15,166
	4	0.0130	0.0298	0.0802	3,909	27.8%	8,906	63.3%	12,670	90.0%	14,070
	Total	0.0012	0.0126	0.0802	2,325	15.5%	8,056	53.6%	12,824	85.4%	15,022

Table 6
Summary Statistics – Going Public Versus Remaining Private

This table presents summary statistics for firms that went public and firms that remained private between 1999 and 2012. The going-public firms are those firms in the manufacturing sector that went public at MSE between 1999 and 2012. The firms remaining private are all the firms in Amadeus (Bureau Van Dijk database) that did not have an IPO between 1999 and 2012, headquartered in Italy, with ROE within plus and minus one range, and with at least €5 million in total assets. All statistics are firm-year observations, with the IPO sample being restricted to the years when the firms were private, prior to going public. *GeoClustListed* is the index of geographic clustering of the listed firms around the firm headquarters. *GeoClustWealth* is the index of geographic clustering of the investor wealth around the firm headquarters. *GeoClustPrivate* is the index of geographic clustering of the private firms around the firm headquarters. *Industry Median MTB* is the median market-to-book ratio of the listed firms in the firm industry. *Roa* is the lagged value of return on assets. *Leverage* is the lagged value debt-to-asset ratio. *Age* is the number of years since firm incorporation. *Assets* is the lagged value of firm total assets in thousands of dollars. All the euro values are in real terms. The last two columns report the *t*-statistics and the *z*-statistics for the test of difference in means and the distribution between the sample of firms going public and the sample of firms remaining private, respectively. ***, **, * indicate significance at the 1%, 5%, and 10% levels, respectively.

	Firms going public (N=157)		Firms remain private (N=95,588)		Tests of differences	
	Mean	Median	Mean	Median	Mean difference *t*-test	Kruskal-Wallis test
GeoClustListed	0.021	0.011	0.017	0.008	4.41***	20.02***
GeoClustWealth	0.007	0.006	0.006	0.006	4.30***	14.79***
GeoClustPrivate	0.017	0.009	0.013	0.008	3.05***	4.71**
Industry Median MTB	0.69	0.70	0.72	0.67	-1.22	0.17
Roa	5.7%	6.4%	8.5%	7.2%	-3.52***	5.88**
Leverage	30.9%	27.3%	15.4%	11.6%	14.89***	68.98***
Age (Years)	16	13	21	18	-1.46	1.18
Assets	1,369,571	124,300	78,650	22,630	20.31***	216.48***

Table 7
The Firm Location and the Likelihood to go Public

This table reports probit model estimation of the probability to go public. The dependent variable equals 0 if the firm stays private and 1 otherwise. After a firm goes public, it is dropped from the sample. *GeoClustListed* is the index of geographic clustering of the listed firms around the firm headquarters. *GeoClustWealth* is the index of geographic clustering of the investor wealth around the firm headquarters. *GeoClustListed* is the index of geographic clustering of the private firms around the firm headquarters. *Industry Median MTB* is the median market-to-book ratio of the listed firms in the firm industry. *Roa* is the lagged value of return on assets. *Leverage* is the lagged value debt-to-asset ratio. *Age* is the number of years since firm incorporation. *Assets* is the lagged value of firm total assets in thousands of dollars. The regression also includes a constant term and calendar year dummies (not reported). *t*-statistics based on standard errors clustered by year and sub-sector are reported in parentheses. ***, **, * indicate significance at the 1%, 5%, and 10% levels, respectively.

	IPO		
	(1)	(2)	(3)
GeoClustListed		-0.0024	-0.0103**
		(-1.42)	(-2.48)
GeoClustWealth		0.0224**	0.0172*
		(2.01)	(1.73)
GeoClustPrivate			0.0137**
			(2.08)
Industry Median MTB	0.0001***	0.0001***	0.0001***
	(5.92)	(5.81)	(5.83)
Roa	-0.0001	-0.0001	-0.0001
	(-0.50)	(-0.50)	(-0.42)
Leverage	0.0009***	0.0009***	0.0009***
	(5.86)	(5.80)	(6.06)
Log(1+Age)	0.0002***	0.0002***	0.0002***
	(5.14)	(5.20)	(5.11)
Log(Assets)	0.0002***	0.0002***	0.0002***
	(10.66)	(10.04)	(10.10)
Observations	95,745	95,745	95,745
Pseudo-R^2	0.240	0.242	0.250
χ^2-test	720.4***	772.6***	776.5***

Table 8
Summary Statistics – Isolated Versus Clustered IPO

This table presents summary statistics for firms in the manufacturing sector that went public at MSE between 1999 and 2012 (the IPOs sample), distinguishing the isolated IPOs and clustered IPOs. The isolated (clustered) IPOs are those IPOs with *GeoClustListed* below (equal or above) the cross-sectional median). *Underpricing* is the percentage difference between the first trading-day market price and the offer price *BHAR3y* is the three-year buy-and-hold abnormal return using the Fama and French (1992) three factor model as a benchmark. *CAR3y* is the three-year cumulative abnormal return using the Fama and French (1992) three factor model as a benchmark. *GeoClustListed* is the index of geographic clustering of the listed firms around the firm headquarters. *GeoClustWealth* is the index of geographic clustering of the investor wealth around the firm headquarters. *GeoClustPrivate* is the index of geographic clustering of the private firms around the firm headquarters. *mMRK_Before60dd* is the average of daily industry-specific index returns in the sixty trading days before the offering date. *σIPO_After30dd* is the daily standard deviation of the IPO stock raw returns in the thirty trading days after the offering date. *σIPO_After255dd* is the daily standard deviation of the IPO stock raw returns in the 255 trading days commencing 6 trading days after the offer. *Tech* equals one if the firm is in a high-tech industry and zero otherwise. *Age* is the number of years since firm incorporation. *Assets* is the value of firm total assets in thousands of dollars. *Inverse Mills Ratio* is the Heckman's λ from the likelihood to go public regression model (Model 3, Table 7). *Revision* is the percentage difference between the offer price and the mean of the indicative price range. *Range* is the prospectus offering price range. *Reputation* is the Megginson and Weiss (1991)'s measure of underwriter reputation (underwriter relative market share). *Institutional* is the percentage of the IPO issue allocated to institutional investors. *Participation Ratio* is the number of secondary (old) shares sold relative to pre-IPO share outstanding. *Second* is the fraction of the total issue offered by existing pre-issue shareholders. *Dilution Factor* is the number of primary (new) shares sold relative to pre-IPO share outstanding. *Shares* is the number of shares (in millions) offered in the IPO. *Proceeds* is the value of offer gross proceeds (in millions). *AIM* equals one if the IPO is listed on New Market (MSE segment) and zero otherwise. All the euro values are in real terms. The last two columns report the *t*-statistics and the *z*-statistics for the test of difference in means and the distribution between the sample of the isolated IPOs and the sample of the clustered IPOs, respectively. ***, **, * indicate significance at the 1%, 5%, and 10% levels, respectively.

Table 8 – continued

	All IPOs (N = 157)		Isolated IPOs (GeoClustListed < CS Median)		Clustered IPOs (GeoClustListed ≥ CS Median)		Tests of differences: Isolated IPOs - Clustered IPOs	
	Mean	Median	Mean	Median	Mean	Median	Mean difference *t*-test	Kruskal-Wallis test
Panel A - Underpricing, Initial Returns and Long-term Perfomance								
Underpricing	9.49%	3.40%	10.74%	2.37%	8.23%	3.61%	0.70	0.08
BHAR3y	-23.08%	-32.52%	-12.01%	-23.93%	-33.97%	-42.72%	2.14**	4.84**
CAR3y	-28.80%	-24.89%	-14.34%	-13.81%	-43.02%	-34.91%	2.32**	5.17**
Panel B - Geographical Variables of Clustering								
GeoClustListed	0.021	0.011	0.006	0.006	0.035	0.031	-10.23***	120***
GeoClustWealth	0.007	0.006	0.005	0.005	0.007	0.007	-5.99***	35.65***
GeoClustPrivate	0.017	0.009	0.007	0.006	0.025	0.017	-7.60***	68.84***
Panel C - Firm and Offer Characteristics								
mMRK_Before60dd	0.009	0.009	0.009	0.008	0.010	0.009	-2.36**	7.57***
σIPO_After30dd	0.038	0.025	0.039	0.023	0.038	0.026	0.22	1.09
σIPO_After255dd	0.029	0.025	0.028	0.023	0.031	0.0274	-1.14	5.19**
Tech	0.168	0.000	0.136	0.000	0.200	0.000	-1.090	0.490
Age (Years)	16	13	18	14	16	10	0.92	4.58**
Assets (€ Millions)	872,544	115,222	219,531	115,100	1,478,065	115,345	-1.84*	0.45
Inverse Mills Ratio	2.674	2.709	2.744	2.763	2.604	2.679	1.33	1.98
Revision	0.241	0.294	0.242	0.286	0.240	0.306	0.03	0.05
Range	0.251	0.247	0.243	0.240	0.259	0.248	-0.73	0.30
Reputation	0.105	0.031	0.110	0.036	0.100	0.014	0.38	0.42
Institutional	0.648	0.639	0.631	0.634	0.665	0.651	-0.45	0.18
Participation Ratio	0.142	0.100	0.168	0.143	0.116	0.045	2.28**	7.46***
Second	0.354	0.236	0.408	0.333	0.300	0.124	1.91*	6.26**
Dilution Factor	0.270	0.251	0.256	0.242	0.284	0.287	-0.85	1.03
Shares (Millions)	3.7	2.8	3.4	3.2	3.9	2.4	-0.74	2.28
Proceeds (€ Millions)	389.2	56.2	129.9	64.0	651.7	51.5	-1.70*	0.07
AIM	0.559	1.000	0.667	1.000	0.450	0.000	2.82***	5.63**

Table 9
The Firm Location and the IPO Underpricing

This table reports results from multivariate analysis of *Underpricing*. *Underpricing* is the percentage difference between the first trading-day market price and the offer price. *GeoClustListed* is the index of geographic clustering of the listed firms around the firm headquarters. *GeoClustWealth* is the index of geographic clustering of the investor wealth around the firm headquarters. *GeoClustPrivate* is the index of geographic clustering of the private firms around the firm headquarters. *σIPO_After30dd* is the daily standard deviation of the IPO stock raw returns in the thirty trading days after the offering date. *mMRK_Before60dd* is the average of daily industry-specific index returns in the sixty trading days before the offering date. *Revision* is the percentage difference between the offer price and the mean of the indicative price range. *Reputation* is the Megginson and Weiss (1991)'s measure of underwriter reputation (underwriter relative market share). *Institutional* is the percentage of the IPO issue allocated to institutional investors. *Participation Ratio* is the number of secondary (old) shares sold relative to pre-IPO share outstanding. *Dilution Factor* is the number of primary (new) shares sold relative to pre-IPO share outstanding. *Proceeds* is the value of offer gross proceeds. *Age* is the number of years since firm incorporation. *Assets* is the value of firm total assets. *Inverse Mills Ratio* is the Heckman's λ from the likelihood to go public regression model (Model 3, Table 7). The regression also includes calendar year dummies (not reported). *t*-statistics based on standard errors clustered by year and sub-sector are reported in parentheses. ***, **, * indicate significance at the 1%, 5%, and 10% levels, respectively.

	Underpricing		
	(1)	(2)	(3)
GeoClustListed		-1.1560**	-1.2128**
		(-2.01)	(-2.21)
GeoClustWealth		12.7098**	14.1455***
		(2.20)	(2.64)
σIPO_After30dd	4.5132***	4.5014***	4.5077***
	(8.73)	(8.94)	(8.52)
mMRK_Before60dd	0.7982***	0.7508***	0.7663***
	(12.60)	(2.62)	(2.52)
Revision	0.0005	0.0010	0.0011
	(0.70)	(1.20)	(1.47)
Range	0.0161	0.0038	0.0292
	(0.12)	(0.03)	(0.23)
Reputation	0.0344	0.0140	0.0131
	(0.62)	(0.33)	(0.59)
Institutional	0.0685	0.0737	0.0524
	(1.21)	(1.42)	(1.05)
Participation Ratio	-0.1541*	-0.1569**	-0.1239**
	(-1.79)	(-2.33)	(-2.18)
Dilution Factor	-0.1857***	-0.1650***	-0.1479***
	(-3.33)	(-3.12)	(-2.67)
Log(Proceeds)	-0.0209	-0.0151	-0.0149
	(-0.87)	(-0.63)	(-0.65)
Log(1+Age)	-0.0087	-0.0067	-0.0062
	(-0.83)	(-0.61)	(-0.74)
Log(Assets)	0.0220	0.0189	0.0207
	(1.20)	(0.98)	(1.00)
Inverse Mills Ratio			-0.0016**
			(2.11)
Constant		-0.2795	-0.3210
		(-1.32)	(-1.29)
Observations	157	157	157
R^2-adj	0.709	0.714	0.722
F-test	9.55***	8.18***	8.653***

Table 10
The Firm Location and the Variability of IPO Initial Returns

The columns labeled OLS show cross-sectional regressions of IPO initial returns (*IPO_IR*) on firm- and offer-specific characteristics; the *t*-statistics, in parentheses, use White's (1980) heteroskedasticity-consistent standard errors. The columns labeled MLE show maximum likelihood estimates of these cross-sectional regressions where the log of the variance of the IPO initial return (*σIPO_IR*) is assumed to be linearly related to the same characteristics that are included in the mean equation. The large sample standard errors are used to calculate the *t*-statistics in parentheses under the coefficient estimates. The log-likelihoods show the improvement achieved by accounting for heteroskedasticity compared with OLS. The sample consists of all manufacturing firms that went public at MSE between 1999 and 2012. See Table 2 for variable definitions. *IPO_IR* is the percentage change from the offer price to the closing price on the 21st day of trading. *σIPO_IR* is the cross-sectional volatility of *IPO_IR*s. *GeoClustListed* is the index of geographic clustering of the listed firms around the firm headquarters. *GeoClustWealth* is the index of geographic clustering of the investor wealth around the firm headquarters. *Reputation* is the Megginson and Weiss's (1991) measure of underwriter reputation (underwriter relative market share). *Shares* is the number of shares (in millions) offered in the IPO. *Tech* equals one if the firm is in a high-tech industry, and zero otherwise. *AIM* equals one if the IPO is listed on New Market (MSE segment) and zero otherwise. *Age* is the number of years since firm incorporation. |*Revision*| is the absolute value of the percentage difference between the offer price and the mean of the indicative price range. *Inverse Mills Ratio* is the Heckman's λ from the likelihood to go public regression model (Model 3, Table 7). The regression also includes calendar year dummies (not reported). ***, **, * indicate significance at the 1%, 5%, and 10% levels, respectively.

	IPO_IR					
	OLS	MLE		OLS	MLE	
		Mean	Variance		Mean	Variance
	(1)	(2)	(3)	(4)	(5)	(6)
GeoClustListed				-2.0871**	-0.4527	-12.4110**
				(-2.48)	(-0.54)	(-2.42)
GeoClustWealth				18.0109**	17.3240*	160.4383**
				(1.97)	(1.68)	(2.23)
Reputation	-0.1629	-0.0292	-1.9158***	-0.2041	-0.0107	-1.6343***
	(-1.19)	(-0.45)	(-3.85)	(-1.30)	(-0.17)	(-3.43)
Log(Shares)	-0.0498	-0.0262**	-0.9829***	-0.0468	-0.0326***	-1.0997***
	(1.49)	(-2.51)	(-5.53)	(1.47)	(-2.60)	(-4.88)
Tech	0.2275	0.0298	1.3367***	0.2205	0.0176	1.1926***
	(1.30)	(0.38)	(6.55)	(1.28)	(0.29)	(6.16)
AIM	0.0979	0.0133	0.9121***	0.0908	0.0247	1.2606***
	(0.69)	(0.44)	(2.96)	(0.67)	(0.74)	(3.48)
Log(1+ Age)	-0.0343	-0.0014	-0.0623	-0.0342*	-0.0033	-0.0792
	(-1.58)	(-0.16)	(-0.76)	(-1.76)	(-0.41)	(-1.00)
|*Revision*|	0.0018	0.0001	0.0351***	0.0007**	0.0006	0.0280***
	(1.45)	(0.07)	(3.38)	(2.10)	(0.55)	(2.67)
Constant	0.1780***	0.0992***	-0.8937***	0.1137	0.0066	-1.7433***
	(2.88)	(3.38)	(-4.74)	(0.57)	(0.12)	(-3.75)
Observations	157	157		157	157	
R^2-adj	0.046			0.052		
F-test (χ^2- test)	1.24	(17.48***)		1.38	(22.95***)	

Figure 1
Buy-and-Hold Abnormal Returns - Isolated and Clustered IPOs

The figure shows the three year post-IPO buy-and-hold abnormal stock returns (offering day +6 to day +765) for firms in the manufacturing sector that went public at MSE between 1999 and 2012 (the IPOs sample), distinguishing the isolated IPOs (dashed blue line) and clustered IPOs (dashed red line). The isolated (clustered) IPOs are those IPOs with *GeoClustListed* below (equal or above) the cross-sectional median).

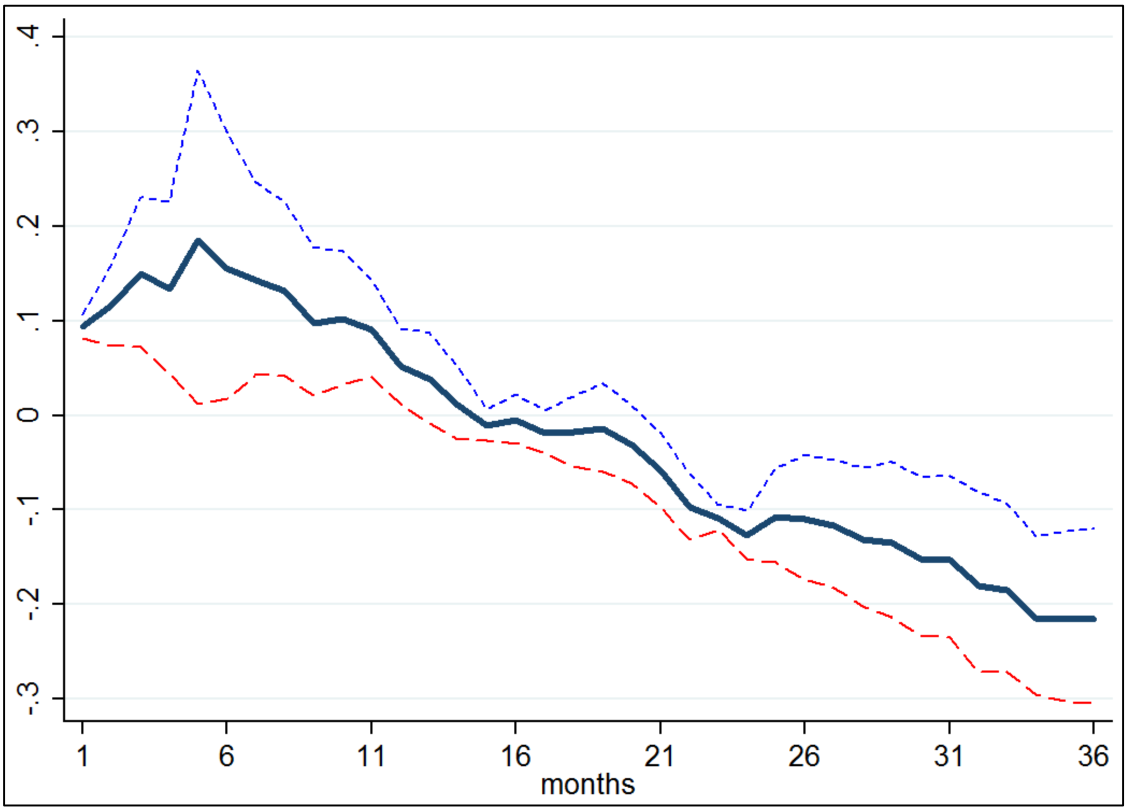

Table 11
Buy-and-Hold Abnormal Returns - Isolated Versus Clustered IPOs

This table reports the buy-and-hold abnormal stock returns for firms in the manufacturing sector that went public at MSE between 1999 and 2012 (the IPOs sample), distinguishing the isolated IPOs and clustered IPOs. The isolated (clustered) IPOs are those IPOs with *GeoClustListed* below (equal or above) the cross-sectional median). The table reports buy-and-hold abnormal stock returns for the periods between 1 month and 3 years. The beginning dates of buy-and-hold periods are the IPOs' sixth trading days. The last two columns report the differential buy-and-hold abnormal stock returns and the *t*-statistics for the test of difference between the sample of the isolated IPOs and the sample of the clustered IPOs, respectively. ***, **, * indicate significance at the 1%, 5%, and 10% levels, respectively.

	All IPOs (N = 157)		Isolated IPOs (*GeoClustListed* < CS Median)		Clustered IPOs (*GeoClustListed* ≥ CS Median)		Isolated IPOs – Clustered IPOs	Difference *t*-test
1-Month (*t*-stat)	9.514	(5.288)***	10.735	(3.583)***	8.263	(4.194)***	2.472	(0.689)
6-Month (*t*-stat)	16.138	(1.804)*	30.562	(1.763)*	1.899	(0.423)	28.663	(1.601)*
12-Month (*t*-stat)	5.328	(0.816)	9.533	(0.865)	1.066	(0.153)	8.467	(0.649)
24-Month (*t*-stat)	-13.083	(-3.317)***	-10.059	(-1.753)*	-16.063	(-2.957)***	6.004	(0.76)
36-Month (*t*-stat)	-23.080	(-4.427)***	-12.007	(-1.488)	-33.968	(-5.315)***	21.961	(2.134)**

Table 12
The Firm Location and the IPO Long-run Performance

This table reports results from multivariate analysis of *BHAR3y*. *BHAR3y* is the three-year post-IPO cross-sectional average buy-and-hold abnormal returns (offering day +6 through day +756), Fama and French (1992) three factor model benchmarked, for firms in the manufacturing sector that went public at MSE between 1999 and 2012. The market-adjusted long-run return on the IPO stock is computed from the offer date +6 through the earlier of offer date +765 or the stock's delisting date. The return is computed using a buy-and-hold strategy. *GeoClustListed* is the index of geographic clustering of the listed firms around the firm headquarters. *GeoClustWealth* is the index of geographic clustering of the investor wealth around the firm headquarters. *σIPO_After255dd* is the daily standard deviation of the IPO stock raw returns in the 255 trading days commencing 6 trading days after the offer. *Reputation* is the Megginson and Weiss (1991)'s measure of underwriter reputation (underwriter relative market share). *Second* is the fraction of the total issue offered by existing pre-issue shareholders. *Age* is the number of years since firm incorporation. *Proceeds* is the value of offer gross proceeds (in millions). *Inverse Mills Ratio* is the Heckman's λ from the likelihood to go public regression model (Model 3, Table 7). The regression also includes calendar year dummies (not reported). *t*-statistics based on standard errors clustered by year and sub-sector are reported in parentheses. ***, **, * indicate significance at the 1%, 5%, and 10% levels, respectively.

	BHAR3y		
	(1)	(2)	(3)
GeoClustListed		-0.7383***	-0.7562***
		(-3.71)	(-3.55)
GeoClustWealth		7.1261***	6.9435***
		(4.09)	(3.82)
σIPO_After255dd	0.7827**	0.7910**	0.8043**
	(2.23)	(2.41)	(2.47)
Reputation	0.0226	0.0112	0.0042
	(0.72)	(0.35)	(0.14)
Second	0.0452***	0.0393**	0.0408**
	(2.74)	(2.24)	(2.24)
Log(1+Age)	-0.0018	-0.0005	-0.0026
	(-0.26)	(-0.08)	(-0.43)
Log(Proceeds)	-0.0129**	-0.0108**	-0.0087
	(-2.15)	(-2.30)	(-1.14)
Inverse Mills Ratio			0.0085
			(0.57)
Constant	0.0585	0.0201	-0.0050
	(1.06)	(0.39)	(-0.06)
Observations	138	138	138
R^2-adj	0.027	0.035	0.035
F-test	2.40**	2.09*	1.97*