The Firm Location Premium[1]

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Abstract

We investigate the relation between corporate market value and firm geographical location. We find that on average non-financial firms not included in the FTSE MIB Index exhibit a location premium equals to almost 0.8 times their market-to-book value. The location premium decreases the more the issuing firm is close to other listed firms, and, almost three times stronger, the more the issuing firm is distant from investors' income. Furthermore, we find that the local home bias effect and thus the location premium of firms that become more or less isolated as consequences of Delistings or IPOs, varies consistently conditioned to the firm's original spatial status with respect to other listed firms. Notably, while the location premium of highly isolated(aggregated) firms decreases(increases) up to the 31.1(29.43) percent for the aggregation(isolation) effect of IPOs(Delistings), the location premium of firms belonging to secondary clusters reacts the opposite. In any case, the aggregation effect appears stronger than the isolation effect. A tentative explanation for these findings is provided. Several and significant methodological, theoretical, and practical implications come out.

Keywords: Location Premium, Local Home Bias, IPO, Delisting.

JEL classification code: G11; G12

1. Introduction

Far from suggesting standard methods to implement "optimal" models for asset allocation, the asset pricing literature at least provides a suitable framework to tackle many already existing financial related issues. One of the main ambiguities that comes out from a theory-and-practice comparison is the investor preference for domestic securities with respect to the foreign ones. Such behavior, also known as home bias (French & Poterba, 1991), is curious after considering the overall higher risk of the not-well-diversified portfolio implied by the overweighting of national assets (Grubel, 1968). Before advocating explanations based on irrational investor behavior (Graham, Harvey, & Huang, 2009), of which Heath & Tversky (1991) laid out the foundations, scholars have provided several interpretations among which the leading role has been assumed by information asymmetries (Gehrig, 1993). In such a framework, national assets are preferred to the foreign ones since investors have an information advantage over the former. Although home bias is commonly conceived in a cross-country setting comparison (for a survey of this literature see Lewis (1999), and Karolyi & Stulz (2003)), similar dynamics, so called local home bias, also emerge restricting the analysis within a single country (Coval & Moskowitz, 1999). Even in this perspective, closer stocks are preferred to the more physically distant ones as a consequence of an information advantage which is found to be directly proportional to the geographical distance between the marginal investor and the issuing firm (Coval & Moskowitz, 2001). However, in spite of the recently increased number of contributes attesting the validity of an information-driven explanation of the investor preference for local (Ivković & Weisbenner, 2005), a growing strand of literature provides evidences that it is determined, at least partly, by irrational behavioral factors (Huberman, 2001), ascribable to the extensively meant concept of familiarity (Grinblatt & Keloharju, 2001).

Nowadays the geographic component of price formation in equity-markets and the existence of local home bias are incontrovertible. However, even if basic theoretical considerations, essentially founded in the above cited literature, suggest that local home bias and firm location should significantly affect firm market value, little empirical evidences have been provided regarding their implications on asset pricing equilibrium. In fact, from Pirinsky & Wang (2006), who first point out that price formation in equity-markets has a significant geographic component, only Hong, Kubik, & Stein (2008) (henceforth HKS) give proofs consistent with the local home bias effect on corporate market value. Notably, HKS find that the combined level of local supply and demand for stocks, that they summarize in a variable named RATIO - defined by the ratio of the aggregate equity book value of local listed firms to the aggregate disposable income of the local households - is systematically inversely related with corporate market value according to a sort of locally perceived rarity/abundance effect. More simply, because of the local home bias, more(less) aggregated firms *ceteris paribus* exhibit a location discount(premium) since local investors have to bear to much(little) risk with respect to the level they want (HKS). This paper aims to provide at first an alternative, and, in our perspective, a more efficient asset pricing model capable to assess the value of the firm geographical position (henceforth also location premium), and, with that, the effect of the investors' preference for closer stock on firm market value. Notably, we quantify the attributes of the firm headquarters location through two new variables that we call I_FIRM and I_INCOME. For any firm-year observation, I_FIRM and I_INCOME are defined by the Johnson and Zimmer's (1985) dispersion index (henceforth also I) calculated respectively for the subjective spatial distribution of listed firms and for the subjective spatial distribution of per capita disposable income of Italian citizens. The higher is the value of I_FIRM or I_INCOME, the more aggregated is the spatial distribution of listed firms or per capita disposable income around the headquarters of the firm-year observation from time to time considered. That's why we talk about "subjective" or "relative" spatial distribution. In this framework, I_FIRM is therefore expected to capture the inverse effect on stock market price caused by the closeness of other listed firms, *i.e.* the local home bias effect or, in the HKS's framework, the role played by the local supply of stocks. Contrariwise, I_INCOME is expected to isolate the direct income effect on corporate market value, *i.e.* the dynamics of the demand-side. The joined effect of I_FIRM and I_INCOME on firm market value defines the premium attributable to the firm geographical location.

Furthermore, we step forward from the existing literature by analyzing the effect on stock market price induced by a variation of the spatial distribution of listed firms, that is, of the local home bias effect. In fact, there are three sources of such a variation: (i) the listing of new firms (IPOs), (ii) the delisting of listed firms, and, even if the phenomenon appears much more restrained, (iii) the moving of headquarters made by an existing listed firms.[2] All else being equal, while an IPO makes the neighboring firms locally less rare, the delisting of an existing firm works the opposite by making the remaining firms locally more isolated. From this local standpoint of view, the moving of head office can be assimilated to an IPO for the hosting area and, at the same time, to a delisting for the sending area, and, thus, will be correspondingly assimilated. Beyond these facts, the subjective spatial distribution of listed firms, or better said the firm spatial status with respect to others listed firms, remains unchanged from one year to another as does the location premium due

[2] HKS analyzes the sample made up by i) all non-financial firms, ii) listed at the NYSE, Amex or Nasdaq over the period 1970 – 2005, iii) headquartered in the lower 48 states of U.S.A. or in the District of Columbia, and iv) with available financial data on CRSP and Compustat. Whithin this sample, HKS find just 23 switchers, i.e. firms that move their headquarters from one Census region to another.

to local home bias does as well. Conversely, IPOs and delistings make respectively more and less aggregated the subjective spatial distribution of listed firms. Therefore, we expect to observe that, *ceteris paribus*, firms from year to year more(less) spatially clustered experience a decrease(increase) of the local home bias effect and thus of the location premium. Finally, we believe that the initial level of aggregation matters in determining such dynamics. In this regard, let's consider a geographical area characterized by N listed firms and I local investors: the per capita risk borne by local investors can be roughly computed by N/I, and the location premium due to the spatial distribution of listed firms is a direct proportion of such a risk. Consider now the effect of an IPO, at first with reference to an area highly densely populated by other listed firms (e.g. N = 100), and, later, to a singularly-populated one (e.g. N = 1). *Ceteris paribus*, as a result of the IPO, the differential of the increase of the per capita risk borne by investors from the less populated by listed firms area with respect to the investors resident in the more populated one is about the 99 percent. The same argument holds for delistings. Therefore, other things being equal, we expect to observe that the decrease(increase) in the local home bias effect and of the location premium due to an increase(decrease) of the number of neighboring listed firms becomes progressively smaller(higher) for highly clustered(isolated) firms.

We test these hypotheses using the sample made by all non-financial firms (henceforth just firm) issuing ordinary shares traded at Milan Stock Exchange (henceforth MSE) over the period 1999–2007 and headquartered within Italian borders. The correspondent panel dataset consists of 1,668 firm-year observations. For the proposed analysis, Italy is an ideal research context for multiple and concomitant reasons. First of all, the spatial distribution of Italian listed firms, which are highly geographically clustered among some relatively small and independent districts such as Milan, Rome, Bologna, and Turin, is optimal in order to analyze the local home bias effects. Secondly, the spatial distributions of the disposable income and of the Italian population are much more uniform than the one of Italian listed firms (Baschieri, Carosi, Mengoli, 2011). This means that it is likely that strong imbalances between local demand and local supply for stocks will be observed, which is the necessary pre-condition for a profitable application of the framework proposed by HKS. The HKS's framework is, in fact, the starting point of our analysis since it is the arrival point in terms of asset pricing implications of local home bias so far produced by the literature. At the same time, the mismatching between the spatial distributions of listed firms and per capita disposable income minimizes *ex-ante* the alleged correlation between the I_FIRM and I_INCOME variables, and with that, the multicollinearity problems that would ensue when they are used together as regressors. Third, the MSE is widely recognized as highly informationally opaque (Zingales (1994); Mengoli, Pazzaglia, & Sapienza (2011)), and characterized by an extremely low insider trading law's enforcement (Bhattacharya & Daouk, 2002). These institutional factors make respectively very likely the existence and the subsequent illegal exploitation of valuable informational advantages. As long as the local home bias has informational roots (see as first Coval & Moskowitz (2001), and Ivković & Weisbenner (2005)), the asset pricing implications related to firm location should emerge stronger in the MSE than elsewhere. Finally, the political history of Italy, which for eight centuries before unification (in 1860) hosted numerous kingdoms, often mutually hostile, makes extremely likely the persistence of a cultural spatial segmentation which should exacerbate dynamics related to locality as firstly evidenced in Grinblatt & Keloharju (2001).

Operationally, at first we test the statistical significance of the relation between the firm's market-to-book ratio and the firm location's attributes. We start by proxying the firm location's attributes through the variable RATIO (HKS). This allows us to verify through a consolidated approach the presence of the local home bias with reference to the selected testing environment. As in HKS, we expect to observe a negative relation between the RATIO and the firm's market-to-book ratio. However, because of the Italian context's peculiarities, we believe that such a relationship could be stronger than documented with respect to the American equity-market. Then, we substitute the RATIO with I_FIRM and I_INCOME variables. While I_FIRM is expected to be negatively correlated with the firm's market-to-book ratio, I_INCOME is expected to interact the opposite. Consistently with the pertinent literature which has evidenced that the local home bias mainly concerns less visible (HKS) and more informationally opaque firms (Ivković & Weisbenner, 2005), within this analysis we distinguish firms included in the primary Italian equity-market index (FTSE MIB Index) from the ones excluded. As long as we observe a smaller location premium due to I_FIRM for firms in the FTSE MIB Index, we believe to weed out any doubt about the presence of the local home bias with reference to the selected sample.

Secondly, in order to investigate the effect on corporate value induced by a variation of the local home bias effect, we start with a cluster analysis of the I_FIRM variable. Since, in effect, firms in the FTSE MIB Index are not affected by local home bias, we limit this analysis to the subsample of firms in it not included. The cluster analysis allows us to create four clusters of firms in function of the degree of aggregation of the subjective spatial distribution of other listed firms. The higher the belonging cluster's number (henceforth cluster value), the higher the value of I_FIRM variable, the more aggregated is the subjective spatial distribution, and, *ceteris paribus*, the smaller is expected to be the local home bias effect and ultimately the location premium. Finally, we test together the statistical significance of the relations of the firm's market-to-book ratio with the lagged cluster value, the first difference of the cluster value, and the cross product of the former with the latter. The first two terms say that the current location premium due to other listed firms' proximity is inversely(positively) related with the previous year's cluster value and its yearly possible positive(negative) variation. The third term says that the initial level of clustering matters. Notably, in this framework, the effect on location premium due to a variation in the firm's cluster value becomes progressively smaller the higher the initial level of cluster value, but it can be overturned for sufficient high initials level of cluster value. It is therefore of critical importance to include this third term in any empirical specification. Moreover, we distinguish between the effect exerted on neighboring firms by IPOs, we named aggregation effect, and the one exerted by delistings, we called isolation effect. To this end, within this analysis we distinguish firm-year observations experienced a positive, negative, and null variation of the cluster value. If indeed I_FIRM is able to proxy the investors preference for closer stocks and this latter significantly affects the firm's market value, for firm-year observations experienced a positive variation of the cluster value (*i.e.* firms become less isolated) the predicted sign of the coefficient of the first term will be negative as of the predicted sign of the coefficient of the second term. In addition the predicted sign of the coefficient of the third term will be positive. Conversely, for firm-year observations experienced a negative variation of the cluster value (*i.e.* more isolated firms) the predicted sign of the coefficients will be negative, positive, and negative respectively. Finally, for firm-year observations experienced no variation of the cluster value (*i.e.* equally isolated firms) the predicted sign of the first coefficients will be negative, while the second and third terms will be equal to zero whithin the model.

According to HKS, we find that listed firms benefit from a location premium, which is a direct proportion of the RATIO variable. Besides, the location premium disappears for firms included in the FTSE MIB Index. When just firms not in the FTSE MIB Index are investigated, the location premium appears substantially stronger than documented for the American equity-market. Once proxied the firm location's attributes through I_FIRM and I_INCOME, the pattern across firms in and out the FTSE MIB Index remains unchanged. While firms not in the FTSE MIB Index exhibit a significant location premium, the market-to-book ratio of firms included in the FTSE MIB Index is independent from both I_FIRM and I_INCOME variables. Notably, firms not in the FTSE MIB Index are found to benefit from a location premium which decreases more aggregated is the subjective spatial distribution of listed firms (I_FIRM), while increasing more aggregated is the subjective spatial distribution of per capita disposable income (I_INCOME). That is, the location premium drops with the closeness between the issuing firm with all other listed firms and raises with the closeness between the issuing firm and the investors' income. Furthermore, the effect of I_INCOME is about 3 (2.92) times stronger than I_FIRM. Indeed, *ceteris paribus*, on average I_FIRM accounts for more than the 36 (36.89) percent of the market-to-book ratio, while the same estimate with reference to I_INCOME is equal to more than one (1.097). The overall mean location premium is quantifiable as about the 90 (90.85) percent of the market-to-book ratio.

When variations of the spatial distribution of listed firms are specifically investigated, striking results come out. As expected, we find that *ceteris paribus* the location premium of firms that increase their cluster value, *i.e.* those firms became less isolated, is inversely and significantly related with the previous year's cluster value, inversely and significantly related with the cluster value's first difference, and directly and significantly related with the cross product of the former with the latter. Similarly, when firms that decrease the cluster value, *i.e.* those firms became more isolated, are investigated the pattern is again as predicted. Indeed, the same coefficients are all statistically significant and negative, positive and negative respectively. Finally, for firms that don't change the cluster value, the coefficient on the previous year's cluster value is negative as predicted, and statistically significant at 5 percent level. Besides, as long as the firm's original spatial status is the first(fourth) cluster, the corresponding location premium variation is negative(positive). Otherwise, the location premium reacts the opposite. Summing up, we estimate that the location premium of firms belonging to first cluster decreases more than proportionally with the prospective cluster's value, of about the 11 (6.20) percent up to more than the 31 (31.06). percent, as direct consequence of the number of neighboring firms which become public. Similarly, the location premium of firms of the fourth cluster increases more than proportionally as decrease the prospective cluster's value, of about the 9 (8.98) percent up to almost the 30 (29.43) percent, because of the neighboring firms which become private. Conversely, because of IPOs, the location premium of firms belonging to second cluster increases more than proportionally with the prospective cluster's value, at about 4 (3.91) times up to more than 23 (23.14) times, while decreases of about the 56 (56.40) percent due to delistings. Similarly, the location premium of firms belonging to third cluster increases up to 26 (26.33) times, while decreasing, of about the 31 (31.06) percent up to the 52 (52.48) percent, as respectively more or less populated by other listed firms becomes the area. Finally, as can be easily noticed, the aggregation effect is significantly stronger than the isolation effect.

Overall these evidences strongly support the Italian investors preference towards local stocks (HKS). Besides, since firms not in the FTSE MIB Index are those for which information asymmetries between local and non-local investors may be largest, our results are consistent with the exploiting of local knowledge by Italian investors (Ivković & Weisbenner, 2005). Evidences obtained when I_FIRM and I_INCOME variables are introduced are strongly consistent with these arguments and strongly support the relevance of the firm geographical position and, with that, the local home bias effect on corporate market value. Notably, on average, the location premium is equal at about the 90 percent of the market-to-book value, drops with the closeness between the issuing firm with all other listed firms and raises, at least three times stronger, with the closeness between the issuing firm and the investors' income. Finally, considering the singularities of the research context, the relative higher magnitude of the RATIO's effect we document with respect the American equity-market suggests the (co)presence of a behavioral origin of the phenomenon interacting with the informational one (Kumar (2006); Baschieri, Carosi, Mengoli, 2011). Consistently with this argument, Kumar (2009) concludes that: *"uncertainty at both stock and market levels amplifies individual investors' behavioral biases and […] relatively better informed investors attempt to exploit those biases"*.

However, some evidences remain unexplained. A tentative explanation is advanced and, arguably, they will be the subjects of future research. At first, the overturned pattern of the location premium's change rate for firms belonging to central clusters. Results suggest that there is an enhancing performance factor due to firms' aggregation which up to certain levels of clustering counterbalances the local home bias effect. On that, the management literature and researchers in industrial organization, organizational ecology, and economic geography have documented the positive role exerted from geographical clustering because of the gaining access to complementary resources (knowledge, information, money as well as physical resources), risk sharing and synergies of resource sharing (see Rosenthal and Strange, 2004, for a review of this literature). However, the financial literature lacks to provide evidences in this sense. Secondly, the greater strength of the aggregation effect with respect the isolationist one. In other words, why a local IPO affects market prices more than a local delisting? In this regards, *a priori* speaking, a reliable explanation seems to be related to the structural fact that while an IPO implies by definition a repositioning of investors portfolio, a delisting does not. For simplicity, think to delistings due to bankruptcy. However, behavioral explanations also might be in play. For instance, while stocks in IPOs are likely to be attention-grabbing stocks, stocks going private are not, or, at least, just with a lesser extent (Barber & Odean, 2008). In this framework, if stocks are able to inherit part of the attention captured by neighboring IPOs and delistings, *ceteris paribus*, a relative larger price reaction to the former with respect to the latter will be expected. Moreover, such asymmetrical reaction should be more pronounced as more as IPOs are perceived by investors as good news whilst delistings as bad news (see Skinner, 1994, and Diamond and Verrechia, 1997, among the first), as indeed it seems possible to hypothesize.

Our paper adds in several ways and along several dimensions. From a methodological perspective, the asset-pricing literature is greatly improved by the introduction of the Johnson and Zimmer's (1985) dispersion index. Indeed, since we focused on local home bias and for homogeneity with HKS, we quantify through I just two attributes of firm location, *i.e.* the relative distribution of other listed firms and the relative distribution of per capita disposable income. Nevertheless, I can be easily computed in order to proxy for several and uninvestigated firm's attributes linked to firm location such as the subjective spatial distribution of suppliers, customers, and competitors. Or even the relative spatial distribution of research centers for R&D-intensive firms. An example of this is represented by the brilliant contributes by Gao, Ng, & Wang (2008) and Landier, Nair, & Wulf (2009) on the effects of firm geographic dispersion. Notably, Gao, Ng, & Wang (2008) measure the firm degree of geographic dispersion with the number of regions in which the firm has subsidiaries and define a firm as geographically dispersed if it has main subsidiaries outside the region of the firm's headquarters. Similarly, Landier, Nair, & Wulf (2009) proxy the firm degree of geographic dispersion with the proportion of divisions in the same state as headquarters and identify dispersed firms as those below the sample median value. It's not that hard to believe that in both above cited cases, the firm degree of geographic dispersion would be better proxied by the Johnson and Zimmer's dispersion index applied to the spatial distribution of firm's subsidiaries or divisions respectively, eventually weighted with the relative importance of the considered subsidiary, or division. As proof of that, the fact that Landier, Nair, & Wulf (2009) address themselves the issue of the correct specification of the firm degree of geographic dispersion (cf. paragraph 1.3). To sum up, the applications of the Johnson and Zimmer index are almost infinite, and the subsequent implications are likely to be determinant for all classes of stakeholders. Going more specifically, while I_FIRM is arguably the best indicator to detect firms more exposed to local home bias as briefly discussed later, I_INCOME variable, eventually once normalized, can be placed among the existent income inequality metrics.

Our paper contributes to the asset-pricing literature also for the empirical findings. In light of our results, the location premium is a significant and substantial factor that it has to be taken into account in valuation practices and cross-sectional investigations. In this regard we recall that at mean values, firms headquartered in the south of Italy benefit from a location premium of about the 77 (77.40) percent, more than the 6 (6.06) percent higher than the one estimated for the north-west of the country which is the richest area of the country. From a practical point of view, these results provide systematic evidence of an untapped relevant potential for those non-financial firms headquartered in those geographical areas "financially depressed" but characterized by high level of private savings. These firms could exploit the contextual effect to be rare goods together with the preference and willingness of a large audience of local investors: both factors could profitably converge in order to obtain new equity at a lower cost. In other words, in case of IPO or SEOs, these firms could exploit an exogenous feature that originates from their territoriality and which could significantly lower firms' cost of capital. Moreover, the local context could for instance represent a sort of poison pill against hostile takeovers because of the overestimation of these securities due to their territorial feature. To future research the task to make light on these issues.

As far the academic implications, our paper contributes also to the local home bias literature. Notably, our results complement and extend those of HKS, suggesting that local home bias is a broad phenomenon that affects corporate market value. The two studies provide evidences supportive of local home bias effect using different proxies, thereby adding to the robustness of the overall finding. Nevertheless, I_FIRM appears more appropriate in detecting firms more exposed to local home bias. Indeed the RATIO variable by HKS is the ratio of two meaningless variables when stand-alone considered, it's partly exogenously defined by the assumption of what's local and what's not, and it's "local" specific. Conversely, I_FIRM is fully endogenously defined at firm-level by just the relative distribution of other listed firms. Nevertheless, our results are consistent with previous contributes on information-driven explanation of local home bias (see among the first Coval & Moskowitz (2001), and Ivković & Weisbenner (2005)), on the coexistence of a behavioral source of the phenomenon (see among the first Grinblatt & Keloharju (2001)) interacting with the latter in order to determine the overall effect on market price (see evidences in Kumar (2006), Kumar (2009), and Baschieri, Carosi, Mengoli (2011) to more about that).

Our paper contribute also to the literature on IPOs. The pattern we observe for location premium's variations caused by listing firms complements and extends results of Braun & Larrain (2009) and Hsu, Reed, & Rocholl (2010). Conducting an event-study over 254 IPOs in 22 emerging markets, Braun & Larrain (2009) show that IPOs, especially in less internationally integrated market, generate a price decline in covariant portfolios during the month before the issue according to a shock by the supply-side. Whereas, Hsu, Reed, & Rocholl (2010) find that successful IPOs indicate a related competitive advantages thus generating in competitors negative stock price reactions, while theirs withdrawal the opposite, and significant deterioration in operating performance. However, even without considering the results' robustness to operating performance's variations, the magnitude of aggregation effect we document seems too big to be fully accounted by the competitive effect documented by Hsu, Reed, & Rocholl (2010). Similarly, our paper contribute also to literature on delistings (see Jensen (1993), and Renneboog & Simons (2005), for reviews of Public-to-Private Transactions literature[3]). The delistings' effect on neighboring firms' corporate value we document is new in literature. Nevertheless, contrary reasoning, it is still consistent with

[3] The most updated evidences on Public-to-Private Transactions are essentially attributable to the contributes of Renneboog, Simons, & Wright, (2007), Geranio & Zanotti (2012), and Achleitner, Betzer, Goergen, & Hinterramskogler (2012).

Hsu, Reed, & Rocholl (2010)'s results and hold the same considerations above provided with reference to IPOs.

The rest of the paper is organized as follows. Section two briefly reviews the literature on local home bias, illustrates the framework of the analysis and define the research questions to be addressed. Section three provides the details of sample definition, variables here employed and the methodology thereafter followed. Section fourth describes the spatial distribution of the local demand and supply of stock in the Italian equity-market. Sections fifth and sixth report evidences on the value and the dynamic of the firm location premium. Section seven concludes.

2. Literature review and framework of the analysis

Ex-post reasoning, it can be said that the financial literature has begun to deal with the firm geographical location analyzing the so-called home bias phenomenon. With home bias academics indentify the well-documented investors' preference towards national assets (French & Poterba (1991), Tesar & Werner (1995)) despite the apparent advantages of portfolio international diversification (Grubel (1968), Levy & Sarnat (1970), Solnik (1974)).[4] In other words, investment portfolios tend to overweight domestic securities with respect to foreign ones. Before invoking explanations based on investors' irrational behavior (Graham, Harvey, & Huang, 2009), academics provided several "classical" interpretations to explain this bias.[5] Among these, the most convincing and consistent seems the existence of informational asymmetries between domestic and foreign investors that favor the former over the latter (among the others Gehrig (1993), and Brennan & Cao (1997)).[6]

The firm geographical location explicitly became part of the financial literature when the same phenomenon, promptly named local home bias, appeared substantial not only in a cross-country setting, but also within the border of a single country. In this perspective, stocks headquartered in geographically nearby locations are preferred to those headquartered in the more distant ones (Coval & Moskowitz (1999), and Ivković & Weisbenner (2005)). Moreover, the

[4] See also Grauer & Hakasson (1987), and De Santis & Gerard (1997). Besides, for updated evidences see Lau, Ng, & Zhang, 2010.

[5] Barriers to capital flows (Black (1974), Stulz (1981a), and Errunza & Losq (1985)), hedging motives (Solnik (1974), Adler & Dumas (1983), Stulz (1981b), Cooper & Kaplanis (1994), and Baxter & Jermann (1997)), deviations from purchasing power parity (Uppal (1993)), political risk (Feldstein & Horioka (1980)), and accounting environments (Young & Guenther (2003), Bradshaw, Bushee, & Miller (2004), and Covrig, Defond, & Hung (2007)) has been investigated as factors capable to generate the home bias. Lewis (1999) and Karolyi & Stulz (2003) provide extensive reviews of the home-bias literature.

[6] See also Shukla & Van Inwegen (1995), Ahearne, Griever, & Warnock (2004), Choe, Kho, & Stulz (2005), and Dvorak (2005). For further related evidences see also Kang & Stulz (1997); Jeske, (2001).

physical distance between the issuing firm headquarters and the investors' residence is found to significantly and inversely affect the investment's performance (Coval & Moskowitz (2001),and Ivković & Weisbenner (2005)) consistently with an information-driven explanation of the local home bias. However, in spite of the considerable number of recent articles supporting this argument (among the others Feng & Seasholes, (2004), Massa & Simonov (2006), Bodnaruk (2009), Teo (2009)), a growing strand of literature provides evidences that the investors preference for local is determined, at least partly, by irrational behavioral factors (Huberman (2001), Zhu (2003), Karlsson & Norden (2007), Baschieri, Carosi, & Mengoli (2011)) that can be assimilated to the generic concept of the investor familiarity with the issuing firm (Grinblatt & Keloharju, 2001). In this perspective, the preference for local is not, at least totally, attributable to an informational advantage owned by local investors, and local portfolios do not automatically generate outperformance (Zhu (2003), Seasholes & Zhu (2010), Doskeland & Hvide (2010)).

Nowadays the geographic component of price formation in equity-markets and the existence of local home bias is incontrovertible. However, even if basic theoretical considerations essentially founded in the above cited literature suggest that it should significantly affect the corporate market value, little evidences have been provided regarding its equilibrium asset-pricing implications. The significance of the geographic component on the equity prices' formation has been pointed out as first in Pirinsky & Wang (2006). Notably, Pirinsky & Wang (2006) find that U.S. firms headquartered near to each other experience positive comovement in their monthly stock returns. Furthermore, since the local comovement of stock returns is stronger for firms with more individual investors and in regions with less financially sophisticated residents, Pirinsky & Wang (2006) conclude that the geographic component is at least partly attributable to the trading patterns of local residents. Similar evidences provided in Barker & Loughran (2007) and Anderson & Beracha (2008) give robustness to these arguments. The most recent financial literature provides evidences supporting multiple and different aspects of the geographic component of corporate market price.[7] For instance, the geographic dispersion of firm's subsidiaries with respect to the corporate headquarters location is found to be negatively related with the firm market value (Gao, Ng, & Wang (2008)). The proximity of divisions to headquarters significantly influences the internal flow of information and the managerial alignment with shareholders (Landier, Vinay, & Wulf (2009)). The corporate headquarters location affects also the firm capital structure (Gao, Ng, & Wang (2011)). However, just HKS theorize and give empirical proofs with reference to the American equity-market of the local home bias effect on stock market prices. More specifically, according to

[7] Pirinsky & Wang (2010) provides an extensive review of corporate finance's findings related to geographic location.

HKS, the local home bias generates a market segmentation based on proximity which significantly affects stock market price according a sort of local rarity/abundance effect. Notably, once exogenously defined the concept of "local" as belonging to the same Census region, HKS estimate the local equity-market conditions faced by the issuing firm by the RATIO variable. The RATIO is defined by the ratio between the local supply of stocks, proxied by the aggregate equity book value of all listed local firms, and the local demand for stocks, proxied by the aggregate disposable income of the local households. HKS find that *ceteris paribus* non-financial firms headquartered in areas characterized by high(low) value of the RATIO, *i.e.* by a local excess of supply(demand) for stocks, show significantly lower(higher) market-to-book ratio, confirming, in fact, the tendency to invest in local stocks as well as its asset-pricing implications. Moreover, consistently with previous evidences supporting the existence of valuable local informational advantages (Ivkovic & Weisbenner (2005)), HKS find that the relation among the market-to-book ratio and the RATIO is no longer significantly different from zero when just firms with sales belonging the cross-sectional top-quartile are investigated.

This paper is part of the debate on the local home bias addressing its asset-pricing implications. Notably, at first we introduce two new variables, I_FIRM and I_INCOME, alternative and, at least in our perspective, more efficient to the RATIO. We used these measures in order to quantify the attributes of the firm headquarters location thus proxying the equity-market conditions faced by the issuing firm. Secondly, trough these variables, we assess the value of the firm geographical positioning (location premium), and, with that, the effect of the investors' preference for closer stock on firm market value. Finally, we investigate the effect on stock market price induced by a variation of the local equity-market conditions faced by the issuing by the supply side. In other words we investigate the effect on corporate value because of (i) the listing of new firms (IPOs), (ii) the delisting of existing listed firms, and, (iii) the moving of headquarters by an existing listed firms.

I_FIRM and I_INCOME variables are defined for any firm-year observation by the Johnson & Zimmer's dispersion index calculated with reference to the subjective spatial distribution of listed firms and the subjective spatial distribution of per capita disposable income of Italian citizens respectively (see paragraph on methodology to a detailed definition). The higher is the value of I_FIRM or I_INCOME, the more aggregated is the spatial distribution of listed firms or per capita disposable income around the headquarters of the firm-year observation from time to time considered. And that is why we talk about "subjective" or "relative" spatial distribution. I_FIRM and I_INCOME variables has indeed numerous advantages with respect to the RATIO. First of all they avoid the exogenous and arbitrary assumption about the concept of locality implied by construction in the RATIO. That is that local firms are those headquartered in the same Census region (HKS) or in the same Italian region (our case and Baschieri, Carosi, & Mengoli (2011)). For instance consider the case of Bolzoni S.p.A. headquartered in the city of Piacenza (Emilia-Romagna). Consistently with the HKS's approach the yearly local market conditions faced by Bolzoni S.p.A have been proxied by the values of RATIO for the region of Emilia-Romagna (Equal to 0.144 on average basis over the period 1999-2007. See Table 2). However, the average yearly distance between the Bolzoni S.p.A. and the listed firms located in the contiguous region of Lombardy (RATIO equal to 0.559 on average basis over the period 1999-2007) is equal to 70.1 kilometers. Conversely, the same measure with reference to others listed firms located in Emilia-Romagna is almost double and equal to 120.7. Shortly, the equity-market conditions faced by Bolzoni S.p.A. are likely to be better estimated by the RATIO of Lombardy than by the one of Emilia-Romagna. In general, the RATIO is likely to provide significantly biased measures of the local equity-market conditions since by construction it considers just a part of the overall information available in the spatial distribution of listed firms. Contrary, I_FIRM and I_INCOME variables consider all the information available since built from the entire spatial distribution of listed firms and per capita investors' disposable income respectively. Another structural element in favor of I_FIRM and I_INCOME is that they are firm-specific variables instead of local-specific. This feature allows us investigate more completely phenomena tied to firm localization, for instance distinguishing firm headquartered in the same area. Besides, as evidenced in HKS, the RATIO is influenced by several exogenous factors such as M&A activities whilst the variables we propose are not.

Operationally, we address these issues using the sample made by all non-financial firms issuing ordinary shares traded at MSE and headquartered within Italian borders over the period 1999–2007. Once introduced I_FIRM and I_INCOME variables, at first we test the statistical significance of the relation between the firm's market-to-book ratio and the firm location's attributes. In order to verify the presence of the local home bias in the Italian equity-market through a consolidated approach, we start our analysis applying the framework proposed by HKS that is proxying the firm location's attributes through the variable RATIO. Where the local home bias should be systematic, the coefficient on the RATIO is expected to be found negative and significant. Furthermore, since the historical cultural segmentation that characterizes Italy is likely to exacerbate the investors' preference for local, as firstly evidenced in Grinblatt & Keloharju (2001), we expect to observe *ceteris paribus* a higher value of the coefficient on the RATIO than previously documented with reference to the American equity-market by HKS. Later, we substitute the RATIO with I_FIRM and I_INCOME variables. The higher is the value of I_FIRM or

I_INCOME, the more aggregated is respectively the spatial distribution of listed firms or per capita disposable income around the headquarters of the firm-year observation from time to time considered. Thus, I_FIRM is expected to capturing the inverse effect on corporate market value caused by the closeness of other listed firms, *i.e.* the local home bias effect or in the HKS's framework the role played by the local supply of stocks. Contrariwise, I_INCOME is expected to isolating the direct income effect on corporate market value, *i.e.* dynamics by the demand-side. Summing up, while I_FIRM is expected to be significantly and negatively correlated with the firm's market-to-book ratio, I_INCOME is expected to interact the opposite. The joined effect of I_FIRM and I_INCOME on firm market value define the premium due to the firm geographical location.

Consistently with the pertinent literature evidencing that local home bias mainly concerns less visible (HKS) and more informationally opaque firms (Ivkovic & Weisbenner, 2005), within this analysis we distinguish firms included in the primary Italian equity-market index (FTSE MIB) from the ones excluded (see Denis, McConnell, Ovtchinnikov, & Yu (2003) for an updated review of evidences related to index inclusion). Since FTSE MIB is composed by the most liquid and capitalized shares traded at MSE, as long as we observe a smaller location premium due to I_FIRM for firms in the FTSE MIB we believe to weeding out any doubt about the presence of the local home bias with reference to the selected sample. At the same time, this analysis allow us to verify if the local home bias in fact origins from a valuable information advantage owned by local investors. Indeed, if the local home bias is in fact information-driven, other being equals, while for firms not in the FTSE MIB, for which information asymmetries between local and non-local investors may be largest, we should observe a significant and stronger effect of the RATIO on the market-to-book ratio, for firms in the FTSE MIB, for which information asymmetries are likely to be smallest, the same effect should be zero (Ivković & Weisbenner, 2005). Conversely if an information advantage owned by local investors didn't drive the tendency to invest in local stocks, we would observe the same effect of the RATIO on the market-to-book ratio for both types of firms.

Secondly, in order to investigate the effect on stock market price induced by (i) the listing of new firms (IPOs), (ii) the delisting of existing listed firms, and, (iii) the moving of headquarters by an existing listed firms, we study the effect on corporate market value induced by a variation in the issuing firm's spatial status. That is, since listed firms because of IPOs, delistings, and headquarters changes become more or less isolated, we investigate the expected variation of location premium due to I_FIRM's variations. Since, in effect firms in the FTSE MIB are not significantly affected by local home bias, we limit this analysis to the subsample of firms not in the FTSE MIB. We start with a cluster analysis of I_FIRM variable. The cluster analysis of I_FIRM allows us to create four homogeneous clusters in terms of subjective spatial distribution. The higher the belonging cluster's number (henceforth cluster value), the higher the value of I_FIRM variable, the more aggregated is the subjective spatial distribution, and *ceteris paribus* smaller is expected to be location premium. The cluster analysis was implemented in order to solve a couple of possible issues. First of all, variations of the I_FIRM variable, even if strictly correct from a mathematical point of view in quantifying variations in the subjective spatial distribution, do not capture effective changes of the spatial status of the issuing firm. The following example should help explain. Consider the case of Biancamano S.p.A., a firm operating in the industry of waste and disposal services headquartered in Milan (Lombardy) that was listed at MSE the 7th March 2007. Because of the Biancamano's IPO, all others listed firms are generally less isolated than before and indeed each sampled firm exhibits a decrease of its value of I_FIRM (on average equal to 153 b.p). However, not all listed firms existing before Biancamano's IPO are correctly identifiable as less isolated. For instance, listed firms headquartered in Sardinia (cf. Saras S.p.A. and Tiscali S.p.A., operating in the industry of oil and gas and technology respectively), though showing an average variation of I_FIRM equal to minus 364 b.p. because of Biancamano's IPO, are not less isolated than before that Biancamano S.p.A. went public. And, consistently, the location premium of those firms should not show significant changes because of Biancamano's IPO. More simply, a variation of I_FIRM does not necessarily implies a change of the spatial status of the issuing firm, of the location premium, and, hence, of the corporate market value. Rather, we expect that a variation of I_FIRM will affect the location premium just of the neighboring firms, that is those that belong to the same geographical cluster. Besides, that's why we do not find a statistically significant relation between the market-to-book ratio and the I_FIRM variable when we adopt either a fixed-effects or a first-difference estimation approach. Secondly, through the cluster analysis of I_FIRM we were able to provide robustness to our previous findings addressing the issue of the sampling distribution of I_FIRM (to know more about that see Johnson & Zimmer (1985)) that, *a priori*, might have affected our results. Indeed, as long as we document that, *ceteris paribus*, the relation between the market-to-book ratio and the belonging cluster value variable does not differ from the one between the market-to-book ratio and I_FIRM variable, we can reasonably be sure that our results do not rely of some estimation bias. Finally, for backward induction, this latter evidence ensures also the robustness of the cluster analysis itself as correct approach in order to detect firms that in fact change their spatial status because of a variation of the subjective spatial distribution.

Once performed the cluster analysis of I_FIRM, in the multivariate analysis context we test together the statistical significance of the relations of the firm's market-to-book ratio with the lagged cluster value, the first difference of the cluster value, and the cross product of the former with the latter. The first two terms say that the current location premium due to other listed firms' proximity is inversely(positively) related with the previous year's cluster value and its yearly possible positive(negative) variation. The third term says that the initial level of clustering matters. In particular, the effect on location premium due to a variation in cluster value becomes progressively smaller the higher the initial level of cluster value, and can be overturned for sufficient high initials level of cluster value. It is therefore of critical importance to include this third term in any empirical specification. Moreover, in order to assess the possible different effect exerted on neighboring firms by IPOs and delistings, within this analysis we distinguish firm-year observations experienced a positive, negative, and null variation of the cluster value. If indeed I_FIRM is able to proxy the investors preference for closer stocks and this latter significantly affects the firm's market value, for firm-year observations experienced a positive variation of the cluster value (*i.e.* firms have become less isolated) the predicted sign of the coefficient of the first term will be negative as of the predicted sign of the coefficient of the second term. In addition the predicted sign of the coefficient of the third term will be positive. Conversely, for firm-year observations experienced a negative variation of the cluster value (*i.e.* more isolated firms) the predicted sign of the coefficients will be negative, positive, and negative respectively. Finally, for firm-year observations experienced no variation of the cluster value (*i.e.* equally isolated firms) the predicted sign of the first coefficients will be negative, while the second and third terms will be equal to zero whithin the model.

3. Data, variables definition, and methodology

3.1 Data sources

This analysis requires at first the matching of two different sources of information: on one hand, the spatial and wealth distribution of the Italian population, on the other hand, accounting, financial and headquarters' location for firms listed at the MSE. With reference to the former, we gathered data from the database provided by the National Institute of Statistics (ISTAT) and the yearly publication "*Rapporto Unioncamere*" (Years from 2004 to 2009). We limit our analysis to the time period from 1999 to 2007, since 1999 is the year of the introduction of the euro, which determined a structural break in the market valuation of Italian listed firms (Bris, Koskinen, & Nilsson, 2009), while 2007 is the most recent year in which data are available. Data at firm level come from several different sources: i) the databases provided by Consob (*i.e.* the Italian equivalent of US SEC) available on its website, www.consob.it; ii) Osiris (Bureau Van Dijk's database); iii) the archives provided by Borsa Italiana S.p.A., the MSE's managing company, available at www.borsaitaliana.it; iv) the electronic archive of "*Il Sole 24Ore*", which is the most prominent financial daily newspaper in Italy; v) the yearly investment guide "*Il Calepino dell'Azionista*" (Years from 1999 to 2007), which provides a brief history of each firm/security listed at MSE; vi) and Datastream and Worldscope (Thompson Financial). Specifically, from Consob's database we obtained the list of all firms issuing securities listed at MSE over the period 1999 – 2007. This represented our initial sample which consisted of 2,537 firm-year observations. From Osiris and Annual Reports (downloaded from www.borsaitaliana.it and companies website) we collected the location, *i.e.* Address, City, Province, and ZIP code, of the headquarters of each firm-year observation in our initial sample. Referring once more to the archives of Borsa Italiana S.p.A., we obtained the lists, updated at the last working day of each year over the period 1999 – 2007, of the securities listed at MSE but not actively traded, and of those included in the primary benchmark index for the Italian equity-market (*i.e.* S&P MIB Index and MIB30 Index).[8] Then from our initial sample, we extracted the observations i) which ordinary shares were actively traded at the end of each year in the period 1999 - 2007, ii) with ROE between plus and minus one, and iii) headquartered in Italy. The resulting unbalanced panel dataset, which is our final sample, consists of 2,463 firm-year observations issuing ordinary shares. From *Il Sole 24Ore*'s archive and "*Il Calepino dell'Azionista*" we obtained data on press coverage and firms' age respectively, while from Datastream and Worldscope we collected all others relevant accounting and financial information. We finally refer to the Nomenclature for the Statistics Territorial Units (NUTS) to split Italy in sub-areas. NUTS codes identify homogeneous territorial statistical units of the European Union on the basis of the surface and the resident population. More specifically, the territory of any country member (NUTS0) is divided by NUTS codes in three nested sub-levels. Geographical macro-areas, are identified as NUTS1, Italian regions as NUTS2 and Italian provinces as NUTS3.[9] Therefore, given the province in which each sampled observation is headquartered, we have been able to identify the correspondent region and geographical macro-area. Finally, through the internet application Google Maps we collected the geographical coordinates (*i.e.* latitude and longitude) of each sampled headquarters and of each capital city of province/region. Table A1 in Appendix A resumes the data sources used in our study.

[8] Currently the primary benchmark index for the Italian equity-market is the FTSE MIB Index which is composed by the 40 most liquid and capitalized Italian shares traded at MSE. The FTSE MIB Index substituted the June 1, 2009 the S&P MIB Index which in turn substituted the June 2, 2003 the MIB30 Index. The MIB30 Index consisted of only the 30 most liquid and capitalized Italian shares traded at MSE.

[9] Exception is represented by the two autonomous provinces of Trento and Bolzano-Bozen, forming the region Trentino Alto Adige. In fact, under the European Parliament Rule No 1059/2003, they were awarded with the legislative rank of region. Data reported for Trentino Alto Adige are obtained by aggregating the data concerning the two provinces mentioned above.

3.2 Methodology and variables definition

As dependent variable we employ the logarithmic transformation of the firm's market-to-book ratio (LN(MARKET-TO-BOOK RATIO)). We take logs because of the high skewness that characterizes the raw market-to-book ratio (MARKET-TO-BOOK RATIO). However, our results still hold using this latter variable (not reported).

As main exogenous, we used at first the variable RATIO (HKS). We compute the RATIO and perform our multivariate analysis at region level (NUTS2), that is "local" is equivalent to "regional". According to HKS, RATIO is equal to the ratio between the local supply and the local demand of stocks. As proxy of the local supply of stocks, we used the aggregated equity book value (EQUITY BOOK VALUE) of all firms headquartered in the same region, while as proxy for the local demand of stocks we considered the aggregate disposable income (DISPOSABLE INCOME) of the households living in the same area. Besides, in order to exclude an artificial relationship between the RATIO and the MARKET-TO-BOOK RATIO variables once controlled for equity's profitability (ROE), we drop Equity Income from DISPOSABLE INCOME. However, our results still hold using the unmodified version of the RATIO (not reported). Furthermore, when we run our regressions we omitted from the numerator of the RATIO the EQUITY BOOK VALUE of the correspondent firm-year observation. We choose the regional level basically for three functional evidences suggesting that the regional sub-division is likely to be the more effective in order to capture an eventual equity-market segmentation based on proximity. First of all, the average (median) surface of the Italian regions corresponds to the 4.97 (5.79) percent of the whole Italian territory, which is approximately the same critical area (cf. the 5.28 percent of the U.S. surface which is approximately the area of the circumference with radius equal to 250 miles) that (Ivković & Weisbenner, 2005) find significant in distinguishing locally biased (and, they claim better informed) investors from the non-local (and they claim worse informed) ones. Secondly, the regional sub-division of the Italian territory is the one that closely represents its historical and cultural pre-unification divisions. Therefore it's the more likely to capture an eventual persistent cultural equity-market segmentation which should exacerbate the local home bias phenomenon (Grinblatt & Keloharju, 2001). Finally, Guiso, Sapienza, & Zingales (2004) give proofs of the positive effects of the regional financial development on the economic success of the same geographical area within the Italian territory. Hence, *a priori*, the regional sub-division of the Italian territory allows to indirectly control for the eventual credit market segmentation. Therefore, the primary specification we test is the following:

$$LN(MARKET\text{-}TO\text{-}BOOK\ RATIO)_{i,t} = \beta_0 + \beta_1 * RATIO_{i,j,t} + \beta * Controls_{i,t} + \varepsilon_{i,t}$$

Afterwards, we substitute the RATIO with I_FIRM and I_INCOME variables. For any sampled firm-year observation, I_FIRM and I_INCOME are defined by the Johnson and Zimmer's dispersion index calculated for the subjective spatial distribution of listed firms and for the subjective spatial distribution of per capita DISPOSABLE INCOME of Italian citizens respectively. This index is based on point-to-individual distances. In general, given the *2*-dimensional Euclidean space E^2, let the generic point *i* and a sample of *r* random points in E^2, all individuated by the latitude and longitude geographical coordinates, the Johnson and Zimmer index of dispersion I for the point *i* is computed as:

$$I = \frac{(r+1) \sum_{r=1 \& r \neq i}^{r} \left(d_{i,r}^{4} \right)}{\left[\sum_{r=1 \& r \neq i}^{r} \left(d_{i,r}^{2} \right) \right]^{2}}$$

where $d_{i,r}$ is the shortest spherical distance (DISTANCE) between the point *i* and each of the *r*-points. In our framework, the *r*-points taken together represent the spatial distribution with respect to the point *i*, or, shortly, the *i*'s subjective spatial distribution. The expected value of I, E(I), have a value approached of 2 for a random distribution (E(I) ≈ 2), E(I) < 2 for regular distribution and E(I) > 2 for an aggregated distribution. For any sampled observation $x_{i,t}$ of firm *i* at year *t*, I_FIRM is equal to I computed with reference to the set of points made up by the geographical coordinates (*i.e.* latitude and longitude) of the headquarters of all other sampled listed firms in year *t*. Similarly, for any sampled observation $x_{i,t}$ of firm *i* in year *t*, I_INCOME is equal to I computed with reference to the set of points made up by the geographical coordinates (*i.e.* latitude and longitude) of each capital city of province, and with weights equal to the provincial per capita DISPOSABLE INCOME, once normalized by the aggregated provincial per capita DISPOSABLE INCOME. The weighted version of I has been choose in order to account for both the different wealth and population that characterize each Italian province. However, our results still hold using the equally weighted version of I_INCOME (not reported). Therefore, the second specification we test is:

$$LN(MARKET\text{-}TO\text{-}BOOK\ RATIO)_{i,t} =$$
$$= \gamma_0 + \gamma_1 * I\_FIRM_{i,t} + \gamma_3 * I\_INCOME_{i,t} + \gamma * Controls_{i,t} + \varepsilon_{i,t}$$

When we run our regressions, we exclude observations with one-digit Primary SIC equal to 6, which are in the financial services industry (cf. FINANCIAL_D = 1). However, these observations are kept for the purposes of computing the regional value of EQUITY BOOK VALUE and thus the RATIO, as well as the I_FIRM variable.

In order to assess the effect of the RATIO, or I_FIRM and I_INCOME on the MARKET-TO-BOOK RATIO for firms (not) included in the Italian equity-market's primary index, we introduce among explanatory variables further regressors: a control dummy, which takes on the value of one if the firm is included in the Italian equity-market's primary index and zero otherwise (FTSE_D), and the interaction term of FTSE_D and RATIO, or I_FIRM and I_INCOME respectively (RATIO*FTSE_D; I_FIRM*FTSE_D; I_INCOME*FTSE_D). In notation, the specifications we test are the following:

$$LN(MARKET\text{-}TO\text{-}BOOK\ RATIO)_{i,t} =$$
$$= \beta_0 + \beta_1 * RATIO_{i,j,t} + \beta_2 * RATIO_{i,j,t} * FTSE\_D +$$
$$+ \beta * Controls_{i,t} + \beta_{FTSE} * FTSE\_D_{i,t} + \varepsilon_{i,t}$$

and

$$LN(MARKET\text{-}TO\text{-}BOOK\ RATIO)_{i,t} =$$
$$= \gamma_0 + \gamma_1 * I\_FIRM_{i,t} + \gamma_2 * I\_FIRM_{i,t} * FTSE\_D +$$
$$+ \gamma_3 * I\_INCOME_{i,t} + \gamma_4 * I\_INCOME_{i,t} * FTSE\_D$$
$$+ \gamma * Controls_{i,t} + \gamma_{FTSE} * FTSE\_D_{i,t} + \varepsilon_{i,t}$$

In such a framework, the coefficient of the interacting variable (β_1, γ_1, *and* γ_3) estimates the overall marginal effect of this latter variable on the dependent variable for firm not in the FTSE MIB Index, the coefficient of the interaction term (β_2, γ_2, *and* γ_4) estimates the additional effect of the interacting variable attributable to firms in the FTSE MIB Index, while the overall marginal effect of the interacting variable on the dependent variable for firms in the FTSE MIB Index is given by the sum of the coefficients of the interacting variable and the interaction term (*i.e.* $\beta_1+\beta_2$, $\gamma_1+\gamma_2$, *and* $\gamma_3+\gamma_4$). Besides, since as widely documented by the pertinent literature firms when included in the primary index equity-market experience increases in their market values (see Shleifer (1986) among the first), the marginal effect on the MARKET-TO-BOOK RATIO of FTSE_D (β_{FTSE}, and γ_{FTSE}) is expected to be significant and positive.

In order to detect firms that effectively changed their spatial status, *i.e.* those firms became less or more isolated because of local listings or delistings respectively, a cluster analysis of sampled observations based on I_FIRM variable has been implemented. Consistently with I_FIRM variable's definition, we run cluster analysis on all sampled observations (that is including observations of financial firms). Instead of cluster analysis, one could more simply consider first differences of the I_FIRM variable. However, as discussed above, they are meaningless for these purposes. As an alternative to clustering, we could also apply cutoffs on I_FIRM variable, coherently group the observations, and then consider first differences of the "grouped" variable so created. However, doing so, we would introduced exogenous and arbitrary elements in the analysis

(How many cutoffs we should consider? And, at what values of I_FIRM variable?). Since in effect firms in the FTSE MIB Index are not significantly affected by local home bias (Cf. $\beta_1+\beta_2$, $\gamma_1+\gamma_2$, *and* $\gamma_3+\gamma_4$, model 3 and model 6, Table 3), we limit the analysis of spatial status variations to the subsample of non-financial firms not in the FTSE MIB Index.

Generally speaking, the cluster analysis is finalized to determine the natural groupings (or clusters) of observations on the basis of the similarity of the characteristics they possess (one or more variables), seeking to minimize the within-group variance and maximize the between-group variance. In order to perform a cluster analysis, it's necessary to choose: i) the type of clustering algorithm, hierarchical or partition, ii) the clustering linkage method, which is the criterion used to compare between-groups, and iii) the measure of (dis)similarity, which is the criterion used to compare between observations (for an exhaustive coverage of the topic see Kaufman & Rousseeuw (1990), and Everitt, Landau, Leese, & Stahl (2011)). From our research point of view, we cluster sampled observations on the basis of the value of I_FIRM variable using i) hierarchical clustering, ii) the average linkage method to compare between-groups, iii) and the absolute-value distance (Minkowski distance metric with argument 1) as (dis)similarity measure among observations. On ii) and iii), despite almost infinite available options in term of linkage methods (see about that Day & Edelsbrunner (1984), among the others), and (dis)similarity measures (see among the others Anderberg (1973), and Gordon (1999), for a discussion of the Minkowski metric and others (dis)similarity measures, respectively), we believe in robustness of our results, since we re-run our analysis using almost all other available options and our results remain anyhow unchanged.[10] On i), the hierarchical clustering has been preferred to the partition clustering in order to endogenously determine firms characterized by the same subjective spatial distribution. Indeed, partition clustering requires the specification of the number of clusters in addition to the above mentioned inputs of cluster analysis. More simply, in partition clustering the number of clusters is exogenously preset and the output is just one "clustered" variable assuming values equal to the number of the cluster to which each observation belongs. Instead, the hierarchical clustering ideally creates as many groups and as many clustered variables as the number of observations to be clustered. Afterward, it is necessary to determine the optimal number of clusters and so the clustered variable to be considered. In our case this means the optimal number of clusters of listed firm and so the

[10] For robustness purposes we re-run the cluster analysis considering as linkage method: i) Single linkage, ii) Complete linkage, iii) Weighted-average linkage, iv) Median linkage, v) Centroid linkage, vi) Ward's linkage. For robustness purposes we re-run the cluster analysis considering as (dis)similarity measure: i) Euclidean distance (Minkowski with argument 2), ii) Squared Euclidean distance, iii) Maximum-value distance (Minkowski with infinite argument), iv) Canberra distance, v) Correlation coefficient similarity measure, vi) Angular separation similarity measure.

optimal clustered variable in order to substitute I_FIRM. The determination of the optimal number of clusters is a considerably debated but yet unsolved issue. A comprehensive survey of methods for estimating the number of clusters is given in Milligan & Cooper (1985), whereas Gordon (1999) discusses the best performers. We address this issue empirically. We start imposing a stopping number *N* equal to ten in the hierarchical algorithm. This is meant just to reduce the computational burden of the analysis. Values of *N* equal to twenty, thirty, or forty respectively, do not change our results as well as the clustered variable in the end selected in order to substitute the I_FIRM variable (Data not reported). Moreover, in order to take into account of the panel structure of the data, and therefore the yearly changes of listed firms' spatial distribution, we perform the cluster analysis on a yearly basis. This means that from hierarchical clustering we obtain for each year in the period 1999-2007 a set of ten clustered variables, generically named CL_I_FIRM_*Year_N*, defined just in the respective year and assuming values in range 1: *N*, where *Year* = 1999, 2000, ... , 2007, and *N* = 1, 2, … ,10 defines the number of clusters in which firm-year observations has been split. Afterward, for each of the ninety variables obtained from clustering, we rank clusters in ascending order according to the cluster average value of the I_FIRM variable and we consistently re-code CL_I_FIRM_*Year_N* variables thus creating a new set of ninety variables (CL_I_FIRM_*Year_N**). This ensures that the higher the belonging cluster's number, the higher the cluster mean value of the I_FIRM variable, the more aggregated the subjective spatial distribution of the firm-year observations that are part of. At third, we create ten further clustered variables, CL_I_FIRM_*N*, with values in range 1: *N*, where *N* = 1, 2, … ,10 is the number of clusters considered, by matching over *Year* and for each value of *N* the ninety CL_I_FIRM_*Year_N** variables previously obtained. Summarizing, the generic clustered version of I_FIRM variable, CL_I_FIRM_*N*, is defined for all sampled firm-year observations, takes value in range 1:*N* where *N* = 1, 2, … ,10 defines the number of clusters in which firm-year observations has been grouped, and defines the number of the cluster to which each firm-year observation belongs. Besides, clusters are created on yearly basis and ranked in ascending order according the yearly cluster average value of I_FIRM variable. Finally, among CL_I_FIRM_*N* variables, we find that the optimal one in order to replace the I_FIRM variable is the four clustered based, *i.e.* CL_I_FIRM_4. Indeed, CL_I_FIRM_4 is the one with the highest correlation coefficients (Spearman's rank correlation coefficients) with I_FIRM variable (0.95, statistically significant at 1 percent level, when measured with reference to the subsamples of non-financial firms. Cf. Table 1 – Panel B. Complete data not reported for shortness). To further check, we investigate the statistical significance of the relation of each of CL_I_FIRM_*N* variables with the MARKET-TO-BOOK RATIO. To this end, we replace in the model the I_FIRM variable with each of the CL_I_FIRM_*N* variables. In notation:

$$LN(MARKET\text{-}TO\text{-}BOOK\ RATIO)_{i,t} =$$
$$= \delta_0 + \delta_N * I\_FIRM\_N_{i,t} + \delta_{11} * I\_INCOME_{i,t} + \delta * Controls_{i,t} + \varepsilon_{i,t}$$
with $N = 1, 2, \dots, 10$

Not surprisingly, and thus confirming the robustness to our approach, we find that the CL_I_FIRM_4 variable is the clustered version of I_FIRM which is the most efficient in explaining the MARKET-TO-BOOK RATIO. Notably, the coefficient on CL_I_FIRM_4 is negative and statistically significant as expected (δ_4 = -0.060, p-value < 0.10. Cf. Model 1, Table 4), its magnitude is the closest among results obtained using CL_I_FIRM_*N* variables to the coefficient estimated using the I_FIRM variable (γ_1 = -0.088, p-value < 0.05. Cf. Model 6, Table 3), and the model's adjusted R-squared is the maximum obtained using CL_I_FIRM_*N* variables (Complete data not reported for shortness).

After clustering, in order to investigate the effect on corporate market value induced by a variation in the issuing firm's spatial status, we substitute in the model the I_FIRM_CL4 variable with its 1-lag version (L1.I_FIRM_CL4), along with the first difference variable of I_FIRM_CL4 (D1.I_FIRM_CL4), and the cross product of the former with the latter (L1.I_FIRM_CL4*D1.I_FIRM_CL4). Thus, the specification we test is:

$$LN(MARKET\text{-}TO\text{-}BOOK\ RATIO)_{i,t} =$$
$$= \zeta_0 + \zeta_1 * L1.I\_FIRM\_CL4_{i,t} + \zeta_2 * D1.I\_FIRM\_CL4 + \zeta_3 * L1.I\_FIRM\_CL4 * D1.I\_FIRM\_CL4 +$$
$$+ \zeta_{13} * I\_INCOME_{i,t} + \zeta * Controls_{i,t} + \varepsilon_{i,t}$$

In this framework, the coefficient of the first term (ζ_1) estimates the marginal effect on the current location premium attributable to the previous year firm's spatial status, the coefficient of the second term (ζ_2) estimates the marginal effect on the current location premium attributable to the variation of the firm's spatial status from one year to another, and the coefficient of the third term (ζ_3) estimates the additional effect on ζ_2 which comes from the previous year firm's spatial status. Indeed, the overall effect on the dependent variable attributable to the closeness of other listed firms, *i.e.* the local home bias effect, is given by the sum of these three coefficients (*i.e.* $\zeta_1 + \zeta_2 + \zeta_3$). Similarly, the dependent variable's variation due to a variation in the firm's spatial status is given by the difference between ($\zeta_1 + \zeta_2 + \zeta_3$) and ζ_1. In fact, while ($\zeta_1 + \zeta_2 + \zeta_3$) defines the current location premium, ζ_1 defines the previous year firm's location premium as well as the current firm's location premium under the hypothesis that no variations in the firm's spatial status has been occurred. Besides, we distinguish also the effect exerted on firm location premium by the aggregation and the isolationism process due to listings and delistings respectively. This in essence for three reasons: the first based on the literature, the second since it's one of the goal of this research, and at third since it's functional to the specification of the estimation model adopted. With reference to the first, as already discussed above, previous evidences seem supporting that the effect of aggregation is somehow different from that isolationist. Basing on that, we at first provide evidences in this sense. Moreover, as clearly stated above, predicted signs of coefficients on D1.I_FIRM_CL4 and L1.I_FIRM_CL4*D1.I_FIRM_CL4 variables, are opposite, negative and positive versus positive and negative, in case of aggregation and isolation respectively. Therefore, whithin this framework, without separating these effects, the relations of D1.I_FIRM_CL4 and L1.I_FIRM_CL4*D1.I_FIRM_CL4 variables with the dependent variable are the joint product of two opposite effects. In this case, the observed relations capture the larger of the two effects, net of the minor both in terms of magnitude and statistical significance. So that, if the aggregation effect is significantly stronger than the isolationist, we will observe that D1.I_FIRM_CL4 and L1.I_FIRM_CL4*D1.I_FIRM_CL4 variables are significantly negatively and positively correlated with the dependent variable respectively. Besides, the magnitude of the relations will be inferior than the actual. And vice versa if the aggregation effect is significantly less strong than the isolationist. Finally, consistently with that, as long as the two competing effects counterbalance each other, the relations are statistically not significant. To this end, we create three new dummy variables detecting firms that from one year to another are found to be equally more, or less spatially aggregated. More specifically, we create the dummy variable NOVAR_D which takes on the value of one if D1.I_FIRM_CL4 is equal to zero and zero otherwise; the dummy variable UP_D which takes on the value of one if D1.I_FIRM_CL4 is greater than zero and zero otherwise; and the dummy variable DOWN_D which takes on the value of one if D1.I_FIRM_CL4 is lesser than zero and zero otherwise. Then, in order to separately estimate the location premium variation for firms become more or less aggregated, we introduce in the model three new interaction terms, obtained multiplying L1.I_FIRM_CL4, D1.I_FIRM_CL4, and L1.I_FIRM_CL4*D1.I_FIRM_CL4 with the dummy variable UP_D or DOWN_D respectively, along with the interacting dummy variable itself (UP_D or DOWN_D) as a control. In the following, the model we test when the aggregation effect is explicitly distinguished.

$$\begin{aligned}
&LN(MARKET\text{-}TO\text{-}BOOK\ RATIO)_{i,t} = \\
&= \zeta_0 + \zeta_1{*}L1.I_FIRM_CL4_{i,t} + \zeta_2{*}D1.I_FIRM_CL4 + \\
&\zeta_3{*}L1.I_FIRM_CL4{*}D1.I_FIRM_CL4 + \\
&\zeta_5{*}L1.I_FIRM_CL4_{i,t}{*}UP_D + \zeta_6{*}D1.I_FIRM_CL4{*}UP_D + \\
&+ \zeta_7{*}L1.I_FIRM_CL4{*}D1.I_FIRM_CL4{*}UP_D + \\
&+ \zeta_{11}{*}I_INCOME_{i,t} + \zeta{*}Controls_{i,t} + \zeta_{UP}{*}UP_D + \varepsilon_{i,t}
\end{aligned}$$

Similarly, the model used for the isolationist effect (not reported) can be easily obtained by opportunely substituting UP_D with DOWN_D as well as the right coefficients. Once more, while the coefficients of the interacting variables (ζ_1, ζ_2, and ζ_3) estimates the overall marginal effect of this latter variable on the dependent variable for firm equally or less spatially aggregated, the coefficient of the interaction term (ζ_5, ζ_6, and ζ_7) estimates the additional effect of the interacting variable attributable to firms more spatially aggregated, while the overall marginal effect of the interacting variable on the dependent variable for these firms is given by the sum of the coefficients of the interacting variable and the interaction term (*i.e.* $\zeta_1 + \zeta_5$, $\zeta_2 + \zeta_6$, and $\zeta_3 + \zeta_7$). The overall marginal effect on the dependent variable are provided in the comprehensive model we estimate which include as long as control variables, a first group of three interaction variables for NOVAR_D, a second group of three interaction variables for UP_D, and a third group of three interaction variables for DOWN_D, together with the interacting dummy UP_D and DOWN_D as control. Notably, in this model, while the effect of NOVAR_D is inherited by the constant, the coefficients of the interaction terms of D1.I_FIRM_CL4 and L1.I_FIRM_CL4*D1.I_FIRM_CL4 with NOVAR_D are not reported since they are blank variables. In notation the comprehensive model we test is the following:

$$
\begin{aligned}
&LN(MARKET\text{-}TO\text{-}BOOK\ RATIO)_{i,t} = \\
&= \zeta_0 + \\
&+ \zeta_4 * L1.I\_FIRM\_CL4_{i,t} * NOVAR\_D + \zeta * D1.I\_FIRM\_CL4 * NOVAR\_D + \\
&\quad + \zeta * L1.I\_FIRM\_CL4 * D1.I\_FIRM\_CL4 * NOVAR\_D + \\
&+ \zeta_5 * L1.I\_FIRM\_CL4_{i,t} * UP\_D + \zeta_6 * D1.I\_FIRM\_CL4 * UP\_D + \\
&\quad + \zeta_7 * L1.I\_FIRM\_CL4 * D1.I\_FIRM\_CL4 * UP\_D + \\
&+ \zeta_8 * L1.I\_FIRM\_CL4_{i,t} * DOWN\_D + \zeta_9 * D1.I\_FIRM\_CL4 * DOWN\_D + \\
&\quad + \zeta_{10} * L1.I\_FIRM\_CL4 * D1.I\_FIRM\_CL4 * DOWN\_D + \\
&+ \zeta_{11} * I\_INCOME_{i,t} + \zeta * Controls_{i,t} + \zeta_{UP} * UP\_D + \zeta_{DOWN} * DOWN\_D + \varepsilon_{i,t}
\end{aligned}
$$

In the multivariate analysis, we include as control a measure of equity's profitability (ROE), firm's future growth opportunities (R&D TO SALES), firm's size, defined as the logarithmic transformation of total asset (LN(FIRM SIZE)), firm's age, defined as the logarithmic transformation of the number of years of firm's life since foundation (LN(1+FIRM AGE)), and firm's press coverage, defined as the logarithmic transformation of the yearly number of newspaper's articles concerning the firm time to time considered (LN(1+PRESS COVERAGE)). Once more, we take logs because of the high skewness that characterizes the raw version of FIRM SIZE, FIRM AGE, and PRESS COVERAGE variables. However, our results still hold using these latter variables (not reported). Whilst the marginal effect on the MARKET-TO-BOOK RATIO of ROE, R&D TO SALES, and PRESS COVERAGE are expected to be positive (see among others Campbell & Thompson, (2008), Xing (2008),), and Dyck & Zingales, (2004), respectively), FIRM

SIZE and FIRM AGE are expected to negatively affect our dependent variable (see among the others Banz (1981), Fama & French, (1993), and Evans (1987), Keloharju & Kulp (1996)). In all the regressions are also included, but not shown, a dummy variable (R&D_D) which equals one if the company does not report R&D expenditure (R&D) (Chan, Lakonishok, & Sougiannis, 2001), a set of four-digit SIC industry dummies, a set of dummies for exchange segment listing (Kadlec & McConnell, 1994), and a set of year dummies. Finally, when we run our regressions if the model includes the RATIO variable, we cluster standard errors at region level to account for any possible variation of other factors such as demographic, social, and cultural characteristics, while at firm and year level otherwise in order to control for possible cross-sectional and time series correlation (Petersen, 2009).

Table 1 reports descriptive statistics on firm characteristic, (Panel A), as well as the correlation matrix of variables involved in the multivariate analysis (Panel B). Table A2 in Appendix A provides more detailed definitions of the variables included in our study.

[Insert Table 1 about here]

4. The local demand and supply for stocks

Table 2 reports averaged data over the investigated period (i.e. 1999-2007) on the spatial distribution of the demand and supply of stocks in the Italian equity-market split by geographical macro-areas (NUTS1) and regions (NUTS2). Figure 1 provides a graphical and hopefully more intuitive representation of regional data. If the Italian investors actually tended to pick securities on the basis of their geographical closeness, the asset pricing consequences would be particularly exacerbated given the spatial distribution of the demand and supply of stocks in the Italian equity-market. In fact, few very densely populated districts of listed firms, such as those centered in the cities of Milan, Turin, and Rome, and the one distributed along the ancient Roman road of Via Emilia respectively, are counterbalanced by large areas completely devoid of listed firms and a much more homogeneous spatial distribution of wealth across the country.

[Insert Figure 1 about here]

[Insert Table 2 about here]

In the first quadrant of Figure 1 we plot the location of each sampled firm’s headquarters, distinguishing non-financial firms (blue and circular data-point) from the financial ones (red and triangular data-point). It is noted quite clearly that Italian listed firms tend to be highly geographically clustered among few areas and in particular in the north of the country. Table 2, columns 2 and 3, provides detailed data of the frequencies. In the northern areas is headquartered over the 75 percent of the whole sample (77.5) and of non-financial firms (76.3): the 56.8 percent of total (the 52.2 percent of non-financials) in the North-West, and the 20.7 (24) percent in North-East respectively. The region most populated by listed firms is Lombardy (North-West), which accounts for 1,033 firm-year observations (627 of which related to non-financial firms), corresponding to the 41.9 percent of the whole dataset (the 37.6 percent of non-financials). Piedmont (North-West) comes in second with 304 firm-year observations (equal to the 12.3 percent of the whole dataset), 210 of which related to non-financial firms (12.6 percent). However, when just non-financial firms are considered, the Emilia-Romagna (North-East) ranks second with its 281 firm-year observations (11.4 percent), 228 of which of non-financials (13.7 percent). In the central and southern areas of Italy including islands, there are a total of 553 firm-year observations (396 of which related to non-financial firms) corresponding to the 22.5 percent of the whole dataset (23.7 among the subsample of firms not operating in the industry of financial services). Whithin these areas, the only region which attracts a relevant number of firms is Lazio (Centre), which alone counts for 300 firm-year observations (227 of non-financials), that is more than 12 percent (12.2) of the whole sample (13.6 among non-financial firms). This evidence appears to be merely a consequence of the presence in this region of the Italian capital, Rome (Lazio).[11] The central role exerted by Rome in the Italian economic environment dramatically emerges even considering State-owned enterprises (SOEs), which, as widely documented by the pertinent literature (see among the first (La Porta, Lopez-de-Silanes, & Shleifer, 1999); (Faccio & Lang, 2002)) represent a considerable part of the Italian equity-market. Consistently with previous evidences, we find that SOEs represent over the 6 percent (6.1) of the whole dataset (151 firm-year observations, all but 2 of which related to non-financial firms), and that over the 30 percent (32.4) is headquartered in Rome.[12] The remaining

[11] As further of proof of that, as far as the provinces (NUTS3) is concerned, the one of Rome (Lazio, Centre) ranks second and accounts for more the 12 percent (12.1) of sampled firms (the 14.4 percent among non-financials). Not surprisingly, the maximum is reached by the province of Milan (Lombardy, North-West) which accounts for the 31.9 of listed firms (the 31.1 percent of non-financials).

[12] Following previous research ((La Porta, Lopez-de-Silanes, & Shleifer, 1999); (Claessens, Djankov, Fan, & Lang, 2002); (Faccio & Lang, 2002); (Bortolotti & Faccio, 2009)), we categorize a firm-year observation as State-owned (SOE_D = 1) if the correspondent largest ultimate owner is the Italian government, a local authority (county, municipality, etc.), or a government agency. Data on ownership structure have been taken from the database used in (Mengoli, Pazzaglia, & Sapienza, 2009) for the years from 1999 to 2005 and from the database used in (Mengoli, Pazzaglia, & Sapienza, 2011) for 2006 and 2007.

central and southern regions as well as the islands register all together solely the 10.3 percent of listed firms (10.1 percent of non-financials). Only three regions, *i.e.* Aosta Valley (North-West), Basilicata (South) and Calabria (South), register zero observations, with the addition of Umbria (Centre) if just non-financial firms are considered. These evidences allow to clearly point out two relevant factors. At first that Italian listed firms are almost entirely clustered in the northern areas of the country, notably around the districts of Milan, Turin (Piedmont), and the Roman Via Emilia, with the exception of the group of firms headquartered near Rome. This implies the co-presence of a few areas with a very high local supply of stocks, and many areas that are characterized by an almost total lack of local supply of stocks. Secondly, that the spatial distribution of financial and non-financials firms is almost identical. Thus, that the values of the I_FIRM variable is not influenced by the inclusion or the possible exclusion of financial firms.

Data on firm EQUITY BOOK VALUE (cf. Column 5 of Table 2) which is our proxy for the supply of stocks, confirm and support findings observed with frequencies. .Regional values of firm EQUITY BOOK VALUE once split by quintiles, are graphically reported in the second quadrant of Figure 1, along with the yearly mean value of the I_FIRM variable once averaged by region. Data on I_FIRM are reported in the eight column of Table 2. The spatial pattern of EQUITY BOOK VALUE is in general quite similar to the frequencies' spatial distribution above described. Notable is the value for Lazio (83,783 million of euro), which is almost double that of Piedmont (52,805 million of euro), and even close to the one of Lombardy (99,859 million of euro). This evidence support and complete the previously documented clustering in Rome of SOEs, which on average are larger than comparable non-SOEs (Faccio & Lang, 2002). In this regard, the opposite case of Liguria (North-West) and Emilia-Romagna removes any doubt on that. The region of Liguria, while accounting for solely 63 firm-year observations, but more than the 30 percent related to SOEs (21 firm-year observations, equal to the 33.3 percent) ranks fourth by regional EQUITY BOOK VALUE with an yearly average value equal to 17,696 million of euro. This value is greater than the 50% compared to the value observed for Emilia-Romagna (11,793 million of euro), which on the contrary counts just 8 firm-year observations (equal to the 2.8 percent of the whole dataset) related to SEOs.

As far as the demand-side, columns 6 and 8 of Table 2 reports the yearly average value of households' DISPOSABLE INCOME aggregated by geographical area, and the yearly mean value of the I_INCOME variable once averaged by geographical area, respectively. The regional DISPOSABLE INCOME split by quintiles and the yearly mean regional value of the I_INCOME variable are graphically reported in the third quadrant of Figure 1. In contrast with previous heterogeneity patterns, households' income appears quite homogeneously distributed over the whole Italian territory, albeit there is a notable concentration in the north where is held on average almost the 53 percent (52.9) of the Italian yearly DISPOSABLE INCOME (the 31.1 percent in North-West; the 21.8 percent in North-East). Looking the regional distribution of DISPOSABLE INCOME, the most richest region is not surprisingly the Lombardy with its yearly 177,193 million of euro. Second comes Lazio (90,024 million of euro/year) and third the Veneto (North-East) (80,891 million of euro/year). However, when per capita DISPOSABLE INCOME is considered, the region of Emilia Romagna rank first with 19,889 euro per capita on average per year, the Aosta Valley comes second (19,475 euro/year), and Lombardy comes third with (19,278 euro/year). These findings led us to consider the per capita DISPOSABLE INCOME spatial distribution in the construction of the I_INCOME variable.

As far observed by comparing the different quadrants of Figure 1, summing up the Italian equity-market is characterized by a significant clustering of the supply for stocks together with a widespread potential demand for stocks. In support of this argument, it is worth noting that while the Italian yearly average DISPOSABLE INCOME for the south-central Italy, excluding Lazio and including Islands, is equal to 37.3 percent, the yearly average EQUITY BOOK VALUE calculated for the same areas is equal to just the 4.7 percent of the Italian yearly average value. As long as the households' DISPOSABLE INCOME and the firms' EQUITY BOOK VALUE are unbiased proxies for the demand and supply of stocks respectively, this evidence in itself is sufficient to point out the presence in the Italian equity-market of relevant local unbalances between the former and the latter. Local unbalances which are at the same time the pre-condition for a profitable application of the framework proposed by HKS, and, the structural reason which makes Italy an ideal testing environment for the local home bias and for its asset-pricing implications.

The fourth quadrant of Figure 1 highlights this imbalance (RATIO), while the last three columns of Table 2, that report data on the RATIO, I_FIRM, and I_INCOME variables, provide a numerical quantification of the phenomenon. Consistently with the data above reported, the northern areas of Italy are generally characterized by above sample average values of the RATIO while the southern areas, excluding Lazio, by the opposite. Looking at the regional distribution of the variable RATIO, Lazio has indeed the highest values, averaging 0.920 over the sample period. Piedmont is second, with an average RATIO of 0.691. At the other extreme, excluding regions without listed firms for which the RATIO is obviously equal to zero, Abruzzo (South) has the lowest average value over the entire sample period, at 0.001. Apulia (South), Sicily (Islands) and Trentino-Alto Adige (North-East) follow with an average RATIO equal to 0.002. As it was expected given the much more uniform territorial distribution of the disposable income, the pattern of the RATIO at macro-area level is almost entirely driven by the supply of stocks. Indeed North-

West come first with an average RATIO equal to 0.595, while Centre ranks second with an average RATIO equal to 0.497 over the sample period. This evidence provides an additional motivation, beyond that previously discussed in Section 3.2, for using the RATIO measured at region level. Indeed, exception is constituted by the increasing gap between the Centre (average RATIO equal to 0.497) and North-East (0.158). In this case in addition to the relevant role played on the supply-side by the above cited centripetal force of Rome, on the demand-side it's determinant the extremely high wealth that characterizes the North-East, which is, in fact, the richest Italian area (e.g. North-East is the first macro-area in terms of disposable income per capita with 19,017 euro on average year over the sample period; North-West come second with on average 18,940 euro/year). Finally, it should noted that similarly with HKS, the variability of the RATIO increases as deeper becomes the analysis (*i.e.* moving from NUTS1 to NUTS2). For robustness purposes we checked positively that this is not due to anomalies, as the presence of few large firms or an abnormal M&A's activity, as shown in HKS.

Previous evidences, even more pronounced, emerge when I_FIRM and I_INCOME variables are considered. Consistently with the above documented more clustered spatial distribution of supply of stocks with respect to the demand of stocks, the national mean value of I_FIRM is 2.933 while the same statistic with reference to I_INCOME variable is equal to 1.851. In this regard, recall that uniform spatial distribution should exhibit a value of I smaller than 2, while aggregated distribution the opposite. Therefore, the spatial distribution faced by the generic Italian listed firms is on average clustered with the respect to the supply of stock and uniform with reference to the demand of stocks. Looking data at macro-area level, I FIRM ranges from the minimum value of 1.108 registered for Islands to the maximum value of 3.782 registered for Lombardy. On the contrary, the I_INCOME variable ranges from the minimum value of 1.522 observed in the Islands, to the maximum of 2.199 of North-East. Similarly, looking data at regional level, excluding regions with no listed firms headquartered, I FIRM ranges from the minimum value of 1.093 registered for Sardinia (Islands) to the maximum value of 4.068 registered for Lombardy. On the contrary, the I_INCOME variable ranges from the value of 1.226 observed in Sardinia, to the maximum of 2.271 of Emilia-Romagna. Therefore, once more spatial data highlights the clustered spatial distribution of supply of stocks which is opposed to the significantly more homogeneous distribution of demand for stocks.

While the general pattern is substantial unchanged moving from the RATIO to the I_FIRM and I_INCOME variables, some significant differences should be noted, representing, indeed, the improvement of the variables we adopted. Indeed, looking at regional values of I_FIRM, Lombardy is the first with a value of 4.068. However, differently from the pattern observed for EQUITY

BOOK VALUE, the region of Trentino Alto Adige comes second (average value of I_FIRM equal to 3.231) and Liguria comes third (3.014). Not surprisingly, Trentino Alto Adige at north-east and Liguria at south-west are adjacent to Lombardy as indeed Piedmont (at west, average value of I_FIRM equal to 2.976), Emilia-Romagna (south, 2.458) and Veneto (east, 2.370). Similarly, looking at I_INCOME, the Emilia-Romagna ranks first with an average value of I_INCOME equal to 2.271, the Lombardy comes second (2.248) and the Trentino Alto Adige comes third (2.104). Similar patterns are observed when less populated area are considered. For instance, the Lazio, register an average value of I_FIRM just equal to 1.305 (I_INCOME equal to 1.505) since beyond the clustered firms in Rome, in general the neighboring areas are almost not populated by listed firms. Concluding, I_FIRM and I_INCOME variables seems more accurate in defining which firms can be considered isolated and which firms are to be considered aggregated with others listed firms.

5. The value of firm location premium

Previous findings suggest that in the Italian equity-market the mismatching of the spatial distribution of listed firms, highly clustered, and the spatial distribution of the households' disposable income, much more homogeneous, generates locally significant deviations from the theoretical equilibrium between demand and supply for stocks. These local conditions appear to be optimal in order to investigate the asset-pricing implications of the investors' preference to invest locally. What's more, a priori, the Italian cultural and institutional setting are likely to exacerbate dynamics related to locality and, among these, especially of the local home bias. In this section we provide evidences supporting the significance of the firm geographical positioning in determining the corporate market value and, accordingly, we provide an estimate of the location premium.

Operationally, we test the statistical significance of the relation between the firm's market-to-book ratio and the equity-market conditions faced by the issuing firm, we named also the firm location's attributes. According to prior contributes on this topic, at first we proxy the firm location's attributes through the variable RATIO (HKS). This allows us to verify through a consolidated approach the presence of the local home bias with reference to the selected testing environment. As in HKS, we expect to observe a negative relation between the RATIO and the firm's market-to-book ratio (i.e. $\beta_1 < 0$). However, because of the Italian context's peculiarities, we believe that such a relationship could be stronger than documented with respect to the American equity-market. Then, we substitute the RATIO with I_FIRM and I_INCOME variables. While I_FIRM is expected to be negatively correlated with the firm's market-to-book ratio, I_INCOME is expected to interact the opposite (i.e. $\gamma_1 < 0$ and $\gamma_3 > 0$). Consistently with the pertinent literature which has evidenced that the local home bias mainly concerns less visible (HKS) and more informationally opaque firms (Ivković & Weisbenner, 2005), within this analysis we distinguish firms included in the primary Italian equity-market index (FTSE MIB Index) from the ones excluded. As long as we observe a smaller location premium for firms in the FTSE MIB Index (i.e. $\beta_1 + \beta_2 > \beta_1$; $\gamma_1 + \gamma_2 > \gamma_1$ and $\gamma_3 + \gamma_4 > \gamma_3$), we believe to weeding out any doubt about the presence of the local home bias with reference to the selected sample.

Table 3 reports the results of the multivariate analysis of the LN(MARKET-TO-BOOK RATIO). The investigated sample consists of 1,668 firm-year observations on non-financial firms issuing ordinary shares traded at MSE over the period 1999 – 2007 and headquartered whithin the Italian territory. In models from 1 to 3 the firm location's attributes has been proxied through the variable RATIO, whilst in models from 4 to 6 through I_FIRM and I_INCOME variables. The first models of each group (models 1, and 4) refers to the base specification of the model adopted; the second ones (models 2, and 5) refers to its fully specified version, whilst in the latest models of each group (models 3, and 6) the subsamples of firm included and not-included in the FTSE MIB Index are separately investigated. Also included in the regressions, but not shown in Table 3, are a dummy variable which equals to one if the firm does not report R&D (R&D_D), a set of four-digit SIC industry dummies, dummies for segment listing, and year dummies. Finally, while in models 1-3 t-statistics are based on standard errors clustered by the region, in models 4-6 t-statistics are computed on standard errors clustered both by firm and year.

[Insert Table 3 about here]

As can be seen from model 1, the effect of the RATIO on the LN(MARKET-TO-BOOK RATIO) is as expected negative, and statistically significant at 10 percent level ($\beta_1 = 0.170$, p-value < 0.10).

Once controlled for press coverage (LN(1+PRESS COVERAGE)), firm's age (LN(1+FIRM AGE)), firm's future growth opportunities (R&D TO SALES), firm's profitability (ROE), and firm's size (LN(FIRM SIZE)), the relation between the RATIO and the LN(MARKET-TO-BOOK RATIO) is still negative and statistically significant (Cf. model 2). However, the magnitude of this effect decreases than more the 30 (32.94) percent ($\beta_1 = -0.114$, p-value < 0.10) reaching about the level documented by HKS. Relations between dependent variable and control variables have all the predicted sign, and all highly statistically significant with the exception of the R&D TO SALES variable.

As can be seen looking model 3, once introduced among explanatory variables the interaction term RATIO*FTSE_D and, as additional control, the dummy variable FTSE_D, the relation between the RATIO and the LN(MARKET-TO-BOOK RATIO) remains negative and statistically significant for firms not in the FTSE MIB Index, while becoming not significant for firms in it included. Notably, the coefficient of the RATIO increases in size by almost the 50 (49.12) percent up to the value estimated in model 1, and in its statistical significance ($\beta_1 = -0.170$, p-value < 0.05). At the same time, as expected, the coefficient of the interaction term is positive and statistically highly significant ($\beta_2 = 0.369$, p-value < 0.01), so that the overall marginal correlation of the RATIO with the LN(MARKET-TO-BOOK RATIO) is not statistically different from zero when just firms included in the FTSE MIB Index are investigated ($\beta_1 + \beta_2 = 0.199$, p-value = 0.28. See the third last row of Table 3, model 3). Besides, it is noted that as predicted the FTSE_D dummy variable is positive related with the dependent variable; however this relation appears not statistically significant ($\beta_{FTSE} = 0.077$, p-value > 0.10). Finally, as far the other control variables, results are unchanged with respect to the previously documented ones, with the exception of the R&D TO SALES variable which becomes significant at 5 percent level.

In order to provide an economic idea of the empirical evidences above reported and a measure of the firm location premium, consider the average non-financial firms, listed at MSE over the period 1999-2007, headquartered in Italy and not in the FTSE MIN Index: its market-to-book ratio is 2.24, while the RATIO equals to 0.463 (Summary statistics for the subsamples of firms not in FTSE MIB Index are not reported for shortness). Previous evidences imply that *ceteris paribus* almost the 42 (41.19) percent of the market-to-book value is attributable to the RATIO, that is to the location premium. Indeed, -0.079 (-0.079 = -0.170 x 0.463) is the estimated LN(MARKET-TO-BOOK RATIO) associated to the RATIO, so that the estimated firm's market-to-book value attributable to the RATIO is 0.924 ($0.924 = e^{(-0.079)}$), which is the 41.19 percent (0.4119 = 0.924/2.24) of the average market-to-book ratio. Obviously, the same statistic is equal to zero for firms included in the FTSE MIB Index. Besides, as expected, the magnitude of the effect of the RATIO on the market-to-book ratio appears substantially stronger than that documented by HKS with reference to the American equity-market (see HKS, Model 10 of Table 6 for comparison). Borrowing their line of reasoning, if a firm headquartered in an Italian region with a high local supply of stocks (e.g. Lombardy, RATIO=0.559) moves to another Italian region with a high local demand of stocks (e.g. Abruzzo, RATIO = 0), thus implying to a different RATIO of about 0.56 which is also the differential hypothesized in HKS, everything else being equal, the corporate market value rises by about the 9.99 percent. Using model with the distinction of firm in and out the FTSE MIB Index (model 3) for the sake of comparison, the estimates are as follow: 0.170 x 0.56 =

0.095; so, the firm's market-to-book value increase would be $e^{(0.095)} - 1 = 0.0999$. Compared to the HKS estimation of 8.09 percent, our measure is about the 23 percent more (0.0999/0.0809=23.38).[13]

Models 4-6 of Table 3 report results from the multivariate analysis of the LN(MARKET-TO-BOOK RATIO) once proxied the firm location's attributes through the I_FIRM and I_INCOME variables. As can be seen from model 4, both I_FIRM and I_INCOME are found to be statistically significant in determining the LN(MARKET-TO-BOOK RATIO). As expected, while the marginal correlation of LN(MARKET-TO-BOOK RATIO) with I_FIRM is negative,(γ_1 = -0.089, p-value < 0.05), the one with I_INCOME is positive (γ_3 = 0.393, p-value < 0.05).

Once controlled for press coverage (LN(1+PRESS COVERAGE)), firm's age (LN(1+FIRM AGE)), firm's future growth opportunities (R&D TO SALES), firm's profitability (ROE), and firm's size (LN(FIRM SIZE)), the pattern observed for the marginal correlations of I_FIRM and I_INCOME variables with the LN(MARKET-TO-BOOK RATIO) is basically unchanged both in magnitude and statistical significance (γ_1 = -0.080, p-value < 0.05; γ_3 = 0.351, p-value < 0.05. Cf. model 5). As the other control variables, the pattern is as expected and unmodified from previous findings.

As can be seen looking model 6, once introduced among explanatory variables the interaction terms I_FIRM*FTSE_D and I_INCOME*FTSE_D, and, as among controls, the dummy variable FTSE_D, the relations between I_FIRM and I_INCOME variables and the LN(MARKET-TO-BOOK RATIO) exhibit the same pattern as before. However, they are slightly stronger, at about the values estimated in model 4, and more statistical significant than previously documented (γ_1 = -0.088, p-value < 0.05; γ_3 = 0.398, p-value < 0.01). At the same time, as expected, the coefficients of the interaction terms are complementary to γ_1 and γ_3 respectively (γ_2 = 0.205, p-value > 0.10; γ_4 = -0.912, p-value < 0.10), making the marginal effects of I_FIRM and I_INCOME variables on the LN(MARKET-TO-BOOK RATIO) not statistically different from zero when just firms in the FTSE MIB Index are investigated ($\gamma_1 + \gamma_2$ = 0.117, p-value > 0.10, and $\gamma_3 + \gamma_4$ = -0.514, p-value > 0.10. See the last two rows of Table 3, model 6). Besides, it is noted that the FTSE_D dummy variable is positively related with the dependent variable as predicted, and statistically significant at 5 percent level (γ_{FTSE} = 1.485, p-value < 0.10). Finally, once again, as far the other control variables results are unchanged with respect to the previously documented ones.

Consider now the same "average sampled firm" previously defined: the corresponding values of I_FIRM and I_INCOME variables are 2.828 and 2.067, respectively. Previous evidences

[13] As further proof of that, Baschieri, Carosi, Mengoli (2011) apply Model 10 of Table 6 from HKS to our dataset and document a coefficient on the RATIO variable equals to -0.197, thus implying an effect on the market-to-book ratio the 44 percent stronger than that documented by HKS with reference to the US.

imply that, *ceteris paribus*, almost the 80 (79.10) percent of the market-to-book ratio is attributable to the location premium. Indeed, 0.574 (0.574 = -0.088 x 2.828 + 0.398 x 2.067) is the estimated LN(MARKET-TO-BOOK RATIO) attributable to I_FIRM and I_INCOME, so that the corresponding estimated firm's market-to-book value is 1.775 (1.775 = $e^{(0.574)}$), which is about the 79.10 percent (0.7910 = 1.775/2.24) of the average market-to-book ratio. Consistently with results obtained with the RATIO variable, the location premium is equal to zero for firms included in the FTSE MIB Index. Besides, the effect of I_INCOME is about 3 (2.92 = 0.3474/1.015) times stronger than I_FIRM. Indeed, *ceteris paribus*, on average I_FIRM accounts for almost the 35 (34.74) percent of the market-to-book ratio (-0.249 = -0.088 x 2.828; 0.780 = $e^{(-0.249)}$; 0.3474 = 0.780/2.24), while the same estimate with reference to I_INCOME is equal to more than the market-to-book value (0.823 = 0.398 x 2.067; 2.277 = $e^{(0.823)}$; 1.015 = 2.277/2.24).

Summing up, evidences related to the RATIO variable support the Italian investors preference towards local stocks (HKS). Besides, firms in the FTSE MIB Index appears not influenced by local dynamics. Since firms not in the FTSE MIB Index are those for which information asymmetries between local and non-local investors may be largest, these results are consistent with the exploiting of local knowledge by Italian investors (Ivković & Weisbenner, 2005). Evidences obtained when I_FIRM and I_INCOME variables are introduced strongly support these arguments. Moreover, they are strongly consistent with the proposed hypothesis' framework: that is the significance of the firm geographical positioning and, with that, the local home bias effect on corporate market value. Indeed, we find that the firm geographical position significantly affects the corporate market value. Notably, we estimate that on average, the location premium value is *ceteris paribus* about the 80 percent of the market-to-book value. Moreover, it drops with the closeness between the issuing firm with all other listed firms and raises, almost three time stronger, with the closeness between the issuing firm and the investors' income. Finally, considering the singularities of the research context, the greater magnitude of the RATIO's effect that we document with respect the American equity-market, suggests, consistently with contributes of Kumar (2009) and Baschieri, Carosi, Mengoli (2011), the (co)presence of a behavioral origin of the local home bias, but more in general of the phenomena related to locality, interacting with the informational factors ultimately amplifying the investors' preference for closer stocks. Indeed, Kumar (2009) concludes that: "*uncertainty at both stock and market levels amplifies individual investors' behavioral biases and […] relatively better informed investors attempt to exploit those biases*".

6. The dynamic of firm location premium and local home bias effect

Previous findings support the significance of the firm geographical position and, consistently, of the location premium's value. Such a premium has been found determined by the well-known local home bias phenomenon, for which isolated firms tend *ceteris paribus* to trade at premium, and by classical dynamics on demand side, for which firms headquartered in the richest areas tend *ceteris paribus* to be traded at premium as well. In this section we carry on the firm location premium's analysis investigating the effect on corporate market value induced by a variation in the issuing firm spatial status with respect to other listed firms, that is by a variation in the local home bias effect. From a more practical standpoint of view, this means investigating the dynamic of the location premium in case of the listing of new firms (IPOs), the delisting of existing listed firms, and, even if the phenomenon is much more restrained, the moving of headquarters by an existing listed firms. Indeed, all else being equal, an IPO makes the neighboring firms locally less rare, the delisting of an existing firm works the opposite by making the remaining firms locally more isolated, while the moving of head office do both respectively for the hosting and the sending areas, and, therefore, will be correspondingly assimilated. Beyond these facts, the issuing firm spatial status remains unchanged from one year to another, and, the absolute location premium and its component due to local home bias does as well. On the other side, we expect to observe that other things being equal, firms from year to year more(less) spatially clustered with other listed firms experience a decrease(increase) in the local home bias effect and thus in the location premium. Besides, we expect that the initial level of clustering matters in determining such dynamic. Therefore, other things being equal, we expect to observe that the decrease(increase) in location premium due to an increase(decrease) of the number of neighboring listed firms becomes progressively smaller(higher) for highly clustered(isolated) firms.

Operationally we test the statistical significance of the relation of the firm's market-to-book ratio with the firm spatial status with respect to other listed firms. The firm spatial status with respect to other listed firms has been proxied through the variable I_FIRM_CL4 which ranges from 1 to 4 the more clustered with other listed firms is the issuing firm. This allows us to detect firms that significantly change their subjective spatial distribution because of listings and/or delistings. Accordingly to previous findings, we expect to observe a negative relation between I_FIRM_CL4 and the firm's market-to-book ratio (i.e. $\delta_4 < 0$). Then, we substitute I_FIRM_CL4 with its 1-lag, which stands for the previous year's firm spatial status and the current firm spatial status as well if significant variations in the subjective spatial distribution of listed firms are not occurred (L1.I_FIRM_CL4), its first difference, which quantify the yearly firm spatial status' variation (D1.I_FIRM_CL4), and the cross product of the former with the latter, which tell us if and how the previous year firm spatial status matters (L1.I_FIRM_CL4* D1.I_FIRM_CL4). While L1.I_FIRM_CL4 is expected to be negatively correlated with the firm's market-to-book ratio (i.e. $\zeta_1 < 0$), the relations with D1.I_FIRM_CL4 and L1.I_FIRM_CL4*D1.I_FIRM_CL4 variables are expected to be complementary across more and less aggregated firms. Notably, for more aggregated firms the predicted sign of the coefficient of the first difference term is negative (i.e. $\zeta_6 < 0$), while the predicted sign of the coefficient of the interaction term is positive (i.e. $\zeta_7 > 0$). Consistently, for less aggregated firms the expected pattern is the opposite (i.e. $\zeta_9 > 0$ and $\zeta_{10} < 0$).

Table 4 reports the results of the multivariate analysis of the LN(MARKET-TO-BOOK RATIO). Since, in fact, firms in the FTSE MIB Index are not significantly affected by local home bias (Cf. Results of models 3 and 6, Table 3), we limit this analysis to the subsample of firms not in the FTSE MIB Index. Therefore, the investigated sample consists of 1,489 firm-year observations on non-financial firms issuing ordinary shares traded at MSE over the period 1999–2007, headquartered whithin the Italian territory, and not in the FTSE MIB Index. Model 1 reports results once the firm spatial status with respect to other listed firms has been proxied through the variable I_FIRM_CL4, and represents the base specification. Indeed, model 1 is equivalent to model 2 of Table 3 except for the I_FIRM variable which has been replaced by its clustered version, that is I_FIRM_CL4. In model 2 the dynamic of the firm spatial status is investigated, while models 3 and 4 provide the same analysis when the subsamples of firms become more or less aggregated are respectively explicitly considered. Finally, model 5 reports results of the comprehensive model which includes in addition to control variables, a first group of three interaction terms for firms that from one year to another are found equally aggregated (regressors with NOVAR_D), a second group of three interaction terms for more aggregated firms (with UP_D), and a third group of three interaction terms for less aggregated firms (with DOWN_D), together with the interacting dummies variables themselves (NOVAR_D, UP_D, and DOWN_D). Recall that in model 5 the effect of NOVAR_D is inherited by the constant term and that the coefficients of the interaction terms of D1.I_FIRM_CL4 and L1.I_FIRM_CL4*D1.I_FIRM_CL4 with NOVAR_D are not reported since they are blank variables.

[Insert Table 4 about here]

As can be seen from model 1, the effect of I_FIRM_CL4 on the LN(MARKET-TO-BOOK RATIO) is as expected negative, and statistically significant at 5 percent level (δ_4 = -0.071, p-value < 0.05). Moreover, the magnitude of δ_4 is the closest among results obtained using CL_I_FIRM_N variables to the coefficient estimated using the I_FIRM variable (γ_1 = -0.088, p-value < 0.05. Cf. Model 6, Table 3). As far the control variables, relations have all the predicted sign, and the pattern both in terms of magnitude and statistically significance is unchanged with respect to the previous findings.

As can be seen looking model 2, once the dynamic of the I_FIRM_CL4 is investigated, the observed pattern is as predicted. Indeed, the relation between L1.I_FIRM_CL4 and the LN(MARKET-TO-BOOK RATIO) is as expected negative, and statistically significant at 5 percent level (ζ_1 = -0.074, p-value < 0.05). Besides, the D1.I_FIRM_CL4 and L1.I_FIRM_CL4*D1.I_FIRM_CL4 variables are negatively and positively correlated with the LN(MARKET-TO-BOOK RATIO) respectively, even if statistically not significant (ζ_2 = -0.008, p-value > 0.10; ζ_3 = 0.013, p-value > 0.10). Therefore, where statistically significant, the negative effect on corporate market value induced by a more aggregated firms is offset by the opposite effect due to firms become more isolated. However, the estimated signs of the relations with D1.I_FIRM_CL4 and L1.I_FIRM_CL4*D1.I_FIRM_CL4 variables suggest that the aggregation effect is, although not statistically significantly, stronger than the isolationist. It appears useful recall that, given these arguments, when the aggregation effect is separately investigated (cf. Model 3), the observed pattern for D1.I_FIRM_CL4 and L1.I_FIRM_CL4*D1.I_FIRM_CL4 variables is expected to be complementary, that is positively and negatively related with the dependent variable, with respect to the one above described, Conversely, when the isolationist effect is separately investigated (cf. Model 4), the expected pattern for D1.I_FIRM_CL4 and L1.I_FIRM_CL4*D1.I_FIRM_CL4 variables is expected to be unchanged. Results of models 3-5 will support these arguments. Once more the pattern of control variables is the one predicted and unchanged from previous findings.

Once firms become more or less aggregated are explicitly investigated, results are still as expected (Cf. Models 3 and 4 respectively, and model 5). Notably, as can be seen looking model 3, once introduced among explanatory variables the interaction terms L1.I_FIRM_CL4*UP_D D1.I_FIRM_CL4*UP_D and L1.I_FIRM_CL4*D1.I_FIRM_CL4*UP_D, and, as additional control, the dummy variable UP_D, the coefficient of L1.I_FIRM_CL4 is still negative and significant (ζ_1 = -0.080, p-value < 0.05), while the D1.I_FIRM_CL4 and L1.I_FIRM_CL4*D1.I_FIRM_CL4 variables are positively and negatively correlated with the LN(MARKET-TO-BOOK RATIO) respectively, even if statistically not significant (ζ_2 = 0.084, p-value > 0.10; ζ_3 = -0.014, p-value > 0.10). At the same time, as predicted, the coefficient of L1.I_FIRM_CL4*UP_D is negative and highly significant (ζ_5 = -1.721, p-value < 0.01), while coefficients of others two terms interacting with UP_D are complementary to ζ_2 and ζ_3 and highly statistically significant as well (ζ_6 = -1.928, p-value < 0.01; ζ_7 = 1.731, p-value < 0.01). These evidences imply that when just firms become more aggregated are investigated, the marginal correlations of L1.I_FIRM_CL4*UP_D, D1.I_FIRM_CL4*UP_D, and L1.I_FIRM_CL4*D1.I_FIRM_CL4*UP_D variables on the LOG(1+MARKET-TO-BOOK

RATIO) are respectively negative, negative, and positive, and all highly statistically different from zero as expected (ζ_5 = -1.802, p-value < 0.01; ζ_6 = -1.840, p-value < 0.01; ζ_7 = 1.716, p-value < 0.01. See model 5). Looking at control variables, it is noted at first that the UP_D dummy variable is positively and highly significantly correlated with the LN(MARKET-TO-BOOK RATIO) (ζ_{UP} = 1.834, p-value < 0.01, and ζ_{UP} = 1.829, p-value < 0.01, in model 3 and 5 respectively). Finally, as far the other control variables results are unchanged with respect to the previously documented ones.

When less aggregated are explicitly investigated, the pattern is as predicted complementary to the one observed for more aggregated firm. Notably, as can be seen looking model 4, once introduced among explanatory variables the interaction terms L1.I_FIRM_CL4*DOWN_D D1.I_FIRM_CL4*DOWN_D and L1.I_FIRM_CL4*D1.I_FIRM_CL4*DOWN_D, and, as additional control, the dummy variable DOWN_D, the coefficient of L1.I_FIRM_CL4 is still negative and significant (ζ_1 = -0.079, p-value < 0.05), while the D1.I_FIRM_CL4 and L1.I_FIRM_CL4*D1.I_FIRM_CL4 variables are negatively and positively correlated with the LN(MARKET-TO-BOOK RATIO) respectively, even if statistically not significant (ζ_2 = -0.058, p-value > 0.10; ζ_3 = 0.035, p-value > 0.10). At the same time, as predicted, the coefficient of L1.I_FIRM_CL4*DOWN_D is negative and highly significant (ζ_8 = -0.476, p-value < 0.01), while coefficients of others two terms interacting with DOWN_D are complementary to ζ_2 and ζ_3 and highly statistically significant as well (ζ_9 = 1.746, p-value < 0.01; ζ_{10} = -0.478, p-value < 0.01). These evidences imply that when just firms become less aggregated are investigated, the marginal correlations of L1.I_FIRM_CL4*UP_D, D1.I_FIRM_CL4*UP_D, and L1.I_FIRM_CL4*D1.I_FIRM_CL4*UP_D variables with the LN(MARKET-TO-BOOK RATIO) are respectively negative, positive, and negative, and all highly statistically different from zero as expected (ζ_8 = -0.571, p-value < 0.01; ζ_9 = 1.746, p-value < 0.01; ζ_{10} = -0.458, p-value < 0.01. See model 5). Looking at control variables, it is noted at first that the DOWN_D dummy variable is positively and highly significantly correlated with the LN(MARKET-TO-BOOK RATIO) (ζ_{DOWN} = 1.719, p-value < 0.01, and ζ_{DOWN} = 1.777, p-value < 0.01, in model 3 and 5 respectively). Once again, as far the other control variables results are unchanged with respect to the previously documented ones.

Finally, it is noted that when firms do not change their spatial status are specifically investigated, the pattern is both in magnitude and statistical significance as expected and strongly consistent with previous findings (Cf. Model 5). Indeed, the relation between L1.I_FIRM_CL4*NOVAR_D and the LN(MARKET-TO-BOOK RATIO) is as predicted negative and statistically significant at 5 percent level (ζ_4 = -0.080, p-value < 0.05). Moreover, the pattern observed for control variables is still consistent with previous evidences.

In order to provide an economic idea of the empirical evidences above presented, consider once again the average sampled firm previously defined. The corresponding value of I_FIRM_CL4 is 2.662, while at least the 25 percent of sampled observations can be defined as isolated, showing a cluster value equals to 1, or aggregated, with a cluster value equals to 4. Results of model 1 are consistent with previous findings . this time indeed, *ceteris paribus*, the location premium is quantifiable as about the 90 (90.85) percent of the market-to-book ratio (0.712 = -0.071 x 2.662 + 0.436 x 2.067; 2.039 = $e^{(0.712)}$; 0.9085 = 2.039/2.24). Moreover, the effect of I_INCOME is estimated once more about 3 (2.98 = 0.3689/1.097) times stronger than I_FIRM_CL4. In fact, *ceteris paribus*, on average on average I_FIRM accounts for more than the 36 (36.89) percent of the market-to-book ratio (-0.189 = -0.071 x 2.662; 0.828 = $e^{(-0.189)}$; 0.3689 = 0.828/2.24), while the same estimate with reference to I_INCOME is equal to more than the market-to-book value (0.901 = 0.436 x 2.662; 2.463 = $e^{(0.901)}$; 1.097 = 2.463/2.24). Besides, consider now the sampled average but isolated firm (i.e. I_FIRM_CL4 is equal to 1) that, because of local IPOs, *de facto* changes its spatial status becoming more aggregated with other listed firms and, accordingly, increases its value of I_FIRM_CL4 up to 2. Our results imply, *ceteris paribus*, a negative variation of the local home bias effect, and thus of the location premium, equals to the 11.66 percent. Notably, for a firm that moves from the first level of clustering of the subjective spatial distribution of other listed firms (i.e. L1.I_FIRM_CL4 = 1) to the second one (i.e. D1.I_FIRM_CL4 = 1 and UP_D = 1), the estimated absolute variation in the LN(MARKET-TO-BOOK RATIO) is equal to -0.124 (-0.124 = -1.840 x (2-1) + 1.716 x (2-1) x 1), which corresponds to a relative variation of corporate market value equals to 11.66 percent (0.1166 = $e^{(-1.802)}$ – 1). If the same firm increases its value of I_FIRM_CL4 up to 3 or 4, the corresponding negative variation is estimated equal to the 21.96 percent and to the 31.06 percent respectively. On the opposite, all else being equal, the aggregated firm (i.e. I_FIRM_CL4 is equal to 4) which becomes more isolated (i.e. DOWN_D = 1) because of local delistings, experiences a positive variation of the local home bias effect, and ultimately of the location premium, which is estimated equals to the 29.43 percent, the 18.77 percent, and the 9.98 percent if the resulting level of clustering of the subjective spatial distribution of other listed firms is equal to 3, 2, and 1 respectively. Finally, because of IPOs, the local home bias effect of firms belonging to second cluster increases more than proportionally with the prospective cluster's value almost 4 (3.91) times up to almost 24 (23.14) times, while decreases of about the 56 (56.40) percent due to delistings. And, similarly, the location premium of firms belonging to third cluster increases up to 26 (26.33) times, while decreasing, of about the 31 (31.06) percent up to the 52 (52.48) percent, as respectively more or less populated by other listed firms becomes the area.

Summing up, overall these evidences strongly support our hypothesis on the dynamic of the local home bias effect and of the location premium. Notably, other things being equal, firms from year to year more(less) spatially clustered with other listed firms because of local IPOs(Delistings) experience a decrease(increase) of the local home bias effect and thus of the location premium. Moreover the initial level of clustering inversely determines such dynamic. Backward reasoning, these evidences provide also further robustness to our previous findings on the significance and on the components of the firm location premium. However, it is noted that some evidences remain unexplained. At first, the overturned pattern of the location premium's change rate observed for firms belonging to central clusters. Results suggest that there is an enhancing performance factor due to firms' aggregation which, up to certain levels of clustering, more than counterbalances the local home bias effect. On that, the management literature and researchers in industrial organization, organizational ecology, and economic geography have documented the positive role exerted from geographical clustering because of the gaining access to complementary resources (knowledge, information, money as well as physical resources), risk sharing and synergies of resource sharing (see Rosenthal and Strange, 2004, for a review of this literature). However, the financial literature lacks to provide evidences in this sense. Secondly, the greater strength of the aggregation effect with respect the isolationist one. In other words, why a local IPO affects market prices of neighboring firms more than a local delisting? In this regards, *a priori* speaking, a reliable explanation seems to be related to the structural fact that while an IPO implies by definition a repositioning of investors portfolio, a delisting does not. For simplicity, think to delistings due to bankruptcy. However, behavioral explanations also might be in play. For instance, while stocks in IPOs are likely to be attention-grabbing stocks, stocks going private are not, or, at least, just with a lesser extent (Barber & Odean, 2008). In this framework, if stocks are able to inherit part of the attention captured by local IPOs and delistings, *ceteris paribus*, a relative larger price reaction to the former with respect to the latter will be expected. Moreover, such asymmetrical reaction should be more pronounced as more as IPOs are perceived by investors as good news whilst delistings as bad news (see Skinner, 1994, and Diamond and Verrechia, 1997, among the first), as indeed it seems possible to hypothesize.

7. Conclusions

The existence of a significant and non-homogeneous local imbalance between potential demand for securities, fairly widespread on the national territory, and potential supply of securities, mainly concentrated in a few districts, joined with the cultural and institutional environment makes

Italy an ideal setting for analysis to investigate phenomena linked to locality in general and, among these, particularly the local home bias, which is the apparently irrational preference of investors for geographically proximate securities.

Nowadays the geographic component of price formation in equity-markets and the existence of local home bias is incontrovertible. However, little empirical evidences have been provided regarding its implications on asset pricing equilibrium. Once introduced a new asset pricing model, this paper assess the value and the dynamic of firms' geographical position, that is the location premium, and, with that, the local home bias effect on corporate market value with reference to a sample made by all non-financial firms issuing ordinary shares traded at Milan Stock Exchange over the period 1999–2007 and headquartered within Italian borders. Notably, we find that on average non-financial firms not included in the FTSE MIB Index exhibit a location premium equals to almost 0.8 times their market-to-book value. The location premium decreases the more the issuing firm is close to other listed firms, and, almost three times stronger, the more the issuing firm is distant from investors' income. Furthermore, we find that the local home bias effect and thus the location premium of firms that become more or less isolated as consequences of Delistings or IPOs, varies consistently conditioned to the firm's original spatial status with respect of other listed firms. Notably, while the location premium of highly isolated(aggregated) firms decreases(increases) up to the 31.1(29.43) percent for the aggregation(isolation) effect of IPOs(Delistings), the location premium of firms belonging to secondary clusters reacts the opposite. In any case, the aggregation effect appears stronger than the isolation effect.

Overall these findings, first of their kind, are strongly consistent with several previous evidences provided in financial literature. Indeed, the paper adds in several ways and along several dimensions to the existing literature on asset pricing, local home bias, IPOs, and Public-to-Private Transactions. Several and significant methodological, theoretical and practical implications come out. However, some evidences ever emerged earlier, even conceivable, remain unexplained A tentative explanation for these findings is provided and, arguably, they will be the subjects of future research.

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Table 1 – Summary Statistics and Pairwise Correlations.

Panel A reports summary statistics on firm characteristics. Panel B presents Spearman's rank correlation coefficients of variables involved in multivariate analysis. The sample consists of 1,668 firm-year observations on non-financial firms issuing ordinary shares traded at MSE over the period 1999 – 2007 and headquartered whithin the Italian territory. Financial firms are those with one-digit Primary SIC equal to 6 (FINANCIAL_D = 1). *MARKET-TO-BOOK RATIO* is the ratio of EQUITY-MARKET VALUE to EQUITY BOOK VALUE. *RATIO* is the ratio of the aggregate EQUITY BOOK VALUE of listed firms headquartered in a given Italian region to the aggregate DISPOSABLE INCOME (less Equity Income) of the households living in the same region. *I_FIRM* is the Johnson and Zimmer's dispersion index computed with reference to the headquarters of all other sampled listed firms. *I_CL_FIRM_4* is the value of the belonging cluster in range 1:4; the higher the cluster value, the higher the cluster average value of *I_FIRM*. *I_INCOME* is the weighted Johnson and Zimmer's dispersion index computed with reference to each capital city of province and with weights equal the provincial per capita DISPOSABLE INCOME normalized by the aggregated provincial per capita DISPOSABLE INCOME. *FTSE_D* equals one if the firm is included in the Italian equity-market's primary index and zero otherwise. *PRESS COVERAGE* is the yearly number of newspaper articles concerning the correspondent firm. *FIRM AGE* is the number of years since the firm's foundation. *R&D TO SALES* is the ratio of R&D to SALES. *ROE* is the ratio of net profit income to the EQUITY BOOK VALUE. *FIRM SIZE* is the value of total asset. Italian territory's sub-areas have been indentified according to NUTS codes: COUNTRY (NUTS0), MACRO-AREA (NUTS1), REGION (NUTS2), PROVINCE (NUTS3). Exception is represented by the region Trentino Alto Adige whose data were obtained by aggregating the data on the two autonomous provinces of Trento and Bolzano-Bozen. NUTS stands for Nomenclature for the Statistics Territorial Units. * indicate statistical significance at 1% levels.

Panel A - Summary Statistics

	Mean	*Median*	*25th Percentile*	*75th Percentile*
MARKET-TO-BOOK RATIO	2.36	1.73	1.14	2.66
RATIO	0.489	0.515	0.194	0.645
I_FIRM	2.838	2.868	1.555	3.824
CL_I_FIRM_4	2.676	3	1	4
I_INCOME	2.052	2.181	1.883	2.271
FTSE_D	0.10	0	0	0
PRESS COVERAGE	29	13	7	23
FIRM AGE (Years)	39	24	12	56
R&D TO SALES	0.67%	0.00%	0.00%	0.00%
R&D_D	0.78	1	1	1
ROE	4.01%	6.71%	0.10%	13.49%
FIRM SIZE (Mln €)	3,129	363	137	1,410

Panel B - Pairwise Correlations

		#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12
#1	LN(MARKET-TO-BOOK RATIO)	1											
#2	RATIO	-0.0108	1										
#3	I_FIRM	-0.0047	0.1027*	1									
#4	CL_I_FIRM_4	-0.0131	0.1794*	0.9472*	1								
#5	I_INCOME	0.0325	-0.3068*	0.6679*	0.6134*	1							
#6	FTSE_D	0.2017*	0.1982*	0.0024	0.0365	-0.1457*	1						
#7	LN(1+PRESS COVERAGE)	0.2927*	0.0639*	-0.041	-0.0249	-0.1464*	0.4491*	1					
#8	LN(1+FIRM AGE)	-0.2486*	0.0994*	-0.0066	-0.0096	-0.0780*	0.047	-0.1601*	1				
#9	R&D TO SALES	-0.0003	0.0124	0.0304	0.0209	0.0259	0.2054*	0.1135*	0.0956*	1			
#10	R&D_D	0.001	-0.0205	-0.0121	-0.0039	-0.0077	-0.2258*	-0.1168*	-0.1096*	-0.9420*	1		
#11	ROE	0.3160*	0.0414	-0.0543	-0.0720*	-0.0275	0.1978*	0.1668*	0.0463	0.0515	-0.0557	1	
#12	LN(FIRM SIZE)	0.002	0.1025*	-0.0316	-0.0135	-0.1666*	0.4784*	0.6303*	0.1576*	0.1301*	-0.1406*	0.2660*	1

Figure 1 – The Geography of Italian Listed Firms: Regional Demand and Supply for Stocks.

Figure 1 reports: i) the location of each sampled firm's headquarters, distinguishing non-financial firms (blue and circular data-point) from financial firms (red and triangular data-point) (I Quadrant); ii) the yearly average value over the period 1999-2007 of the aggregate EQUITY BOOK VALUE of firms headquartered in each Italian region split by quintiles (II Quadrant); iii) the yearly average value over the period 1999-2007 and split by quintiles of the aggregate DISPOSABLE INCOME (less Equity Income) of the households living in each region (III Quadrant); iv) the yearly average value over the period 1999-2007 and split by quintiles of the RATIO variable calculated at region level (IV Quadrant). Besides, Quadrant II, III, and IV report the yearly average value over the period 1999-2007 of the regional mean value of the variables I_FIRM, I_INCOME, and I_FIRM and I_INCOME, respectively. The sample consists of 2,463 firm-year observations on firms issuing ordinary shares traded at MSE over the period 1999 – 2007 and headquartered whithin the Italian territory. Financial firms are those with one-digit Primary SIC equal to 6 (FINANCIAL_D = 1). EQUITY BOOK VALUE is the book value of common equity. DISPOSABLE INCOME is the households' disposable income. RATIO is the ratio of the aggregate EQUITY BOOK VALUE of listed firms headquartered in a given Italian region to the aggregate DISPOSABLE INCOME (less Equity Income) of the households living in the same region. I_FIRM is the Johnson and Zimmer's dispersion index computed with reference to the headquarters of all other sampled listed firms. I_INCOME is the weighted Johnson and Zimmer's dispersion index computed with reference to each capital city of province and with weights equal the provincial per capita DISPOSABLE INCOME normalized by the aggregated provincial per capita DISPOSABLE INCOME. Italian territory's sub-areas have been indentified according to NUTS codes: COUNTRY (NUTS0), MACRO-AREA (NUTS1), REGION (NUTS2), PROVINCE (NUTS3). Exception is represented by the region Trentino Alto Adige whose data were obtained by aggregating the data on the two autonomous provinces of Trento and Bolzano-Bozen. NUTS stands for Nomenclature for the Statistics Territorial Units.

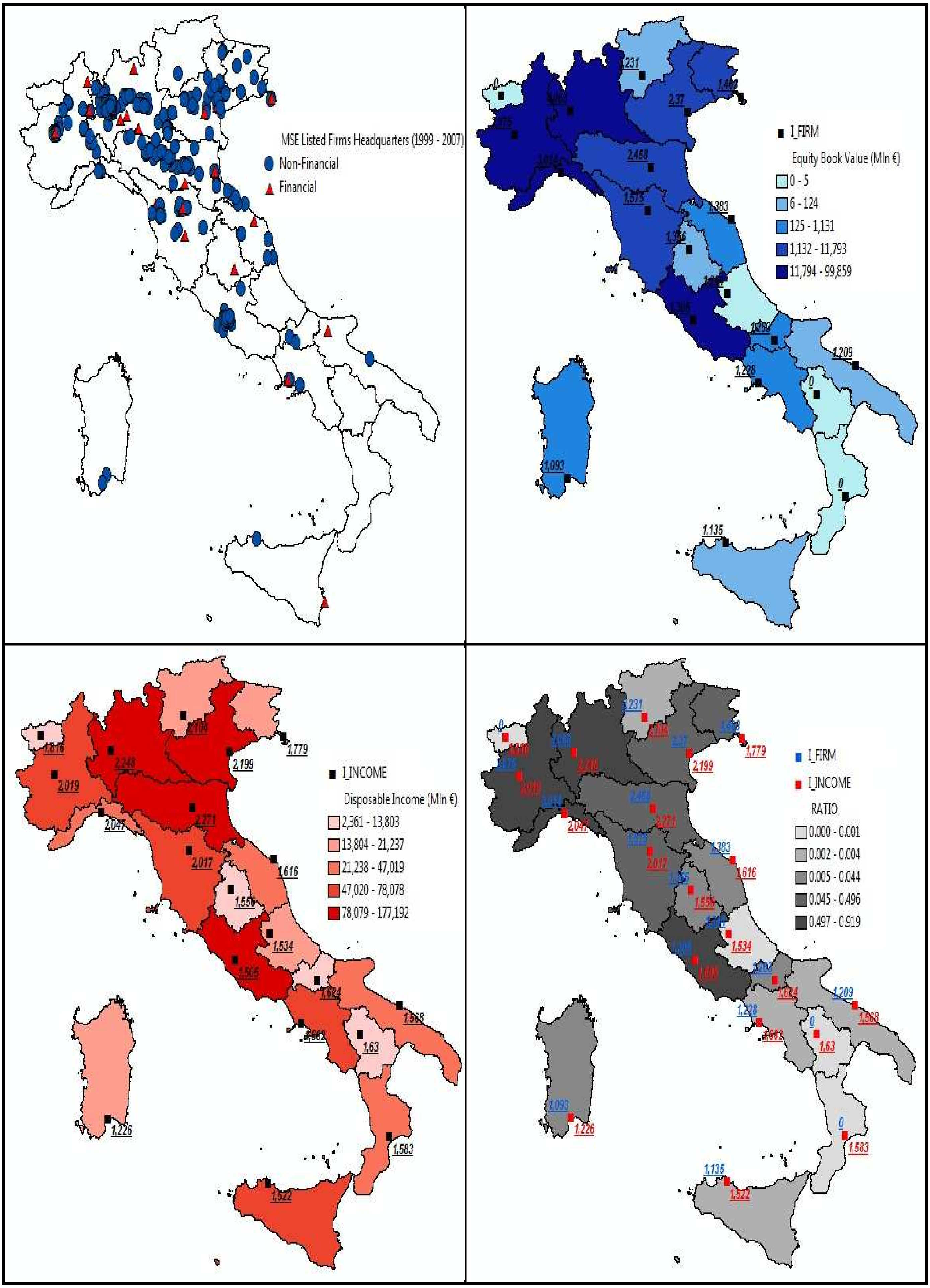
MSE Listed Firms Headquarters (1999 - 2007)
Non-Financial
Financial
I_FIRM
Equity Book Value (Mln €)
0 - 5
6 - 124
125 - 1,131
1,132 - 11,793
11,794 - 99,859
I_INCOME
Disposable Income (Mln €)
2,361 - 13,803
13,804 - 21,237
21,238 - 47,019
47,020 - 78,078
78,079 - 177,192
I_FIRM
I_INCOME
RATIO
0.000 - 0.001
0.002 - 0.004
0.005 - 0.044
0.045 - 0.496
0.497 - 0.919

Table 2 – The Geography of Italian Listed Firms: Local Demand and Supply for Stocks - Descriptive Statistics.

Table 2 reports descriptive statistics on the spatial distribution of Italian listed firms and the local demand and supply for stocks. Statistics are calculated at COUNTRY (NUTS0), MACRO-AREA (NUTS1), and REGION (NUTS2) level. MACRO-AREAs and REGIONs are sorted in alphabetical order. The sample consists of 2,463 firm-year observations on firms issuing ordinary shares traded at MSE over the period 1999 – 2007 and headquartered whithin the Italian territory. *LISTED FIRMS* is the number of firm-year observations. *NON-FINANCIAL LISTED FIRMS* is the number of firm-year observations related to non-financial firms. Financial firms are those with one-digit Primary SIC equal to 6 (FINANCIAL_D = 1). Columns from 4 to 9 report the yearly average value over the period 1999-2007 of the correspondent variable. *POPULATION* is the resident population. *EQUITY BOOK VALUE* is the book value of common equity. *DISPOSABLE INCOME* is the households' disposable income. *RATIO* is the ratio of the aggregate *EQUITY BOOK VALUE* of listed firms headquartered in a given Italian geographical sub-area to the aggregate *DISPOSABLE INCOME* (less Equity Income) of the households living in the same Italian geographical sub-area. *I_FIRM* is the Johnson and Zimmer's dispersion index computed with reference to the headquarters of all other sampled listed firms. *I_INCOME* is the weighted Johnson and Zimmer's dispersion index computed with reference to each capital city of province and with weights equal the provincial per capita *DISPOSABLE INCOME* normalized by the aggregated provincial per capita *DISPOSABLE INCOME*. Italian territory's sub-areas have been indentified according to NUTS codes: COUNTRY (NUTS0), MACRO-AREA (NUTS1), REGION (NUTS2), PROVINCE (NUTS3). Exception is represented by the region Trentino Alto Adige whose data were obtained by aggregating the data on the two autonomous provinces of Trento and Bolzano-Bozen. NUTS stands for Nomenclature for the Statistics Territorial Units.

ITALY - MACRO-AREA - REGION		LISTED FIRMS (Firm-Year Obs.)	NON-FINANCIAL LISTED FRMS (Firm-Year Obs.)	POPULATION (Mln)	EQUITY BOOK VALUE (Mln €)	DISPOSABLE INCOME (Mln €)	RATIO	I_FIRM	I_INCOME
(1)		(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
NUTS0 - COUNTRY									
Italy	.	2,463	1,668	57.70	300,598	920,084	0.325	2.933	1.851
NUTS1 - MACRO-AREA									
Centre	(C)	494	349	11.09	96,538	191,935	0.497	1.390	1.616
Islands	(I)	20	17	6.64	1,023	77,853	0.013	1.108	1.522
North-East	(NE)	510	401	10.81	32,142	200,636	0.158	2.324	2.199
North-West	(NW)	1,400	871	15.17	170,360	286,222	0.595	3.782	2.019
South	(S)	39	30	14.00	534	163,439	0.003	1.242	1.662
NUTS2 - REGION									
Abruzzo	S	2	2	1.28	5	17,553	0.001	1.344	1.534
Aosta Valley	NW	0	0	0.12	0	2,361	0.000	0.000	1.816
Apulia	S	5	2	4.04	89	47,020	0.002	1.209	1.568
Basilicata	S	0	0	0.60	0	7,305	0.000	0.000	1.630
Calabria	S	0	0	2.01	0	22,935	0.000	0.000	1.583
Campania	S	22	16	5.74	285	64,458	0.005	1.228	1.662
Emilia-Romagna	NE	281	228	4.06	11,793	80,654	0.144	2.458	2.271
Friuli-Venezia Giulia	NE	54	42	1.19	10,604	21,237	0.496	1.463	1.779
Lazio	C	300	227	5.21	83,783	90,024	0.920	1.305	1.505
Liguria	NW	63	34	1.59	17,696	28,590	0.608	3.014	2.047
Lombardy	NW	1,033	627	9.19	99,859	177,193	0.559	4.068	2.248
Marche	C	44	32	1.49	1,132	24,771	0.045	1.383	1.616
Molise	S	10	10	0.32	155	4,168	0.037	1.263	1.624
Piedmont	NW	304	210	4.27	52,805	78,078	0.691	2.976	2.019
Sardinia	I	11	11	1.64	922	21,016	0.044	1.093	1.226
Sicily	I	9	6	5.00	101	56,837	0.002	1.135	1.522
Trentino Alto Adige	NE	3	3	0.96	29	17,854	0.002	3.231	2.104
Tuscany	C	141	90	3.55	11,499	63,336	0.178	1.575	2.017
Umbria	C	9	0	0.84	124	13,803	0.009	1.356	1.556
Veneto	NE	172	128	4.60	9,715	80,891	0.117	2.370	2.199

Table 3 – The Effect of RATIO, and I_FIRM and I_INCOME on Corporate Market Value

Table 3 reports results from the multivariate analysis of the *LN(MARKET-TO-BOOK RATIO)* once proxied the local equity-market conditions by the *RATIO* (Models 1-3) and by *I_FIRM* and *I_INCOME* variables (Models 4-6). The sample consists of 1,668 firm-year observations on non-financial firms issuing ordinary shares traded at MSE over the period 1999 – 2007 and headquartered whithin the Italian territory. Financial firms are those with one-digit Primary SIC equal to 6 (FINANCIAL_D = 1). *MARKET-TO-BOOK RATIO* is the ratio of EQUITY-MARKET VALUE to EQUITY BOOK VALUE. *RATIO* is the ratio of the aggregate EQUITY BOOK VALUE of listed firms headquartered in a given Italian region to the aggregate DISPOSABLE INCOME (less Equity Income) of the households living in the same region. *I_FIRM* is the Johnson and Zimmer's dispersion index computed with reference to the headquarters of all other sampled listed firms. *I_INCOME* is the weighted Johnson and Zimmer's dispersion index computed with reference to each capital city of province and with weights equal the provincial per capita DISPOSABLE INCOME normalized by the aggregated provincial per capita DISPOSABLE INCOME. *FTSE_D* equals one if the firm is included in the Italian equity-market's primary index and zero otherwise. *PRESS COVERAGE* is the yearly number of newspaper articles concerning the correspondent firm. *FIRM AGE* is the number of years since the firm's foundation. *R&D TO SALES* is the ratio of R&D to SALES. *ROE* is the ratio of net profit income to the EQUITY BOOK VALUE. *FIRM SIZE* is the value of total asset. Also included in the regressions (but not shown) are a dummy variable which equals to one if the firm does not report R&D (R&D_D), a set of four-digit SIC industry dummies, dummies for segment listing, and year dummies. Italian territory's sub-areas have been indentified according to NUTS codes: COUNTRY (NUTS0), MACRO-AREA (NUTS1), REGION (NUTS2), PROVINCE (NUTS3). Exception is represented by the region Trentino Alto Adige whose data were obtained by aggregating the data on the two autonomous provinces of Trento and Bolzano-Bozen. NUTS stands for Nomenclature for the Statistics Territorial Units. In model 1-3: t-statistics based on standard errors clustered by REGION are reported in parentheses. In model 4-6: t-statistics based on standard errors clustered by firm and year are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

		Dependent Variable: LN(MARKET-TO-BOOK RATIO)					
		RATIO			I		
Independent Variables		**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Constant		0.561***	1.053***	1.334***	-0.089	0.347	0.537
		(4.17)	(4.32)	(5.95)	(-0.25)	(0.74)	(1.14)
RATIO	β_1	-0.170*	-0.114*	-0.170**			
		(-2.00)	(-1.91)	(-2.75)			
RATIO*FTSE_D	β_2			0.369***			
				(3.25)			
I_FIRM	γ_1				-0.089**	-0.080**	-0.088**
					(-2.00)	(-2.12)	(-2.27)
I_FIRM*FTSE_D	γ_2						0.205
							(1.48)
I_INCOME	γ_3				0.393**	0.351**	0.398***
					(2.36)	(2.41)	(2.66)
I_INCOME*FTSE_D	γ_4						-0.912*
							(-1.66)
FTSE_D	β_{FTSE}, γ_{FTSE}			0.077			1.485**
				(0.48)			(2.07)
LN(1+PRESS COVERAGE)			0.263***	0.243***		0.262***	0.241***
			(10.31)	(11.18)		(7.03)	(6.44)
LN(1+FIRM AGE)			-0.115***	-0.117***		-0.111***	-0.116***
			(-3.02)	(-3.47)		(-4.50)	(-4.94)
R&D TO SALES			1.076	1.415**		1.163	1.548
			(1.35)	(2.17)		(1.16)	(1.49)
ROE			0.426***	0.406***		0.408**	0.388**
			(4.39)	(4.11)		(2.30)	(2.24)
LN(FIRM SIZE)			-0.063**	-0.084***		-0.054*	-0.074***
			(-2.58)	(-3.45)		(-1.96)	(-2.70)
Observations		1668	1652	1652	1668	1652	1652
Adjusted R-Squared		0.34	0.45	0.46	0.35	0.45	0.46

		Firms Included in the FTSE MIB Index					
F-test: Effect of RATIO on LN(MARKET-TO-BOOK RATIO)	$\beta_1 + \beta_2$			0.199			
				(2.66)			
F-test: Effect of I_FIRM on LN(MARKET-TO-BOOK RATIO)	$\gamma_1 + \gamma_2$						0.117
							(0.78)
F-test: Effect of I_INCOME on LN(MARKET-TO-BOOK RATIO)	$\gamma_3 + \gamma_4$						-0.514
							(0.97)

Table 4 – The Effect of Variations of Firm Spatial Status on Corporate Market Value

Table 4 reports results from the multivariate analysis of the *LN(MARKET-TO-BOOK RATIO)* once listed firms has been clustered according to the value of I_FIRM variable. The sample consists of 1,489 firm-year observations on non-financial firms issuing ordinary shares traded at MSE over the period 1999–2007, headquartered whithin the Italian territory and not in the FTSE MIB Index. Financial firms are those with one-digit Primary SIC equal to 6 (FINANCIAL_D = 1). Firms in the FTSE MIB Index are those included in the Italian equity-market's primary index (FTSE_D = 1). *MARKET-TO-BOOK RATIO* is the ratio of EQUITY-MARKET VALUE to EQUITY BOOK VALUE. I_FIRM is the Johnson and Zimmer's dispersion index computed with reference to the headquarters of all other sampled listed firms. *I_FIRM_CL4* is the value of the firm belonging cluster in range 1:4; the higher the cluster value, the higher the cluster average value of I_FIRM. *L1.I_FIRM_CL4* is the 1 lag value of *I_FIRM_CL4*. *D1.I_FIRM_CL4* is the first difference value of *I_FIRM_CL4*. *NOVAR_D* equals to one if *D1.I_FIRM_CL4* is equal to zero and zero otherwise. *UP_D* equals to one if *D1.I_FIRM_CL4* is greater than zero and zero otherwise. *DOWN_D* equals to one if *D1.I_FIRM_CL4* is lesser than zero and zero otherwise. *I_INCOME* is the weighted Johnson and Zimmer's dispersion index computed with reference to each capital city of province and with weights equal the provincial per capita DISPOSABLE INCOME normalized by the aggregated provincial per capita DISPOSABLE INCOME. *PRESS COVERAGE* is the yearly number of newspaper articles concerning the correspondent firm. *FIRM AGE* is the number of years since the firm's foundation. *R&D TO SALES* is the ratio of R&D to SALES. *ROE* is the ratio of net profit income to the EQUITY BOOK VALUE. *FIRM SIZE* is the value of total asset. Also included in the regressions (but not shown) are a dummy variable which equals to one if the firm does not report R&D (R&D_D), a set of four-digit SIC industry dummies, dummies for segment listing, and year dummies. Italian territory's sub-areas have been indentified according to NUTS codes: COUNTRY (NUTS0), MACRO-AREA (NUTS1), REGION (NUTS2), PROVINCE (NUTS3). Exception is represented by the region Trentino Alto Adige whose data were obtained by aggregating the data on the two autonomous provinces of Trento and Bolzano-Bozen. NUTS stands for Nomenclature for the Statistics Territorial Units. T-statistic based on standard errors clustered by firm and year are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Independent Variables		Dependent Variable: LN(MARKET-TO-BOOK RATIO) (1)	(2)	(3)	(4)	(5)
Constant		0.389	0.380	0.323	0.337	0.297
		(0.77)	(0.81)	(0.71)	(0.71)	(0.64)
I_FIRM_CL4	δ_4	-0.071**				
		(-2.12)				
L1.I_FIRM_CL4	ζ_1		-0.074**	-0.080**	-0.079**	
			(-2.15)	(-2.27)	(-2.22)	
D1.I_FIRM_CL4	ζ_2		-0.008	0.084	-0.058	
			(-0.13)	(0.69)	(-0.62)	
L1.I_FIRM_CL4*D1.I_FIRM_CL4	ζ_3		0.013	-0.014	0.035	
			(0.43)	(-0.27)	(0.34)	
L1.I_FIRM_CL4*NOVAR_D	ζ_4					-0.080**
						(-2.27)
L1.I_FIRM_CL4*UP_D	ζ_5			-1.721***		-1.802***
				(-7.54)		(-7.61)
D1.I_FIRM_CL4*UP_D	ζ_6			-1.928***		-1.840***
				(-10.99)		(-10.45)
L1.I_FIRM_CL4*D1.I_FIRM_CL4*UP_D	ζ_7			1.731***		1.716***
				(9.20)		(9.32)
UP_D	ζ_{UP}			1.834***		1.829***
				(10.89)		(11.58)
L1.I_FIRM_CL4*DOWN_D	ζ_8				-0.476***	-0.571***
					(-2.79)	(-3.22)
D1.I_FIRM_CL4*DOWN_D	ζ_9				1.746***	1.746***
					(2.87)	(3.02)
L1.I_FIRM_CL4*D1.I_FIRM_CL4*DOWN_D	ζ_{10}				-0.478***	-0.458***
					(-2.87)	(-2.71)
DOWN_D	ζ_{DOWN}				1.719***	1.777***
					(2.86)	(3.13)
I_INCOME	δ_{11}, ζ_{11}	0.436***	0.451***	0.471***	0.475***	0.482***
		(2.85)	(3.18)	(3.32)	(3.19)	(3.32)
LN(1+PRESS COVERAGE)		0.213***	0.230***	0.231***	0.231***	0.232***
		(5.43)	(4.77)	(4.76)	(4.81)	(4.81)
LN(1+FIRM AGE)		-0.117***	-0.132***	-0.130***	-0.132***	-0.130***
		(-4.56)	(-4.70)	(-4.69)	(-4.67)	(-4.68)
R&D TO SALES		1.056	0.816	0.796	0.814	0.790
		(0.94)	(0.66)	(0.64)	(0.66)	(0.63)
ROE		0.457**	0.327**	0.356**	0.328*	0.358**
		(2.08)	(1.97)	(2.28)	(1.96)	(2.27)
LN(FIRM SIZE)		-0.066**	-0.067**	-0.065**	-0.067**	-0.065**
		(-2.28)	(-2.17)	(-2.11)	(-2.16)	(-2.09)
Observations		1489	1206	1206	1206	1206
Adjusted R-Squared		0.37	0.38	0.39	0.38	0.39

Appendix A

Table A1 – Data sources

Data Source	Url	Data Collected
Household level		
ISTAT	www.istat.it	Households' disposable income and resident population at region level.
Rapporto Unioncamere	www.unioncamere.it	Households' disposable income and resident population at province level.
Firm level		
Consob	www.consob.it	List of all firms issuing securities listed at Milan Stock Exchange over the period 1999 - 2007.
Osiris	https://osiris.bvdep.com	Location (Address, City, Province, ZIP code) of the headquarters of each firm included in the sample.
Company Annual Report	www.borsaitaliana.it & company website	Location (Address, City, Province, ZIP code) of the headquarters of each firm included in the sample.
Borsa Italiana S.p.A.	www.borsaitaliana.it	List updated at the end of the last working day of each year over the period 1999-2007 of: i) securities not actively traded and ii) securities included in the S&P MIB Index and MIB30 Index
Il Sole 24 Ore	www.ilsole24ore.com	Firm press coverage: number of articles
Il Calepino dell'Azionista	.	Firm's year of foundation.
Datastream & Worldscope	www.thomsonone.com	Financial and accounting information.
NUTS	http://epp.eurostat.ec.europa.eu	NUTS Codes

Table A2 – Variables definition

Variable	Description
CL_I_FIRM_*Year_N*	The set of ninety variables obtained from clustering sampled observations on the basis of the value of I_FIRM variable using hierarchical clustering with a stopping number *N* equal to ten, the average linkage method, the absolute-value distance. The generic variable CL_I_FIRM_*Year_N*, is defined just in the respective year and assumes values in range 1: *N*, where: *Year* = 1999, 2000, ... , 2007, and *N* = 1, 2, … ,10 is the number of clusters in which firm-year observations has been split.
CL_I_FIRM_*Year_N**	The set of ninety variables obtained from CL_I_FIRM_*Year_N* variables. For each of the CL_I_FIRM_*Year_N* variables: i) clusters has been ranked in ascending order according to the cluster average value of I_FIRM; ii) clusters has been consistently re-coded.
CL_I_FIRM_*N*	The set of ten variables obtained matching over *Year* and for each value of *N* the CL_I_FIRM_*Year_N** variables. The generic variable CL_I_FIRM_*N*, is defined for all sampled firm-year observations, takes value in range 1:*N*, and defines the number of the cluster to which each firm-year observation belongs. Clusters are ranked in ascending order according the yearly cluster average value of I_FIRM variable
DISPOSABLE INCOME	The household' disposable income. It is computed as follow: DISPOSABLE INCOME = Primary Income- Current Taxes - Social Contributions + Social Benefits + Other Net Transfers where: Primary Income = Gross Operating Surplus + Gross Mixed Income + Income from Employment + Financials Income (Equity Income + Non-Equity Income). Source: ISTAT.
DISTANCE	The shortest spherical distance between two points on the Earth's surface in kilometers. Formally, let (θ_s , λ_s) and (θ_f , λ_f) be the geographical latitude and longitude of two points, a base standpoint *S* and the destination forepoint *F* respectively, the DISTANCE $d_{s,f}$ between *S* and *F* is computed as: $d_{s,f} = \arccos\{\cos(lon_s - lon_f)*\cos(lat_s)*\cos(lat_f) + \sin(lat_s)*\sin(lat_f)\}*2\pi r/360$ where: r is the radius of the earth (≈ 6378 km).
D1.I_FIRM_CL4	The first difference value of I_FIRM_CL4
DOWN_D	Equal to one if D1.I_FIRM_CL4 is lesser than zero and zero otherwise.
EQUITY BOOK VALUE	Book value of common equity. Source: Worldscope (datatype: WC03501).
EQUITY-MARKET VALUE	Market value of common equity. Source: Worldscope (datatype: WC08001).
FINANCIAL_D	Equal to one if the one-digit Primary SIC is equal to 6 and zero otherwise.
FIRM AGE	The number of years of firm's life since foundation. Source: Il Calepino dell'Azionista.
FIRM SIZE	Total asset. Source: Worldscope (datatype: WC02999).
FTSE_D	Equal to one if the firm is included in the Italian equity-market's primary index (S&P MIB Index, MIB30 Index) and zero otherwise. Source: Borsa Italiana S.p.A.
I	The Johnson and Zimmer index of dispersion. Formally, given the *2*-dimensional Euclidean space E^2, let the generic point *i* and a sample of *r* random points in E^2, all individuated by the latitude and longitude geographical coordinates, the Johnson and Zimmer index of dispersion I for the point *i* is computed as: $I = \frac{(r+1)\sum_{r=1 \,\&\, r\neq i}^{r}\left(d_{i,r}^{4}\right)}{\left[\sum_{r=1 \,\&\, r\neq i}^{r}\left(d_{i,r}^{2}\right)\right]^{2}}$ where: $d_{i,r}$ is the DISTANCE between the point *i* and each of the *r*-points. The expected value of I, E(I), has a value approached of 2 for a random distribution (E(I) ≈ 2), E(I) < 2 for regular distribution and E(I) > 2 for an aggregated distribution. In the weighted version of *I*, $d_{i,r}$ at the numerator has to be multiplied by $w_{i,r}^2$, while $d_{i,r}$ at the denominator by $w_{i,r}$. Where: $w_{i,r}$ is the weight of $d_{i,r}$.
I_FIRM	The yearly Johnson and Zimmer index of dispersion I computed with reference to the set of points made up by the geographical coordinates (*i.e.* latitude and longitude) of the headquarters of all other listed firms.
I_FIRM_CL4	The value of the belonging cluster in range 1:4. The higher the cluster value, the higher the cluster average value of I_FIRM.
I_INCOME	The yearly weighted Johnson and Zimmer index of dispersion I computed with reference to the set of points made up by the geographical coordinates (*i.e.* latitude and longitude) of each capital city of province and with weights $w_{i,r}$ equal to the provincial per capita DISPOSABLE INCOME normalized by the aggregated provincial per capita DISPOSABLE INCOME.
L1.I_FIRM_CL4	The 1 lag value of I_FIRM_CL4.
MARKET-TO-BOOK RATIO	The ratio of EQUITY-MARKET VALUE to EQUITY BOOK VALUE.
NOVAR_D	Equal to one if D1.I_FIRM_CL4 is equal to zero and zero otherwise.
PRESS COVERAGE	The yearly number of articles concerning the considered firm. Source: Il Sole 24 Ore.
RATIO	The ratio of the aggregate EQUITY BOOK VALUE of the firms headquartered in a given geographical area to

	the aggregate DISPOSABLE INCOME (less Equity Income) of the households living in the same geographical area. Formally, considering at year *t* an economy where *I* listed firms and *K* households are located in the region *j*, the RATIO for region *j* is computed as: $$RATIO_{j,t} = \frac{\sum_i BV_{i,j,t}}{\sum_k DI_{k,j,t}}$$ where: $BV_{i,j,t}$ is the EQUITY BOOK VALUE of the listed firm *i* headquartered in the region *j* in the year *t*, and $DI_{k,j}$ is the DISPOSABLE INCOME of the household *k* living in the region *j* in the year *t*.
R&D	Research and development expense. Source: Worldscope (datatype: WC01201).
R&D_D	Equal to one if the firm does not report R&D and zero otherwise.
R&D TO SALES	The ratio of R&D to SALES.
ROE	The ratio of firm's net profit income to the EQUITY BOOK VALUE. Source: Datastream (datatype: DWRE).
SALES	Net sales or revenues. Source: Worldscope (datatype: WC01001).
SOE_D	Equal to one if the firm's largest ultimate owner is the Italian government, a local authority (county, municipality, etc.), or a government agency and zero otherwise. Data Source: database used in (Mengoli, Pazzaglia, & Sapienza, 2009) for the years from 1999 to 2005, and database used in (Mengoli, Pazzaglia, & Sapienza, 2011) for 2006 and 2007.
UP_D	Equal to one if D1.I_FIRM_CL4 is greater than zero and zero otherwise.