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Secondary market listings in equity crowdfunding: The missing link?

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ABSTRACT

While the prevalence of equity crowdfunding has increased, investors have had very few opportunities to exit such investments. Thus, several equity crowdfunding platforms have started considering the development of secondary markets for buying and selling shares. Using detailed data from the world's first secondary market for equity crowdfunding, we investigate whether plans to list on the secondary market increase investor participation and thus the amount of money entrepreneurs raise during their equity crowdfunding campaigns. We find that in the early days of the secondary market, communicating a listing plan attracted more investors and larger investment sums. However, these effects largely disappeared after the first two years of secondary market operation. We interpret this to stem from investors' recognition of the insufficient liquidity of the secondary market and thus its probable inability to constitute a viable exit route. We also find that ex post, many entrepreneurs forgo listing, especially if their campaigns are not sufficiently successful, which implies significant costs associated with a listing. Our findings offer valuable insights to platforms aiming at launching secondary markets and regulators responsible for validating relevant initiatives. Specifically, we highlight how participation in equity ownership can be increased through well-functioning secondary markets, which however are difficult to achieve within equity crowdfunding.

1. Introduction

In recent years, equity crowdfunding platforms have begun enabling startups to raise early-stage funding to finance their development (Ahlers et al., 2015; Blaseg et al., 2021; Drover et al., 2017; Hornuf and Schwienbacher, 2016; Stevenson et al., 2019; Vismara, 2018; Walthoff-Borm et al., 2018a). In exchange for their investment, crowd investors receive private, illiquid shares. Similar to venture capital investors and business angels, crowd investors need to be able to sell their shares to recover their money. Two important exit routes are initial public offerings (IPOs) and trade sale exits (Black and Gilson, 1998); however, these events are rare for early-stage startups. A recently developed alternative route is secondary markets,[1] whose main objective is to create liquidity for current crowd investors who cannot or do not wish to wait for a formal stock market listing or a trade sale. Simultaneously, secondary markets allow new investors to invest in early-stage companies outside actual funding rounds. Nevertheless, offering viable exit opportunities for crowd investors remains a missing part of the equity crowdfunding model (Cumming et al., 2019; Cummings et al., 2020). In this paper, we investigate the viability and benefits of secondary markets for equity crowdfunding. More specifically, we examine the mechanisms of secondary market listings from the perspectives of investors and entrepreneurs. First, we adopt the investor perspective by asking the following question: Does announcing a startup's plan to list on a secondary market affect its capacity to raise more funding during an equity crowdfunding campaign (i.e., primary market)? Second, we turn to the entrepreneur perspective by exploring what ultimately induces startups to list on such markets after their campaigns.

The main theme that guides us in addressing these research questions is whether secondary markets are viewed as a viable means of exit by crowd investors. In this case, secondary markets would reduce the perceived illiquidity risk of securities purchased on the primary market

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[1] In general, secondary markets for equities refer to any private venue where investors can buy and sell shares that have previously been issued by target companies on the primary market. Secondary markets *for equity crowdfunding* are markets where sellers can express their interest in selling shares and buyers can express their interest in buying shares or, depending on the platform, make offers to sellers. This means that trades may take place without the need for startups to become actively involved or to comply with any further regulations or disclosure requirements. Further discussion is provided in Section 2.

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(the equity crowdfunding campaign). Equity crowdfunding then becomes less risky for investors when coupled with a well-functioning secondary market. Empirical evidence shows that both retail and professional investors value share liquidity (Hanselaar et al., 2019; Nadauld et al., 2019). For instance, Hanselaar et al. (2019) show that companies are able to raise more money on the stock market when the market is more liquid. Nadauld et al. (2019) show that share illiquidity is associated with a significant discount and thus costs for investors. Thus, we expect that a liquid secondary market attracts more funding for startups if entrepreneurs commit to listing on the secondary market. Moreover, this extra funding can stem from investors' willingness to pledge more money, the presence of more investors who are willing to pledge, or both effects together. Entrepreneurs and early investors may also gain through increased market valuation of the startup, since the reduced liquidity risk decreases the cost of capital (the discount rate used in valuation calculations). The extent to which valuations are increased depends on the liquidity of the secondary market. As will become clear in our analysis, crowd investors' expectations change as the level of liquidity becomes clear over time. The effect may even disappear if it turns out that secondary markets do not offer the expected level of liquidity.

Over the last few years, several equity crowdfunding platforms have announced their intentions to set up secondary markets.[2] However, thus far, few have proceeded to establish and maintain their own secondary market.[3] In addition, some have started to collaborate with existing secondary marketplaces to increase their own attractiveness to investors. To the best of our knowledge, no empirical research has yet been undertaken on secondary markets for equity crowdfunding, although a few studies point out the need to establish some to provide exit routes for crowd investors (Borello et al., 2015; Schwienbacher, 2019). However, there is an established body of literature on closely related secondary markets for illiquid assets in other areas, for example, secondary markets for peer-to-peer lending (Holden et al., 2020) and secondary syndicated loan markets (Gande and Saunders, 2012, and Wittenberg-Moerman, 2008, among others), where buyers and sellers trade claims on a third party. In addition, the emerging literature on initial coin offerings is able to cover aftermarket activity because of the abundance of secondary markets for token trading (Fisch, 2019; Momtaz, 2021). The closest research to ours is that of Holden et al. (2020), who use data from large peer-to-peer (P2P) lending platforms. They show that having a secondary market improves the primary issuance market through increased and quicker funding of entrepreneurial projects. However, there are substantial differences between equity crowdfunding and peer-to-peer lending. The latter instruments are less risky and involve a maturity of typically less than two years. In the context of equity crowdfunding, investors' common shares have no maturity date and typically must be held for much longer than loans from P2P lending platforms. Their investment horizon is therefore much longer. Additionally, equity crowdfunded startups generally invest the funds into long-term investments such as R&D (Eldridge et al., 2021), which requires that invested funds stay within the company for many years for the company to realize its potential.

We use proprietary data from the Finnish equity crowdfunding platform Invesdor, which has been collaborating with Privanet, a local broker that has been operating a secondary market for private shares. Together, they established reportedly the world's first secondary market for equity crowdfunding in 2014 (Invesdor, 2014). Our sample contains 25,874 individual investments into 287 unique campaigns, 166 of which were successful in raising funds on the platform (on average, EUR 330,000).

Using this rich dataset, we document the following results. First, from the decision-making perspective of investors, we show that startups that planned to list at the time of their campaigns raised substantially more money than those that did not. The difference is approximately 150 %, which is economically large. However, there is a substantial difference in terms of timing. Listing plan announcements led to an over 300 % increase in fundraising during the first two years of the secondary market's operation (we obtain similar results with slightly longer or shorter periods); however, the effect decreased or even disappeared afterward. The difference is similarly distinct for the number of investors. We perform several robustness checks to ensure that this striking result is not driven by outliers or alternative factors. Moreover, we control for the possible endogeneity of a listing plan, and while we do find partial evidence for endogeneity, our conclusions are robust to controlling for the possibility. In terms of individual investors, we find that individual investment sizes are initially 60 % higher for campaigns with a listing plan, but this effect largely disappears again after the first two years. This suggests that the effect of a listing plan on fundraising is driven by both increased investor participation and increased investment of individual investors. Furthermore, we find that different types of investors are differentially affected by secondary markets, as the effect of a listing plan is significant for only regular crowd investors and not for legal entity investors or key investors. This is consistent with the notion that larger, more experienced investors place limited importance on the presence of a secondary market because they may be less exposed to liquidity shocks.

We interpret these investor-perspective results as follows. Initially, when the secondary market for equity crowdfunding was established, investors could not assess its liquidity; however, they expected it to be adequate, given that they were able to observe adequate previous liquidity on other secondary markets (not equity crowdfunding focused). Thus, investors reacted positively to the prospect of secondary market listings. As equity crowdfunded startups became available for trading, shareholders eventually discovered a lack of liquidity on the secondary market, as little trading was taking place; this, in turn, kept them from investing as before. This result highlights that secondary markets can be beneficial for equity crowdfunding, but only if they ensure sufficient liquidity, which is important especially for regular crowd investors.

Second, taking an entrepreneur perspective, we evaluate the determinants of companies' post-campaign listings. There are several costs associated with listing, including competition effects from the secondary market on the primary market (Andrieu and Groh, 2021; Chen et al., 2013), downward pressure on valuation (see Nadauld et al., 2019, for evidence in private equity), reputational concerns (Akerlof, 1970), and coordination and communication costs (Sapienza and Korsgaard, 1996; Walthoff-Borm et al., 2018b). Indeed, many companies do not list despite the evident benefits of a listing plan for fundraising. We expect that these costs decrease with an increase in the success of a campaign; accordingly, we find that the more successful a company's campaign is, the more likely the company is to become listed on the secondary market after the campaign. Although a listing plan communicated during the campaign does predict the probability of a post-campaign listing (a plan increases the likelihood of listing by approximately 30 %), our findings suggest that many entrepreneurs make the final decision to list only after they know the campaign outcome and may withdraw from listing if the campaign closes with minimal success or, correspondingly, decide to list only post hoc after a highly successful campaign.

Our findings demonstrate to platform managers, entrepreneurs, and policy makers that secondary markets can be used as an effective mechanism to foster equity crowdfunding activity, as long as investors view them as efficient. Practitioners can seek to overcome the challenges of establishing liquid secondary markets by, for instance, collaborating

[2] For example, during 2017, Crowdcube, StartEngine, FundedByMe, and Invesdor announced activities or plans involving secondary markets. However, by mid-2021, two of the platforms still had no secondary market and StartEngine had just begun operating one in late 2020; moreover, Crowdcube started to roll out its secondary market in the latter half of 2021.

[3] Seedrs operates a bulletin board solution and Funderbeam operates a secondary market with auto-matching.

with other platforms or third parties, ensuring sufficient information disclosure, supporting buyers and sellers in price setting, and by leveraging technological advances such as blockchain technology.

The remainder of this article is structured as follows. Section 2 presents relevant literature, sheds light on the features of secondary markets, develops hypotheses, and discusses our empirical setting. Section 3 presents our data and sample statistics. Section 4 presents our main results. Section 5 highlights theoretical and practical implications and concludes.

2. Secondary markets for equity crowdfunding

2.1. Equity crowdfunding and secondary markets

Research on crowdfunding in general and equity crowdfunding in particular has been growing in recent years, notably in terms of understanding the drivers of fundraising outcomes (Ahlers et al., 2015; Hervé et al., 2019; Lukkarinen et al., 2016; Mohammadi and Shafi, 2018: Vismara, 2018). A more recent and much smaller strand of research has investigated the post-campaign performance of crowdfunded startups (Blaseg et al., 2021; Hornuf et al., 2018; Signori and Vismara, 2018; Walthoff-Borm et al., 2018b). Nevertheless, there is very little research on what happens before and after campaigns (Pollack et al., 2021). As pointed out in the introduction, academic literature on exit opportunities for equity crowdfunding investors is particularly scarce. Given the lack of research on secondary markets for equity crowdfunding, in this subsection, we offer a discussion of their function and the challenges associated with their establishment.

Secondary markets for equity crowdfunding have several possible benefits. Similar to stock markets for venture capital funds (Black and Gilson, 1998), secondary markets can offer crowd investors exit opportunities for their otherwise illiquid investments and thereby increase the overall attractiveness of equity crowdfunding. In particular, they facilitate the recirculation of funds into new startups by allowing crowd investors to retrieve and reinvest their money. If they work efficiently, secondary markets may also provide information about market prices to investors and entrepreneurs, which may be particularly useful for assessing startup performance and help investors in making decisions on follow-on financing. Unbiased price quotes are also useful for establishing proper incentives for management and employees since they provide feedback on their actions taken (Roell, 1996). At the margin, secondary markets may even improve the monitoring of companies if the shares offered are purchased by existing shareholders (Burkart et al., 1997). Indeed, they could allow some shareholders to acquire larger stakes in a company and thus have increased incentives to intervene and monitor its management. This can be particularly useful for equity-crowdfunded companies that are often perceived to be suffering from excessive ownership dispersion (Drover et al., 2017), which limits shareholder intervention and generates agency costs.

Crucially, a secondary market for equity crowdfunding is different from a public stock exchange. We define a secondary market for equity crowdfunding as a (usually digital) place where buyers and sellers can meet for the purpose of trading shares in companies that have previously conducted a successful equity crowdfunding campaign. The secondary market may be a mere bulletin board that displays prices, offered quantities, and perhaps the contact details of buyers and sellers (ESMA, 2021); moreover, it may offer clearing and settlement services, matching buyers and sellers and transferring funds and securities. Unlike public stock exchanges, such markets entail no regulatory information disclosure requirements for target companies. A secondary market is designed to facilitate trades of privately held shares outside regulated markets. This means that the amount of extra information generated by secondary markets is limited to price discovery when a transaction takes place, since companies are not forced to disclose financial or non-financial information, unlike publicly listed companies.

Maintaining marketplaces for trading shares of early-stage ventures has also proved difficult outside the equity crowdfunding context (Carpentier et al., 2010). However, experiences from existing marketplaces, such as the Canadian TSX Venture Exchange, suggest that they may offer upside potential for both investors and ventures, although they also concretize the problem of price-setting by individual investors (Carpentier et al., 2010; Carpentier and Suret, 2006). One event that popularized secondary markets for retail investors was the massive sale of Facebook shares prior to its IPO. Many employees who had received shares from stock option plans associated with their early involvement in the company wanted to cash out before Facebook went public and were able to list shares on secondary markets such as SecondMarket (now called Nasdaq Private Market) and SharesPost. These markets allowed the employees to sell Facebook shares and investors to purchase them before the company went public. While Facebook's employees were the first to popularize secondary markets for employee shares, other unicorns such as AirBnB and Lyft subsequently underwent similar events. Alon-Beck (2018) and Larcker et al. (2018) argue that secondary markets for unlisted companies allow companies to stay private longer while offering exit opportunities to investors who want to leave earlier. However, secondary markets may be more prone to insider trading and investor protection concerns, as they are less regulated than formal markets (Diamond, 2012; Osovsky, 2014).

2.2. Empirical setting: Invesdor and Privanet

We address our research questions in the empirical context of Finland, which hosts one of the largest equity crowdfunding markets in Europe (Ziegler et al., 2020, p. 82) and is home to reportedly the world's first secondary marketplace for equity crowdfunding (Invesdor, 2014). As Finnish regulation does not impose lockup periods on investors, they are free to trade their shares soon after the corresponding primary market campaign. In particular, we focus on the longest-standing Finnish equity crowdfunding platform, Invesdor, and a secondary marketplace operated by an investment service group focused on unlisted securities, Privanet. This is a particularly suitable research setting for at least two reasons. First, companies crowdfunded via the Invesdor platform were given an opportunity, but not obligated, to list on Privanet's secondary market. This allows us to compare companies with and without listing plans, as well as companies that do and do not become listed. Second, Invesdor encourages companies to utilize only one class of common shares, which promotes the equal treatment of shareholders and facilitates trading. Investors on Invesdor usually make direct investments in fundraising companies and receive the same voting rights and dividend rights as other shareholders.

Invesdor uses the all-or-nothing model: if a campaign's minimum funding target is not reached by the predetermined end date, all commitments are returned to investors. Invesdor classifies investors into two broad categories: key investors and regular investors. An investor typically earns key investor status when his/her cumulative investments via the platform exceed 10,000 euros. Key investors may receive information about new investment opportunities ahead of other users, and they sometimes receive targeted e-mails or invitations to investor events. However, key investors invest on the same terms as all other investors, and they do not have special shareholder privileges.

Privanet began offering an aftermarket for the securities of unlisted companies in 2001 (Privanet, 2018). In cooperation with Invesdor, Privanet extended this aftermarket to include a list reserved exclusively for equity crowdfunded companies in January 2014 (Invesdor, 2014). Prior to this collaboration, equity crowdfunded companies from Invesdor could technically still have opted to list on Privanet's other lists; however, this option was not promoted, and no such company had listed. The first listings of equity crowdfunded companies took place, to the best of our knowledge, in summer 2014, and the first trades on their shares took place in January 2015. The secondary market subsequently evolved to include companies originally funded via four different equity crowdfunding platforms, including Privanet's own equity crowdfunding

platform Around, which was in operation for three years, beginning in May 2016.[4] Most companies that conducted a successful equity crowdfunding campaign on Around were subsequently listed on the secondary market. The secondary market functioned until mid-2021, when Privanet ceased its operations due to regulatory issues. The key prerequisite for a company to be accepted on Privanet's equity crowdfunding aftermarket was a successful equity crowdfunding campaign. Listing on the aftermarket entailed no obligations and no charges to companies.

Privanet's secondary market displayed investors' buy and sell orders publicly online and provided the related clearing and settlement services. The trading process on the secondary market is depicted in Fig. 1. First, an investor places a buy or sell order containing the investor's name, the type of security, the order type (buy or sell), the number of securities, the price limit, the period of validity (maximum one month), and any special conditions regarding transaction execution (e.g., requirements pertaining to the minimum acceptable lot size). After a broker accepts the order, it becomes visible on the platform. The platform seeks to match orders and execute transactions primarily based on the best available price and secondarily based on the order of arrival. Upon the execution of the transaction, each party pays the platform a 2 % transaction fee (with a minimum of € 30) and a transfer tax (0.8 % per side).[5] After payment, if so agreed upon, Privanet sends the necessary trade information to the target company so it can update its shareholders' register. If no counterparty is found during the validity period of the order, the order lapses (Privanet, 2016).

The liquidity of the secondary market varies considerably by company, with trades on equity crowdfunded companies much less frequent than those on larger companies. Between January 2015 and December 2018, approximately 300 trades took place on the list reserved exclusively for equity crowdfunded companies, that is, approximately 1.4 trades per week. The mean and median number of trades per company was 9 and 2, respectively. Among the companies on the equity crowdfunding list, 70 % were subject to trades. Fig. 2 shows the quarterly trading volume and number of companies for which trades were executed during each quarter for our sample companies listed on Privanet.

2.3. Hypothesis development

In this section, we elaborate on the hypotheses that we later test. To understand the relevance of secondary markets for two key stakeholder groups, investors and companies, we assess two types of prominent decisions: first, investors' decisions to invest in campaigns with or without listing plans, and second, companies' decisions to become listed once it becomes possible after their campaigns. Note that these two decisions relate to different questions that arise at different points in time: the first concerns campaign outcomes, while the second concerns the post-campaign decision to list.

Secondary markets offer a way for investors to trade their shares, also in entrepreneurial firms (Carpentier et al., 2010; Carpentier and Suret, 2006). Current shareholders in need of liquidity can sell, while new investors can buy shares instead of waiting for a follow-up financing round or even an IPO. Thus, for current investors, well-functioning secondary markets reduce the perceived liquidity risk of securities purchased in the primary market (i.e., equity crowdfunding campaigns). It is well documented in the finance literature that investors value liquid shares over illiquid shares since they can sell such shares relatively easily and at will (Amihud and Mendelson, 1991). For instance, Nadauld et al. (2019) offer related evidence for significant illiquidity costs in the context of private equity where secondary markets are also not competitive, finding that illiquidity leads to an average price discount of 5 %.

The regular crowd is prone to liquidity shocks, which can prompt them to sell their shares if a market is available (Lee and Parlour, 2022). Early research into equity crowdfunding offers some evidence that investors value the ability to detach from their shares earlier rather than later, as campaigns with shorter times to planned exit attract more investors than those with longer horizons (Vismara, 2016). Furthermore, the ability to earn returns upon the sale of shares has been found to be the most important factor underlying investors' motivations to invest; this is more important than, for instance, the ability to earn dividends or help entrepreneurs (Lukkarinen et al., 2022). This investor-stated importance of the ability to sell, combined with the possible relevance of shorter investment horizons, suggests that liquidity is important to equity crowdfunding investors, which is similar to the situation of investors in public stock markets (Amihud and Mendelson, 1991) and in private equity (Nadauld et al., 2019). In contrast, investors who must buy illiquid shares discount their value to obtain compensation for the extra risk taken (Lee and Parlour, 2022). This reduced value means investors want to pay less for shares. Similar to lending platforms (as shown by Braggion et al., 2022), crowd investors thus demand better terms from entrepreneurs, which represents a cost for these entrepreneurs.

With the introduction of secondary markets, equity crowdfunding investments become less risky for investors, since they can sell their shares well before a formal exit event such as an IPO or a trade sale (exit routes similar to those of venture capital; Black and Gilson, 1998). Consistent with this view, Hanselaar et al. (2019) show that companies going public are able to raise more money on the stock market when the market is more liquid, suggesting that more investors are willing to participate. The presence of secondary markets can especially attract investors who are risk averse or whose investment horizons are shorter. Others may commit more capital just because they can sell if they want to. Conversely, in the absence of the opportunity to sell, investors may reduce their exposure to shares of equity crowdfunded companies by investing more elsewhere in more liquid assets, such as publicly listed shares (Lukkarinen et al., 2022).

Thus, we expect that the presence of a secondary market attracts more funding for startups, particularly if the entrepreneur has announced a plan to list on the secondary market. We summarize this prediction in Hypothesis 1a.

H1a (Listing plan – campaign level). Companies that communicate a plan to list on a secondary market after their equity crowdfunding campaigns are able to raise more funds than those that do not communicate such a plan.

The larger fundraising amounts hypothesized in H1a may be due to the participation of more investors, individual investors investing larger amounts, or both effects simultaneously (Mochkabadi and Volkmann, 2020). Given that indications of exit potential can affect early-stage equity investors' binary investment decisions (whether or not to invest) as well as individual investment sizes (Bapna, 2019), we expect both effects to be present. As the former effect requires taking a campaign-level perspective and the latter an investment-level perspective, as a direct implication of Hypothesis 1a, we predict the following:

H1b (Listing plan – investment level). Companies that communicate a plan to list on a secondary market after their equity crowdfunding

[4] The creation of Privanet's equity crowdfunding platform temporarily changed Invesdor's and Privanet's relationship from one of cooperation to one of coopetition. Therefore, the creation of Around may have had an adverse impact on Invesdor's willingness to promote the opportunity to list on Privanet's secondary market to its fundraisers. Our models account for this event with year-based dummy variables or a specific "before/after competition" dummy variable.

[5] Source: J. Niemeläinen, Privanet Securities Oy, personal communication, September 24, 2019. These transaction costs, which are clearly higher than those for public stock exchanges, can reduce the attractiveness of secondary markets. In particular, they render secondary markets unsuitable for day trading.

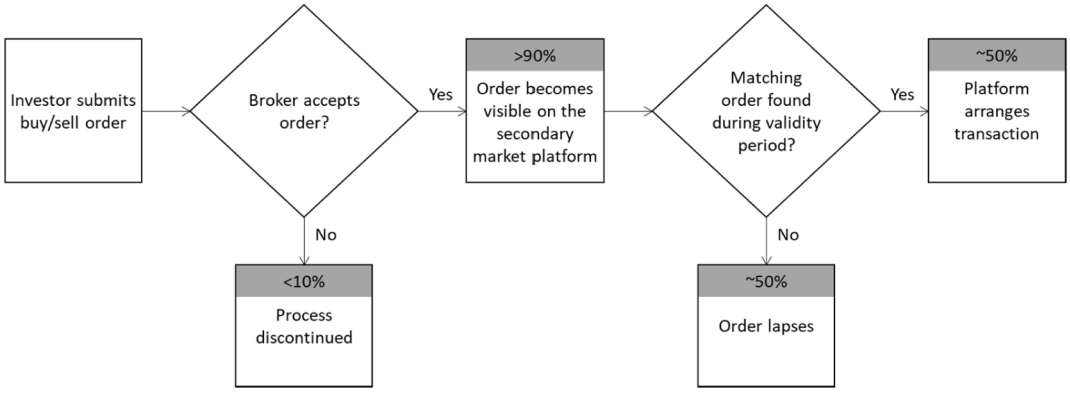

Fig. 1. Secondary market trading process on the focal marketplace Privanet.

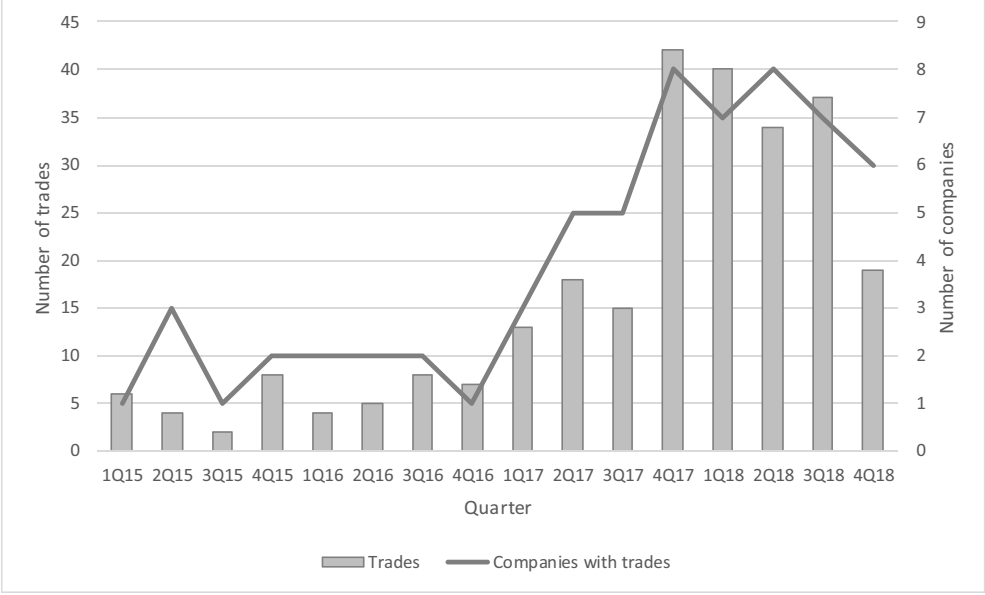

Fig. 2. Quarterly number of trades and number of companies with trades for companies that had conducted an equity crowdfunding campaign on Invesdor by the end of 2018 and became listed on Privanet.

campaigns are able to attract larger individual investments than those that do not communicate such a plan.

Regarding H1a, the amount raised and the number of investors can be tested at the campaign level; however, regarding H1b, an assessment of the drivers of individual investment sizes calls for an investment-level analysis.

The liquidity of the secondary market is a crucial assumption that leads to H1a/H1b. When a secondary market is first set up, investors form expectations about its operation. In particular, they may infer its level of liquidity based on more established, liquid markets, such as public stock exchanges' listings of small and medium-sized growth companies or, as is the case in our empirical setting, from listings of larger private companies that are available on the same secondary market platform. However, the true liquidity of a secondary market dedicated to equity crowdfunding is revealed after the first listings have been posted. Given that crowd investors' expected holding periods are usually long and span years (Elder and Hayes, 2021; Moedl, 2021; Signori and Vismara, 2018), investors are unlikely to expect strong secondary market activity in the first months following a campaign; thus, it can take quite some time for investors to learn about the market's true liquidity. However, as time passes after the first listings and investors begin offering their shares for sale, investors can observe the true liquidity of such a market. As this happens, rational investors then adjust their beliefs about future liquidity and their ability to sell soon, which can alter their willingness to invest in new campaigns if the actual level of liquidity is different from their initial expectations. More specifically, if it turns out that such liquidity is largely absent, the positive impact of a listing plan on entrepreneurs' fundraising capability may be greatly reduced or even disappear. Alternatively, an insufficient increase in stock price may lead investors to refrain from participating in follow-up financing rounds. The impact of changes in beliefs is well documented for entrepreneurs, who – in the same way – adjust their early beliefs on their ideas over time as more information arrives about their viability (McCann and Vroom, 2015; Shepherd et al., 2007). Initial beliefs are generally based on prior knowledge and adjusted as one learns more about the focal phenomenon. As documented by Hastie (2001), decisions made by individuals are the product of beliefs, and changes in beliefs may result in the adjustment of decisions. These belief adjustments may then lead entrepreneurs to even abandon their projects. Regarding secondary markets, crowd investors collectively learn more about the level of liquidity when the first investors start trying to sell their shares. Then, if the secondary market has no liquidity, the positive effect of a listing plan on fundraising derived in Hypotheses H1a/H1b will decrease or even disappear.

After considering the importance of secondary market listing plans for investors' investment decisions during a campaign, we turn to entrepreneurs' actual listing decisions after a campaign. Even an entrepreneur who has communicated a listing plan during his/her campaign may retract it after campaign closure because a listing plan does not constitute a binding obligation. We foresee costs associated with both retracting from a publicly communicated listing plan and listing, which suggests that in equilibrium, not all entrepreneurs will communicate a listing plan or list. In particular, entrepreneurs for whom the costs of retracting or listing are higher than the fundraising gains of a listing plan can be expected to refrain from announcing a listing plan. The main potential costs of retracting and listing are outlined in the next two paragraphs.

The key cost of retracting from a publicly announced listing plan stems from the possibility of entrepreneurs losing credibility or trust, which they are likely to need in future follow-up investment rounds. Investors' ability to trust a company is particularly relevant in the case of further equity crowdfunding rounds, given such investments' riskiness and opacity for crowd investors (Barbi and Mattioli, 2019). The issue of credibility and trust is also relevant in the case of IPOs (Useche, 2014) and when follow-up financing comes from venture capital, since venture capitalists are also concerned about the extent to which they can trust the entrepreneur if they decide to invest (Sapienza and Korsgaard, 1996). Furthermore, damaged investor-side credibility and trust can adversely affect a company's revenue prospects from customers, as many crowd investors play a dual role as both investors and customers of the corresponding companies (Estrin et al., 2018).

Regarding the costs of listing, there are at least four possible costs associated with a company listing on a secondary market. First, an active secondary market may reduce the prospects of a successful follow-up fundraising round, as investors interested in the company may decide to purchase existing shares on the secondary market instead of waiting for the next primary market fundraising round. Given that this reduces the demand for new shares in the primary market (similar to the description of Chen et al., 2013 in other contexts; see also Andrieu and Groh, 2021 for a related argument in the context of venture capital), entrepreneurs considering a follow-up financing round may prefer not to list their shares to reduce this competition between the two markets. In other contexts, Diamond (2012) offers evidence that secondary markets may even lead to insider trading, further reducing the prospects of follow-up fundraising. A second cost is possible downward pressure on valuation, as entrepreneurs may find it difficult to justify a certain valuation in subsequent financing rounds if trades have taken place on the secondary market at a lower valuation between rounds. This argument is consistent with findings regarding private equity markets revealing significant discounts in secondary market transactions (Nadauld et al., 2019). Possible explanations for such discounts include illiquidity and information asymmetry. This negative effect on prices can be amplified in thin markets by investors' fire sales. A third source of costs may be reputational concerns. If too many investors start selling their shares on the secondary market, this may signal that the prospects of the corresponding company have deteriorated. Thus, listing (the necessary condition for trading) may lead to a signal that the company has become a "lemon" (Akerlof, 1970). Fourth, listing may increase demands on startups' (usually already scarce) resources through an increase in the coordination and communication costs associated with new shareholders (Sapienza and Korsgaard, 1996; Walthoff-Borm et al., 2018b).

Many of these expected costs of listing can be mitigated by a highly successful first round of funding (equity crowdfunding campaign), as such a round strongly signals the quality of the offering. Signals are of particular importance in the equity crowdfunding space, as evidenced by Ahlers et al. (2015) and others (Mochkabadi and Volkmann, 2020), because they help entrepreneurs overcome information asymmetry problems, which plague most innovative startups during the fundraising process (Hervé et al., 2019). Because of this signaling effect, an entrepreneur who had a highly successful first round is less likely to be concerned about primary market demand in subsequent funding rounds, downward valuation pressures, or the reputational risks related to secondary market listings. Therefore, we predict a positive relationship between campaign success and the likelihood of a startup becoming listed.

H2 (Listing decision). Startups that have conducted a more successful equity crowdfunding campaign are more likely to be listed on the secondary market.

3. Data, variables, and sample description

3.1. Data

Our initial sample includes all equity crowdfunding campaigns, both successful and unsuccessful, conducted via Invesdor from its inception in May 2012 to March 2021. We exclude any campaigns that are not pure equity crowdfunding campaigns, namely, private campaigns targeted to restricted groups of people, initial public offerings, and bond offerings. Furthermore, we exclude campaigns that did not raise any money, as they are unlikely to be seriously executed campaigns: at the very least, the entrepreneurs themselves or individuals from their close networks are expected to invest to give their campaigns initial momentum. Thus, the final main sample includes 287 campaigns conducted by 244 different companies.

In our investment-level analyses, we include only transactions deemed to reflect real investment intentions, excluding transactions that were cancelled, rejected, or left unpaid. The sample that matches these criteria includes 31,150 unique investments made by 19,731 investors on Invesdor's platform between May 2012 and November 2019. Of these, 29,071 investments are used in our analyses, as the remainder have missing data for some variables.

3.2. Methodology for identification strategy

Our aim is to test the impact of a secondary market on startups' fundraising capacity. Our identification strategy relies on estimating the impact of the announcement of a listing plan by a company on its fundraising capacity. This helps answer the question of whether announcing a listing plan leads to an increase in the money raised during an equity crowdfunding campaign. We further perform similar analyses on the number of investors and the likelihood of achieving the funding goal. Indeed, our data include not only campaign-level information but also investment- and investor-level information. The latter enables us to run our analysis at the investment level and thus examine the impact of investor characteristics on individual investments.

In addition, we use an instrumental variables approach to address the possibility that a listing plan is endogenous. Given the expected positive impact on fundraising in previous campaigns by other companies, entrepreneurs may endogenously decide to commit to listing; this would introduce the possibility of reverse causality. Here, our identifying assumption is that the chosen instrumental variables are not related to the fundraising performance of the campaign in question. To meet this requirement, we construct a time-varying market measure that captures the differences between the funding ratios of recently conducted campaigns with and without listing plans. Larger values of this measure reflect greater fundraising benefits associated with a listing plan in previous campaigns. To ensure that this measure meets the exclusion restriction (that is, that the differences in recent campaigns' performance do not directly affect the focal campaign's fundraising performance), we use a relative measure. While absolute fundraising amounts have increased over time (Lukkarinen et al., 2022) and absolute differences between funding ratios may be larger in hotter markets, relative differences (that is, ratios) between funding ratios are not similarly affected by macro-level variation. At the same time, given that firms

tend to follow successful practices previously adopted by others (Lieberman and Asaba, 2006), we can expect entrepreneurs to be more likely to present a listing plan in their own campaigns if they have observed better fundraising performance among previous campaigns with listing plans. Thus, this instrumental variable meets the relevance condition, as we can expect it to influence the likelihood of a specific campaign portraying a listing plan. The necessary tests to evaluate the validity of this instrument will be performed whenever it is used in the analysis.

An alternative test of the impact of a secondary market on startups' fundraising capacity would have been to see whether campaigns with a commitment to list that were conducted during the period when listing was possible raised more funds than similar campaigns conducted prior to this period. We do not adopt this difference-in-difference approach because while listing commitments could have taken place prior to the collaboration between Invesdor and Privanet, in practice, this never happened. All the listing commitments in our sample occurred after the collaboration started. This makes any difference-in-difference estimation impossible in our case.

3.3. Variables

Our data consist of campaign-, investment- and investor-level variables. The campaign-level explained variables are the *amount raised* during each campaign, the *number of investors* in each campaign (to address H1a), and a dummy indicating whether each company was *listed* on the secondary market (to address H2). The explanatory variable, namely, whether a secondary market *listing plan* was publicly communicated during the campaign, is further described in the next paragraph. We introduce *previous retractions* to control for the number of previously ended successful campaigns that had listing plans but did not list. Consistent with previous literature, we add controls for the *funding target*, the *funding ratio*, company *orientation* (B2B or B2C), *company age*, whether each company had secured funding from a *professional investor* (business angel or VC), the fraction of equity offered in the campaign as *free float*, campaign *duration*, the *minimum investment* accepted in the campaign, the *number of words* on the campaign page, the company's *team size* as presented on the campaign page, whether the company had previously conducted a successful equity crowdfunding campaign (*previous success*), the *social media activity* around the campaign, the number of *simultaneous campaigns* ongoing on the platform, and whether the company was located outside the home country of the platform and secondary market (*foreign campaign*) (Ahlers et al., 2015; Günther et al., 2018; Hornuf et al., 2022; Hornuf and Schwienbacher, 2018; Johan and Zhang, 2020; Lukkarinen et al., 2016; Ralcheva and Roosenboom, 2020).

The investment-level explained variable is the *investment size* by an investor in a campaign (to address H1b). We include a novel control denoting whether each investment was made as a *gift* to another person and a control for the number of *available campaigns* on the platform on the day of the investment (Hornuf and Schwienbacher, 2018). We further include investor-level controls for *investor gender*, *investor age*, whether each investor invested as a *legal entity* or a private person (proxying for investor experience and sophistication), whether the investor had earned *key investor* status on the focal platform (typically earned by people who have invested over 10,000 euros; thus, this is a proxy for large investors), average income per resident in the investor's zip code area (*investor income*), whether the *investor* was located *in* the *company city* (to account for local bias), and whether the *investor* was located *in* a *capital* city (to account for large-city effects) (Günther et al., 2015; Günther et al., 2018; Hervé et al., 2019; Hornuf et al., 2022; Wallmeroth, 2019). All the variables are defined in Table 1.

The *listing plan* variable depicts whether a company publicly communicated a post-campaign listing plan while running its equity crowdfunding campaign. It encompasses three types of plans. Campaigns are considered to have made a *listing commitment* if it was publicly communicated during the campaign that a secondary market listing

Table 1
Definition of variables.

Variable	Description	Source
Campaign-level variables: secondary market listings		
Listing plan	Indicator equal to 1 if it was publicly communicated or otherwise clear during the campaign that a secondary market listing was highly likely to take place after the campaign and 0 otherwise. Includes the following: Listing commitment: It was publicly communicated during the campaign that a secondary market listing would take place following the campaign. Statements referring to a listing possibility with no clear and convincing intentions are not considered commitments and are assigned a value of 0. IPO soon: The company communicated a clear IPO plan soon (c. within a year) after the campaign; such campaigns are often positioned as pre-IPO rounds. Already listed: The company was already listed at the time of the campaign (as a consequence of an earlier equity crowdfunding campaign).	Campaign text extracts sourced from the focal platform's database Web search of platform domain Library search of online media
Listed	Indicator equal to 1 if the company is or has been listed on a secondary market and 0 otherwise. Note that a listing does not presuppose that trades took place. Companies were listed on Privanet, First North Finland, First North Sweden, Nasdaq Helsinki, NGM's Nordic SME list, and the Direct Market segment of the Vienna Stock Exchange.	Websites of secondary markets operated in the home countries of the sample companies
Previous retractions	Number of successful campaigns that ended before the respective campaign that had a listing plan but did not list.	Platform database Campaign text extracts sourced from the focal platform
Campaign-level variables: campaign outcomes		
Amount raised	Total amount raised (in euros) during the campaign. Regression models use the natural logarithm because relative changes in the amount raised are more relevant in this context than absolute changes.	Platform database
Number of investors	Number of investors who participated in the campaign via the platform. Regression models use the natural logarithm because relative changes in the number of investors are more relevant in this context than absolute changes.	Platform database
Campaign successful	Indicator equal to 1 if the campaign reached its minimum funding target and thus was successful and	Platform database

(*continued on next page*)

Table 1 (*continued*)

Variable	Description	Source
	0 otherwise. In a few instances, campaigns that did not fully reach their minimum funding targets nevertheless closed as successful if it was so requested by the company and agreed upon by investors.	
Funding ratio	Total amount raised during the campaign (via the platform and through external investments) as a proportion of the minimum target (or maximum funding target if the campaign has no minimum target).	Platform database
Ratio of funding ratios (X months)	Ratio of the average funding ratios of campaigns with and without a listing plan. Includes campaigns that ended in the last X (6, 9, or 12) months before the end of the respective campaign. Valued 0 if the timeframe does not include campaigns with a listing plan. A value larger than 1 implies that the funding ratios of campaigns with a listing plan were on average larger than those of campaigns without a plan.	Platform database
Entrepreneur's networks	Share of the total amount raised that was collected via external investments, which usually represents larger investments from the entrepreneur's private networks. For example, 0.05 means that 5 % of the total was raised via private networks.	Platform database
Campaign-level variables: campaign content and specifications		
Funding target	Minimum funding target (in euros) of the campaign (or maximum target if the campaign has no separate minimum target, as with IPOs).	Platform database
Orientation	Indicator equal to 1 if the company mostly offers its products directly to consumers (B2C), and 0 if the company mostly sells to businesses or other organizations (B2B).	Campaign text extracts sourced from the focal platform
Company age	Company age (in years) at the time the campaign started.	Orbis database Platform database
Professional investor	Indicator equal to 1 if the company had secured funding from a business angel or a venture capital fund before or during the campaign and 0 otherwise.	Campaign text extracts sourced from the focal platform
Free float offered	Fraction of equity given out by the company if the campaign were to reach its minimum target (or maximum target if the campaign has no minimum target).	Platform database
Duration	Campaign duration (in days). This variable reflects the actual campaign duration, which most often matches the predetermined campaign duration.	Platform database
Minimum investment	Minimum investment (in euros) accepted in the campaign.	Platform database
Number of words	Number of words on the campaign page, excluding any words related to a listing plan description. If the campaign was available in Finnish and English, the length of the longer version is used. Measure of company's preparedness. Regression models use the natural logarithm.	Campaign text extracts sourced from the focal platform
Team size	Number of named individual human team members presented on the campaign main page.	Campaign text extracts sourced from the focal platform
Previous success	Indicator equal to 1 if the company has previously run a successful equity crowdfunding campaign and 0 otherwise.	Platform database Finnish equity crowdfunding platforms' websites
Social media activity	Number of times the campaign page was shared, commented, or reacted to on social media (Facebook and Pinterest).	SharedCount
Simultaneous campaigns	Number of campaigns that were simultaneously ongoing on the platform during the campaign. Average daily number of simultaneous campaigns.	Platform database
Foreign campaign	Indicator equal to 1 if the company is located in a different country than the focal platform and the focal secondary market (i.e., if the company is located outside Finland).	Platform database
Campaign start dummies	Indicator variables based on the campaign start year: Campaign start 2012–14 (reference category) Campaign start 2015–16 Campaign start 2017–18 Campaign start 2019–2021	Platform database
Before or after competition	Indicator equal to 1 if the campaign started before the opening or after the closing of a competing equity crowdfunding platform operated by the focal secondary market provider and 0 otherwise.	Platform database
End after cutoff	Indicator equal to 1 if the campaign ended on or after the cutoff date of 30 June 2016 and 0 otherwise.	Platform database
Valuation	Pre-money valuation of the target company (in millions of euros) as displayed on the campaign page.	Platform database
Campaign updates	Number of updates made to the campaign page during the campaign. The updates are organized under a separate "Updates" title.	Platform database
Revenue generating	Indicator equal to 1 if the company had positive	Platform database

(*continued on next page*)

Table 1 (*continued*)

Variable	Description	Source
	revenue in the fiscal year preceding the campaign and 0 otherwise.	
Campaign-level variables: post-campaign outcomes		
Active	Indicator equal to 1 if the company was still active in spring of 2021 and 0 otherwise. Inactive companies are bankrupt, in liquidation, or dissolved.	Orbis database as of May 2021
Subsequent funding	Indicator equal to 1 if new financial players (private equity, venture capital, mutual or pension fund, financial company, insurance company, bank, or state investment fund) or crowd investors (through a successful equity crowdfunding campaign) joined the company's shareholder base in any year following the campaign or if the company's shares were acquired by a strategic buyer and 0 otherwise.	Orbis database as of May 2021 Finnish equity crowdfunding platforms' websites
Investment-level variables		
Investment size	Size of the investment (in euros). Regression models use the natural logarithm.	Platform database
Gift investment	Indicator equal to 1 if the investor purchased the shares as a gift for another recipient and 0 if the investor made the investment for him/herself.	Platform database
Available campaigns	Number of campaigns that were available on the focal platform on the day of the investment.	Platform database
Investment after cutoff	Indicator equal to 1 if the investment was made on or after the cutoff date of 30 June 2016 and 0 otherwise.	Platform database
Investor-level variables		
Investor gender	Indicator equal to 1 if the investor's probable gender based on his/her first name is female and 0 if it is male.	Platform database Finnish Digital and Population Data Services Agency U.S. Social Security Administration
Investor age	Investor's age (in years) at the time of the investment.	Platform database
Legal entity	Indicator equal to 1 if the investor invests as a legal entity and 0 if the investor invests as a private person.	Platform database
Key investor	Indicator equal to 1 if the investor has been assigned a special status by the equity crowdfunding platform and 0 otherwise. We refrain from using the platform's own term "lead investor" to avoid confusion with the general meaning of this term. Typically, investors whose cumulative investments exceed 10,000 euros are assigned this status. They may receive information about investment opportunities ahead of other investors, targeted e-mails, and invitations to events.	Platform database
Investor income	Mean income (in thousands of euros) per resident in the investor's zip code area. Only available for investors in Finland.	Platform database Statistics Finland
Investor in company city	Indicator equal to 1 if the investor is located in the same city as the target company and 0 otherwise.	Platform database
Investor in capital	Indicator equal to 1 if the investor is located in a capital city and 0 otherwise.	Platform database

would take place after the campaign. Statements referring to a listing possibility with no clear, convincing intentions are not considered commitments. *IPO soon* campaigns are often presented as pre-IPOs, as such companies planned to conduct IPOs soon (within approximately one year) after their campaigns. In both cases, listings mentioned as only a possible future exit strategy are not coded as listing plans. In addition, campaigns conducted by companies that were *already listed* are coded as having a listing plan, as investors in such campaigns can be rather confident that their shares will (continue to) be listed on the secondary market. We use three complementary sources to build our *listing plan* variable. The primary source is a comprehensive document containing all the campaigns' content sourced from the focal platform. We conduct a text search of the original campaign text, campaign updates posted by the entrepreneurs or the platform during the campaigns, and the campaigns' discussion fora, searching for the following keywords in English and Finnish: secondary, aftermarket, after market, marketplace, market place, growth list, stock exchange, stock market, pre-IPO, pre IPO, IPO, public offering, to list, get listed, become listed, listing, Privanet, First North, and Nasdaq. We manually assess each keyword hit to determine whether it includes a listing plan. The press releases, blog posts, and newsletters posted by the focal platform represent the second source. We use the keywords used in the previous phase and manually assess each hit. The third source is the two main economic newspapers of the focal country (Kauppalehti and Talouselämä). We use the previously mentioned keywords in Finnish in combination with the name of the focal platform. As a cross-check of this three-step methodology, we read through the campaigns of all the companies that did become listed to ensure the capture of any company that mentioned a listing plan, which is indeed the case. This process leads to the identification of 32 campaigns with a listing plan.

3.4. Descriptive statistics

Table 2 presents the summary statistics of the sampled campaigns. Panel A presents the full sample, and Panel B compares the mean values for the successful and unsuccessful campaigns. A listing plan was present for 11 % of the campaigns, and 16 % of the campaigns were associated with a secondary market listing. On average, each company received pledges of EUR 330,486 from 120 investors, although there is great variation across the campaigns. Fifty-eight percent of the campaigns successfully reached their funding goals, and 26 % of these eventually listed on a secondary market. Successful campaigns planned to list more often than unsuccessful campaigns (16 % versus 4 %).

Table 3 presents the summary statistics of the campaigns related to secondary market listings. Panel A presents the campaigns with listing plans. Sixty-three percent of the companies with listing plans eventually listed; those that did not either had faced equity crowdfunding campaign failure or decided to act differently. Panel B presents the campaigns of companies that were listed on the secondary market. Forty-four percent

Table 2
Summary statistics of all equity crowdfunding campaigns.

Panel A - All campaigns	Mean	Median	Std. Dev.	Min	Max
Listing plan (0 = no, 1 = yes)	0.11	0.00	0.32	0.00	1.00
Listed (0 = no, 1 = yes)	0.16	0.00	0.36	0.00	1.00
Amount raised (EUR)	330,486	129,879	482,545	293	2,499,266
Number of investors	120	38	207	0	1670
Campaign successful (0 = no, 1 = yes)	0.58	1.00	0.49	0.00	1.00
Funding ratio	117.9 %	101.6 %	127.3 %	0.2 %	1008.4 %
Funding target (EUR)	302,250	200,000	405,433	20,000	4,259,288
Orientation (0 = B2B, 1 = B2C)	0.56	1.00	0.50	0.00	1.00
Company age (years)	5.97	4.00	9.57	0.00	97.00
Professional investor (0 = no, 1 = yes)	0.28	0.00	0.45	0.00	1.00
Free float offered	9.5 %	7.0 %	10.5 %	0.4 %	75.0 %
Duration (days)	69	63	36	1	233
Minimum investment (EUR)	435	304	551	2	5600
Number of words	3189	3038	1776	115	8890
Entrepreneur's networks	14.1 %	0.0 %	29.0 %	0.0 %	100.0 %
Team size	6.49	6.00	3.42	1.00	23.00
Social media activity	304	82	671	0	8309
Previous success	0.14	0.00	0.35	0.00	1.00
Simultaneous campaigns	8.79	8.76	3.78	1.19	20.20
Foreign campaign	0.16	0.00	0.37	0.00	1.00
Before/after competition (0 = no, 1 = yes)	0.54	1.00	0.50	0.00	1.00
Active (0 = no, 1 = yes)	0.76	1.00	0.43	0.00	1.00
Subsequent funding (0 = no, 1 = yes)	0.18	0.00	0.39	0.00	1.00

Panel B - Successful vs. unsuccessful	N		Mean		Difference
	Successful	Unsuccessful	Successful	Unsuccessful	
Listing plan (0 = no, 1 = yes)	166	121	0.16	0.04	0.12***
Listed (0 = no, 1 = yes)	166	121	0.26	0.02	0.24***
Amount raised (EUR)	166	121	508,070	86,859	421,211***
Number of investors	166	121	195	17	178***
Campaign successful (0 = no, 1 = yes)	166	121	1.00	0.00	1.00***
Funding ratio	166	121	185.2 %	25.5 %	159.7 %***
Funding target (EUR)	166	121	330,238	263,854	66,384
Orientation (0 = B2B, 1 = B2C)	166	121	0.61	0.50	0.11*
Company age (years)	166	121	7.20	4.28	2.92**
Professional investor (0 = no, 1 = yes)	166	121	0.36	0.16	0.20***
Free float offered	166	121	8.0 %	11.6 %	−3.6 %***
Duration (days)	166	121	61	81	−20***
Minimum investment (EUR)	166	121	467	391	76
Number of words	166	121	3735	2439	1297***
Entrepreneur's networks	166	121	16.6 %	10.6 %	6.0 %*
Team size	166	121	7.45	5.17	2.29***
Social media activity	166	121	438	121	318***
Previous success	166	121	0.22	0.03	0.18***
Simultaneous campaigns	166	121	8.53	9.15	−0.62
Foreign campaign	166	121	0.11	0.22	−0.11**
Before/after competition (0 = no, 1 = yes)	166	121	0.51	0.58	−0.07
Active (0 = no, 1 = yes)	166	121	0.84	0.65	0.18***
Subsequent funding (0 = no, 1 = yes)	166	121	0.28	0.06	0.22***

Figures represent 287 campaigns conducted on Invesdor. Significance level represents chi2 test result for indicator variables and two-tailed *t*-test result for continuous variables. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

of these companies had committed to listing during their campaigns, which suggests that many companies do not pre-commit to a listing during their campaigns despite their possible intentions to list or that they only decide whether to list afterward, possibly prompted by shareholders' requests. One possible reason is that listing may have adverse effects if shares are traded at very low prices; thus, companies first want to see the outcome of their equity crowdfunding campaigns to determine the overall investor interest in their shares.

Finally, Table 4 presents the summary statistics of the sampled investments. Each observation represents an investment made by a crowd investor. The average investment amount per investor in the full sample is EUR 1880, which is similar to the figures of equity crowdfunding studies from other countries (see, e.g., Hervé et al., 2019, for France). Of the 25,874 investments, 21 % were into campaigns with a listing plan and 39 % into campaigns that led to a listing.

4. Main results

We now turn to the empirical analysis. We proceed as follows. Section 4.1 investigates the impact of a listing plan on campaign outcomes, allowing us to formally test Hypothesis H1a. Section 4.2 analyzes the investments at the investor level to test Hypothesis H1b. Having examined the investments, we turn in Section 4.3 to the determinants of the decision to list on a secondary market for companies that had successful equity crowdfunding campaigns. This analysis is again performed at the campaign level and allows us to test Hypothesis H2.

4.1. *Effect of a listing plan on campaign outcome*

Table 5 presents linear regression models predicting the natural logarithm of the amount raised and thus proposes a formal test of H1a. Model (1) presents the baseline case for the control variables, Model (2)

Table 3
Summary statistics of campaigns related to secondary market listings.

	N	Mean	Median	Std. dev	Min	Max
Panel A - Campaigns with a listing plan						
Listing plan (0 = no, 1 = yes)	32	1.00	1.00	0.00	1.00	1.00
Listed (0 = no, 1 = yes)	32	0.63	1.00	0.49	0.00	1.00
Amount raised (EUR)	32	643,471	404,378	652,021	2603	2,499,266
Number of investors	32	215	103	278	3	1222
Campaign successful (0 = no, 1 = yes)	32	84.4 %	100.0 %	36.9 %	0.0 %	100.0 %
Funding ratio	32	1.91	1.59	1.86	0.05	10.08
Funding target (EUR)	32	537,466	315,758	773,104	25,000	4,259,288
Orientation (0 = B2B, 1 = B2C)	32	0.56	1.00	0.50	0.00	1.00
Company age (years)	32	8.47	6.50	8.03	0.00	32.00
Professional investor (0 = no, 1 = yes)	32	0.28	0.00	0.46	0.00	1.00
Free float offered	32	9.1 %	5.2 %	12.9 %	0.4 %	73.5 %
Duration (days)	32	58	54	42	7	174
Minimum investment (EUR)	32	473	472	493	41	2970
Number of words	32	3429	2952	1987	717	7907
Entrepreneur's networks	32	15.0 %	0.0 %	31.7 %	0.0 %	97.3 %
Team size	32	6.91	6.50	3.30	3.00	16.00
Social media activity	32	557	36	1512	0	8309
Previous success	32	0.31	0.00	0.47	0.00	1.00
Simultaneous campaigns	32	8.20	8.22	3.60	2.00	17.39
Foreign campaign	32	0.19	0.00	0.40	0.00	1.00
Before/after competition (0 = no, 1 = yes)	32	0.63	1.00	0.49	0.00	1.00
Active (0 = no, 1 = yes)	32	0.91	1.00	0.30	0.00	1.00
Subsequent funding (0 = no, 1 = yes)	32	0.25	0.00	0.44	0.00	1.00
Panel B - Campaigns by companies that listed						
Listing plan (0 = no, 1 = yes)	45	0.44	0.00	0.50	0.00	1.00
Listed (0 = no, 1 = yes)	45	1.00	1.00	0.00	1.00	1.00
Amount raised (EUR)	45	717,317	658,950	657,902	5501	2,499,266
Number of investors	45	260	144	275	0	1222
Campaign successful (0 = no, 1 = yes)	45	95.6 %	100.0 %	20.8 %	0.0 %	100.0 %
Funding ratio	45	2.11	1.94	1.53	0.11	10.08
Funding target (EUR)	45	399,750	249,834	427,306	20,000	1,995,000
Orientation (0 = B2B, 1 = B2C)	45	0.78	1.00	0.42	0.00	1.00
Company age (years)	45	6.49	5.00	5.28	0.00	22.00
Professional investor (0 = no, 1 = yes)	45	0.38	0.00	0.49	0.00	1.00
Free float offered	45	9.1 %	5.3 %	12.1 %	0.4 %	73.5 %
Duration (days)	45	60	56	41	7	204
Minimum investment (EUR)	45	453	300	756	41	5250
Number of words	45	3232	3221	1679	713	6730
Entrepreneur's networks	45	18.2 %	0.0 %	33.6 %	0.0 %	100.0 %
Team size	45	7.40	7.00	2.57	3.00	15.00
Social media activity	45	550	25	1396	0	8309
Previous success	45	0.42	0.00	0.50	0.00	1.00
Simultaneous campaigns	45	8.36	8.63	3.27	1.25	16.63
Foreign campaign	45	0.04	0.00	0.21	0.00	1.00
Before/after competition (0 = no, 1 = yes)	45	0.67	1.00	0.48	0.00	1.00
Active (0 = no, 1 = yes)	45	0.96	1.00	0.21	0.00	1.00
Subsequent funding (0 = no, 1 = yes)	45	0.53	1.00	0.50	0.00	1.00

includes the independent variable *listing plan*, and Model (3) proceeds to include the number of previous successful campaigns that had listing plans but did not list. The results suggest that the presentation of a listing plan during an equity crowdfunding campaign increases the amount of money raised by companies. The 95 % confidence intervals of the coefficient of *listing plan* are [0.491, 1.348] in Model (2) and [0.531, 1.340] in Model (3). The regression coefficient suggests that a listing plan increases the amount raised by approximately 150 % ($e^{0.920} - 1 = 1.51$ and $e^{0.935} - 1 = 1.55$). Even the lower ends of the confidence intervals imply an economically meaningful effect of approximately 60 % ($e^{0.491} - 1 = 0.63$ and $e^{0.531} - 1 = 0.70$). The results regarding the control variables are mostly in line with findings from previous equity crowdfunding research. Consumer-oriented companies raise more funds than business-oriented companies (Lukkarinen et al., 2016); companies backed by professional investors have more successful campaigns (Ralcheva and Roosenboom, 2020); larger proportions of equity offered (that is, less retained equity) negatively influence campaign outcomes (Ralcheva and Roosenboom, 2020); and more wordy company descriptions (Johan and Zhang, 2020), the entrepreneurs' networks (Lukkarinen et al., 2016), team size (Johan and Zhang, 2020; Ralcheva and Roosenboom, 2020), and social media activity (Lukkarinen et al., 2016) have positive effects on campaign outcomes. Consistent with investors' local bias (Hornuf et al., 2022), foreign campaigns raise less funds. Our results suggest that campaigns with higher funding targets raise more funding, consistent with the regressions of Lukkarinen et al. (2016) and the correlations of Johan and Zhang (2020) but inconsistent with Piva and Rossi-Lamastra's (2018) statistically significant negative effects and Ralcheva and Roosenboom's (2020) statistically nonsignificant effects. Similar to Ahlers et al. (2015), we find no significant effect of company age on campaign outcomes.

The large marginal effect of committing to list is especially surprising given the eventual lack of liquidity within the secondary market. Given that the argumentation leading to the hypothesized effect of a listing plan on campaign success (H1a) is largely based on the notion that investors value the ability to sell (see Section 2.3), we expect a change in these beliefs when the lack of liquidity becomes apparent. At this point, assuming that investors become aware of the lack of liquidity, the effect of announcing a listing plan should decrease or even disappear. It is likely that the secondary market does not constitute a viable exit route for most investors after all, although they may have initially thought

Table 4
Summary statistics of investments.

	N	Mean	Median	Std. dev	Min	Max
Investment size (EUR)	25,874	1880	541	9536	2	750,000
Listing plan	25,874	0.21	0.00	0.41	0.00	1.00
Listed	25,874	0.39	0.00	0.49	0.00	1.00
Investor gender (0 = male, 1 = female)	25,874	0.20	0.00	0.40	0.00	1.00
Investor age	25,874	42.8	41.0	11.8	16.0	91.0
Investor income (kEUR)	25,874	28.2	26.1	7.9	13.3	81.4
Investor in company city	25,874	0.27	0.00	0.44	0.00	1.00
Investor in capital	25,874	0.31	0.00	0.46	0.00	1.00
Legal entity as investor	25,874	0.07	0.00	0.26	0.00	1.00
Key investor status	25,874	0.20	0.00	0.40	0.00	1.00
Gift investment	25,874	0.04	0.00	0.20	0.00	1.00
Available campaigns	25,874	8.71	8.00	3.75	0.00	21.00
Before/after competition	25,874	0.38	0.00	0.49	0.00	1.00
Investment after cutoff	25,874	0.70	1.00	0.46	0.00	1.00

that it could. Models (4) through (6) assess whether the effect of a listing plan is moderated by investors' (assumed) knowledge of the secondary market's lack of liquidity as the number of listings increases. In this case, investors may revise their view on the benefits of the secondary market and become less influenced by a listing plan in subsequent campaigns. To investigate this possibility that crowd investors learn over time, we first split the sample into two subsamples according to the amount of information prospective investors have accumulated about the efficiency of the secondary market. We thus split the sample into campaigns that took place when the equity crowdfunding secondary market had offered listings for less than two years and campaigns that took place later. As the first companies were listed, to the best of our knowledge, in the summer of 2014, we use 30 June 2016 as the specific cutoff. Thus, at this cutoff, investors have had two years to observe the trading (or lack thereof) of shares listed on the secondary market.[6] Statistically, this cutoff yields subsamples that include relatively balanced quantities of campaigns with listing plans (13 in the first and 19 in the second subsample).

The results of Models (4) and (5) in Table 5 suggest that a listing plan has a large ($e^{1.474} - 1 = 3.37$; thus, an approximately 330 % increase) and statistically significant ($p < 0.01$) effect (95 % CI: [0.604, 2.345]) on the amount raised in the early days of the secondary market (when there were few previous listings) and that this effect decreases economically ($e^{0.437} - 1 = 0.55$, so an approximately 50 % increase) and loses its statistical significance ($p > 0.1$) as more companies are listed (95 % CI: [−0.095, 0.968]). Model (6) incorporates the full time period and an interaction indicator variable. *End date after cutoff* is equal to 1 for campaigns that ended after the cutoff. The results regarding the interaction model are similar to those of the split sample approach: a listing plan increases the amount raised by approximately 320 % ($e^{1.435} - 1 = 3.20$) for campaigns ending before the cutoff and by approximately 50 % ($e^{(1.435-1.000)} - 1 = 0.55$) for campaigns ending after the cutoff. This important finding suggests that investors revise their prior beliefs on the benefits of a secondary market listing after discovering that it does not constitute an effective exit mechanism. In addition, the effect of equity retention emerges, suggesting again that investors become more knowledgeable in their decision making.

Given that it is possible that the listing plan variable is endogenous, we next use two-stage least squares (2SLS) regressions with an instrumental variable that describes the relative funding performance of previous campaigns with listing plans (Table 6). *Ratio of funding ratios (6/9/12 months)* represents the difference in funding ratios between the campaigns with and without listing plans that ended within the previous six, nine, or twelve months. We use this variable as our instrument. As described in Section 3.2, a larger ratio indicates that greater benefits are associated with a listing plan in terms of fundraising capacity during previous campaigns, which could induce the entrepreneurs of current campaigns to announce listings. The first-stage models show that the relative funding performance of previous campaigns with listing plans indeed predicts the likelihood that a campaign will have a listing plan. The first-stage F-statistics range from 9.8 to 15.0, and they are all statistically significant ($p < 0.01$), suggesting that the instruments have additional explanatory power for *listing plan* after all the other variables are controlled. The second-stage results show nonsignificant p values for Durbin and Wu-Hausman tests of endogeneity (except for 9 months, where the p value is less than the limit of 0.05)[7] and thus do not call for a general rejection of the null hypothesis of exogeneity of a listing plan. Therefore, we retain our estimates in Table 5 for assessing the economic significance of a listing plan. In terms of the control variables in the first-stage regression, note that we obtain significantly negative coefficients for the free float offered. This suggests that entrepreneurs commit to listing only if they plan to issue a limited fraction of shares during the campaign.

As the effect of a listing plan on the amount raised is so strikingly large, we perform several robustness checks on the analyses in Table 5, which are available in Online appendix A. First, we check that these results are not due to outliers (Table A1). The results are robust to removing the largest (campaigns that raised >2 million euros and campaigns that raised >1 million euros) and smallest (campaigns that raised <1000 euros) campaigns. Second, we confirm that the results are robust to different cutoffs (Table A2). Third, we consider the possibility of another variable underlying the large effect (Table A3). We assess three possible alternative variables: valuation (Åstebro et al., 2021), campaign updates (Block et al., 2018), and revenue generation (Nitani et al., 2019; Vismara, 2018). Again, *listing plan* is not considerably affected. Fourth, instead of assessing the effect on the amount raised, we check whether a listing plan increases the probability of reaching the minimum target (Online appendix C, Table C1). The results remain strong: a listing plan increases the probability of success by 43 percentage points ($p < 0.01$) in the first subsample, and we observe no effect at the 0.05 level in the second subsample. Finally, we consider the possibility that the change around our cutoff relates to a broader change within our empirical context. An assessment of the general trading activity of non-equity crowdfunded companies on Privanet reveals no changes in trading patterns around our cutoff. Given all these robustness checks, we conclude that our findings in terms of significance and

[6] While equity crowdfunding investors generally have long holding periods that span years (Elder and Hayes, 2021; Moedl, 2021; Signori and Vismara, 2018), some investors can be expected to wish to sell their shares even soon after the corresponding campaigns due to, for instance, personal liquidity shocks (Lee and Parlour, 2022). In our sample, the average time from campaign end to first trade is 1.6 years, and the time to second trade is 2.1 years. Given that our data capture only realized trades (that is, bids that were matched by a buy order) and only approximately 50 % of bids are matched with an order (Fig. 1), it is likely that there were also several unmatched bids visible on the secondary market during the first two years of listings. Therefore, we consider two years to be a suitable time frame for investors to learn about the secondary market's liquidity.

[7] To sanity check the results for 9 months, we create instrumental variables reflecting the previous 6, 7, 8, 9, 10, 11, and 12 months. The Durbin p values are 0.09, 0.08, 0.06, 0.03, 0.10, 0.17, and 0.09, respectively. The Wu-Hausman p values are 0.10, 0.09, 0.07, 0.04, 0.11, 0.19, and 0.11, respectively. Thus, all the values are of a similar order of magnitude, although the 9-month value is the only one falling below the five percent threshold.

Table 5
Linear regressions of the natural logarithm of the amount raised: Effect of listing plan.

	Baseline	Listing plan	Retractions	Split sample: <30-Jun-16	Split sample: ≥30-Jun-16	Interaction
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Listing plan		0.920***	0.935***	1.474***	0.437	1.435***
		(0.218)	(0.205)	(0.439)	(0.269)	(0.384)
Previous retractions			−0.433***	0.068	−0.042	0.004
			(0.147)	(0.213)	(0.070)	(0.068)
Funding target (ln)	0.811***	0.741***	0.749***	0.686***	0.749***	0.866***
	(0.099)	(0.102)	(0.100)	(0.204)	(0.119)	(0.104)
Orientation (0 = B2B, 1 = B2C)	0.372**	0.362**	0.389**	0.466	0.171	0.344**
	(0.168)	(0.165)	(0.161)	(0.344)	(0.171)	(0.166)
Company age (years)	−0.007	−0.008	−0.005	0.011	−0.004	−0.008
	(0.008)	(0.007)	(0.008)	(0.034)	(0.007)	(0.008)
Professional investor	0.345**	0.399**	0.396**	0.814**	0.211	0.439**
	(0.168)	(0.166)	(0.164)	(0.397)	(0.184)	(0.174)
Free float offered (ln)	−0.320***	−0.263**	−0.230**	0.017	−0.389***	−0.265**
	(0.115)	(0.109)	(0.109)	(0.230)	(0.131)	(0.108)
Duration (days)	−0.000	0.000	−0.001	0.000	−0.005	−0.000
	(0.003)	(0.003)	(0.003)	(0.004)	(0.004)	(0.003)
Minimum investment (kEUR)	0.194*	0.211*	0.214*	−0.100	0.442***	0.221*
	(0.117)	(0.121)	(0.123)	(0.225)	(0.116)	(0.127)
Number of words (ln)	0.280	0.339	0.527**	0.622*	0.688**	0.620***
	(0.264)	(0.248)	(0.242)	(0.368)	(0.292)	(0.208)
Entrepreneur's networks	1.140***	1.132***	1.085***	1.672***	0.326	1.059***
	(0.257)	(0.254)	(0.242)	(0.448)	(0.238)	(0.259)
Team size	0.063**	0.063**	0.063**	0.107	0.026	0.059**
	(0.030)	(0.029)	(0.028)	(0.068)	(0.031)	(0.027)
Social media activity (ln)	0.153***	0.162***	0.151***	0.055	0.291***	0.181***
	(0.039)	(0.038)	(0.036)	(0.061)	(0.054)	(0.039)
Previous success	0.558***	0.434**	0.389*	0.495	0.740***	0.596***
	(0.202)	(0.209)	(0.204)	(0.407)	(0.243)	(0.202)
Simultaneous campaigns	0.000	0.005	−0.040	−0.010	0.013	0.011
	(0.024)	(0.024)	(0.025)	(0.080)	(0.022)	(0.021)
Foreign campaign	−0.474**	−0.498**	−0.585***	−0.134	−0.099	−0.259
	(0.225)	(0.221)	(0.214)	(0.401)	(0.252)	(0.227)
Campaign start 2015–16	0.603*	0.557*	1.134***			
	(0.351)	(0.337)	(0.415)			
Campaign start 2017–18	0.430	0.364	1.357**			
	(0.423)	(0.407)	(0.551)			
Campaign start 2019–21	0.498	0.504	2.500***			
	(0.463)	(0.443)	(0.886)			
End date after cutoff						−0.442
						(0.304)
Listing plan × end date after cutoff						−1.000**
						(0.456)
Constant	−3.237	−2.884	−3.575*	−3.369	−5.682**	−6.127***
	(2.242)	(2.118)	(2.022)	(3.106)	(2.801)	(1.848)
Observations	287	287	287	113	174	287
R^2	0.583	0.602	0.617	0.530	0.592	0.607
Adjusted R^2	0.557	0.575	0.590	0.452	0.550	0.581

Dependent variable: amount raised (ln). Robust standard errors in parentheses. Two-tailed p-values: ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$. VIF values for other variables than the Campaign start dummies and the number of previous retractions (which all depend on campaign timing and can therefore be expected to exhibit collinearity in the models in which they are all included) are all below 4.

magnitude are robust.

Table 7 presents linear regression models that assess the effect of a listing plan on the natural logarithm of the number of investors, which is often used as an alternative measure of campaign outcomes (Cumming et al., 2019; Mochkabadi and Volkmann, 2020). The results suggest that committing to listing during a campaign increases the number of investors by over 110 % ($e^{0.749} - 1 = 1.11$ and $e^{0.755} - 1 = 1.13$) ($p < 0.01$) (Models (2) and (3)). Similar to Table 5, the effect of a listing plan is especially large ($e^{1.451} - 1 = 3.27$) and statistically significant ($p < 0.01$) when there have been few previous listings (Model (4)), and the effect disappears when more companies have been listed (Model (5)). We obtain similar results regarding the interaction effect of *listing plan* with the indicator denoting campaigns that ended after the cutoff: a listing plan increases the number of investors by approximately 370 % ($e^{1.544} - 1 = 3.68$) for early campaigns and has no effect ($e^{1.544-1.581} - 1 = -0.04$) for later campaigns. Regarding control variables, notably, the minimum investment had a negative effect on the number of investors (and no effect on the amount raised) in the earlier sample and a positive effect on the amount raised (and no effect on the number of investors) in the later sample, suggesting that decreases in investor numbers are offset by larger individual investments.

Table 8 presents two-stage regression results where the listing plan dummy is instrumented with the funding ratios of previously committed campaigns, similar to Table 6. Nonsignificant p values for Durbin and Wu-Hausman tests suggest that *listing plan* need not be treated as endogenous. Again, various other robustness checks are provided in Online appendix B. The variable *listing plan* maintained its large coefficient and statistical significance ($p < 0.01$) in all the checks.

In summary, the existence of secondary markets positively affects the fundraising capacity of entrepreneurs; thus, H1a is supported. In particular, it attracts more investors and thus fosters greater participation in funding innovative startups through equity crowdfunding platforms. The observed impact is statistically and economically meaningful. However, we also find that this impact disappeared over time. One possible reason for this phenomenon that is in line with our observations of actual trading on the secondary market is that investors

Table 6
Two-stage least square regressions of the natural logarithm of the amount raised.

	Last 6 months		Last 9 months		Last 12 months	
	1st stage	2nd stage	1st stage	2nd stage	1st stage	2nd stage
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Ratio of funding ratios (6 months)	0.058***					
	(0.015)					
Ratio of funding ratios (9 months)			0.055***			
			(0.017)			
Ratio of funding ratios (12 months)					0.070***	
					(0.022)	
Listing plan		2.699**		3.594**		3.092**
		(1.161)		(1.511)		(1.476)
Previous retractions	−0.012	−0.450***	−0.025	−0.459***	−0.047	−0.454***
	(0.031)	(0.139)	(0.033)	(0.152)	(0.036)	(0.144)
Funding target (ln)	0.085***	0.615***	0.080***	0.548***	0.077***	0.586***
	(0.025)	(0.143)	(0.025)	(0.168)	(0.025)	(0.162)
Orientation (0 = B2B, 1 = B2C)	0.003	0.371**	0.007	0.362*	0.007	0.367**
	(0.038)	(0.170)	(0.038)	(0.186)	(0.038)	(0.176)
Company age (years)	0.000	−0.005	0.001	−0.006	0.000	−0.006
	(0.002)	(0.010)	(0.002)	(0.010)	(0.002)	(0.010)
Professional investor	−0.075	0.500**	−0.078*	0.553**	−0.078	0.523**
	(0.047)	(0.221)	(0.047)	(0.246)	(0.048)	(0.234)
Free float offered (ln)	−0.073***	−0.120	−0.068**	−0.064	−0.070**	−0.095
	(0.027)	(0.142)	(0.027)	(0.163)	(0.028)	(0.156)
Duration (days)	−0.001	0.001	−0.001	0.001	−0.001	0.001
	(0.001)	(0.003)	(0.001)	(0.003)	(0.001)	(0.003)
Minimum investment (kEUR)	−0.028	0.248	−0.029	0.265	−0.027	0.255
	(0.035)	(0.158)	(0.035)	(0.173)	(0.035)	(0.164)
Number of words (ln)	−0.066	0.648***	−0.070	0.709***	−0.077	0.674***
	(0.051)	(0.242)	(0.051)	(0.271)	(0.052)	(0.258)
Entrepreneur's networks	−0.019	1.069***	−0.011	1.061***	−0.003	1.065***
	(0.066)	(0.293)	(0.066)	(0.320)	(0.066)	(0.304)
Team size	−0.002	0.063**	−0.002	0.063*	−0.001	0.063**
	(0.007)	(0.030)	(0.007)	(0.033)	(0.007)	(0.031)
Social media activity (ln)	−0.006	0.167***	−0.008	0.175***	−0.010	0.170***
	(0.008)	(0.038)	(0.008)	(0.042)	(0.008)	(0.040)
Previous success	0.128**	0.148	0.134**	0.026	0.129**	0.095
	(0.061)	(0.315)	(0.061)	(0.362)	(0.061)	(0.347)
Simultaneous campaigns	−0.002	−0.033	−0.004	−0.029	−0.007	−0.031
	(0.007)	(0.030)	(0.007)	(0.033)	(0.007)	(0.031)
Foreign campaign	0.051	−0.635***	0.044	−0.661**	0.035	−0.646**
	(0.054)	(0.244)	(0.054)	(0.267)	(0.054)	(0.254)
Campaign start 2015–16	0.017	1.069***	0.051	1.036***	0.060	1.054***
	(0.076)	(0.343)	(0.077)	(0.376)	(0.077)	(0.357)
Campaign start 2017–18	0.063	1.270***	0.139	1.226**	0.230*	1.251**
	(0.106)	(0.478)	(0.110)	(0.524)	(0.121)	(0.497)
Campaign start 2019–21	0.053	2.591***	0.133	2.637***	0.255	2.611***
	(0.171)	(0.759)	(0.179)	(0.830)	(0.196)	(0.789)
Constant	−0.547	−2.927	−0.430	−2.598	−0.350	−2.783
	(0.453)	(2.067)	(0.454)	(2.277)	(0.455)	(2.166)
Observations	287	287	287	287	287	287
R2	0.147	0.549	0.133	0.462	0.131	0.515
F-statistic	14.976		10.361		9.765	
Durbin *p*-value		0.090		0.034		0.094
Wu-Hausman *p*-value		0.102		0.040		0.107

First-stage dependent variable: listing plan. Second-stage dependent variable: amount raised (ln). Standard errors in parentheses. Conventional standard errors are used to allow calculation of endogeneity statistics. Two-tailed *p*-values: ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

were initially optimistic about the liquidity of the secondary market for equity crowdfunding due to the relatively high liquidity of other (non-equity crowdfunded) companies' shares on Privanet's other lists but that this optimism disappeared as the lack of liquidity within this market became apparent. This interpretation suggests that secondary markets are beneficial only when they work efficiently. These findings are useful for deriving important implications in our Discussion and conclusion section.

4.2. Effect of a listing plan on individual investors' investment sizes

We now turn the analysis to the investor level (H1b) to study the impact of a listing plan on the size of investments made by individual investors. The sample size is now much larger, since the unit of observation is an investment of a given investor in a given campaign. Table 9 presents regression models to assess the effect of a listing plan on the natural logarithm of the size of the investments made by investors. Recall that the average investment is EUR 1880 (median of EUR 541; see Table 4). Model (1) is the baseline specification. Model (2) assesses the effect of a listing plan on investment size. Models (3) and (4) assess whether the effect is different for investors who invest as legal entities or who have obtained key investor status than it is for other, regular investors. Models (5) and (6) present the results for the subsamples of earlier and later investments separately, similar to Models (4) and (5) in Tables 5 and 7. We use cluster robust standard errors with observations clustered into campaigns.

In the main specification (Model (2)), the variable *listing plan* has an effect of 33 % ($e^{0.285} - 1 = 0.33$) ($p < 0.05$) on the amount invested by

Table 7
Linear regressions of the natural logarithm of the number of investors: Effect of listing plan.

	Baseline	Listing plan	Retractions	Split sample: <30-Jun-16	Split sample: ≥30-Jun-16	Interaction
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Listing plan		0.749***	0.755***	1.451***	−0.035	1.544***
		(0.238)	(0.236)	(0.404)	(0.222)	(0.367)
Previous retractions			−0.171	0.360*	−0.051	0.086
			(0.127)	(0.181)	(0.071)	(0.070)
Funding target (ln)	0.427***	0.370***	0.373***	0.502***	0.369***	0.515***
	(0.090)	(0.095)	(0.095)	(0.163)	(0.115)	(0.098)
Orientation (0 = B2B, 1 = B2C)	0.375**	0.367**	0.377**	0.581**	0.137	0.337**
	(0.153)	(0.153)	(0.152)	(0.258)	(0.175)	(0.151)
Company age (years)	−0.003	−0.004	−0.003	0.009	−0.004	−0.007
	(0.008)	(0.008)	(0.008)	(0.031)	(0.008)	(0.008)
Professional investor	0.126	0.170	0.169	0.397	0.110	0.252
	(0.173)	(0.173)	(0.172)	(0.360)	(0.177)	(0.165)
Free float offered (ln)	−0.286***	−0.240**	−0.226**	−0.137	−0.352**	−0.258***
	(0.099)	(0.097)	(0.098)	(0.175)	(0.139)	(0.094)
Duration (days)	−0.002	−0.001	−0.001	−0.004	−0.003	−0.001
	(0.002)	(0.002)	(0.002)	(0.003)	(0.004)	(0.002)
Minimum investment (kEUR)	−0.256*	−0.242*	−0.240	−0.744***	0.060	−0.276*
	(0.132)	(0.146)	(0.146)	(0.236)	(0.131)	(0.148)
Number of words (ln)	0.203	0.251	0.325	0.106	0.683**	0.410**
	(0.225)	(0.217)	(0.219)	(0.266)	(0.278)	(0.176)
Entrepreneur's networks	−0.627**	−0.633**	−0.652***	−1.077**	−0.796***	−0.762***
	(0.249)	(0.247)	(0.246)	(0.471)	(0.256)	(0.251)
Team size	0.056**	0.056**	0.056**	0.063	0.044	0.053**
	(0.027)	(0.026)	(0.026)	(0.047)	(0.028)	(0.024)
Social media activity (ln)	0.223***	0.230***	0.226***	0.138***	0.352***	0.260***
	(0.036)	(0.035)	(0.034)	(0.049)	(0.041)	(0.032)
Previous success	0.356	0.255	0.237	−0.129	0.903***	0.462**
	(0.222)	(0.227)	(0.227)	(0.374)	(0.234)	(0.218)
Simultaneous campaigns	−0.045**	−0.042*	−0.059**	−0.015	−0.039	−0.021
	(0.021)	(0.021)	(0.024)	(0.058)	(0.024)	(0.021)
Foreign campaign	−0.685***	−0.705***	−0.740***	−0.422	−0.222	−0.352*
	(0.176)	(0.176)	(0.175)	(0.436)	(0.194)	(0.189)
Campaign start 2015–16	0.631*	0.594*	0.822**			
	(0.332)	(0.318)	(0.380)			
Campaign start 2017–18	0.165	0.112	0.504			
	(0.377)	(0.366)	(0.488)			
Campaign start 2019–21	0.261	0.266	1.055			
	(0.405)	(0.392)	(0.754)			
End date after cutoff						−0.795***
						(0.283)
Listing plan × end date after cutoff						−1.581***
						(0.432)
Constant	−4.799**	−4.512**	−4.785**	−4.565*	−8.557***	−7.366***
	(2.009)	(1.965)	(1.949)	(2.373)	(2.825)	(1.605)
Observations	287	287	287	113	174	287
R^2	0.494	0.512	0.516	0.522	0.603	0.538
Adjusted R^2	0.462	0.479	0.481	0.442	0.563	0.507

Dependent variable: number of investors (ln). Robust standard errors in parentheses. Two-tailed p-values: ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$. VIF values for other variables than the Campaign start dummies and the number of previous retractions (which all depend on campaign timing and can therefore be expected to exhibit collinearity in the models in which they are all included) are all below 4.

individuals. This effect is driven by regular investors, for whom the effect size is 38 % ($e^{0.321} - 1 = 0.38$) (Model (4)), whereas a listing plan has no effect on the investment sizes of legal entities or key investors, consistent with the notion that these typically larger and more experienced investors place limited importance on a secondary market presence because they may be less exposed to liquidity shocks. This is perhaps due to their greater wealth, which allows them to allocate money to equity crowdfunding investments for long periods relatively easily. The results by time-based subsample (Models (5) and (6)) further corroborate our suggestion that investors learned about the lack of liquidity in the focal secondary market over time and therefore ceased to be affected by listing plans. At 61 % ($p < 0.05$), the effect is larger in the subsample of earlier investments, and it largely disappears in the subsample of later investments (27 %, $p < 0.1$). The interaction term of *listing plan* with the indicator for post-cutoff investments is not statistically significant, however, in Model (7). To conclude, as there is some impact at the individual level and H1b is thus supported, the observed finding of increased fundraising capacity through listing plans results partly from increased investor participation and partly from increased investment-level pledges.

Finally, note that most of the control variables in Table 9 are significant and consistent with prior literature. Investors who are male (Hervé et al., 2019; Wallmeroth, 2019), older (Hervé et al., 2019), more experienced or sophisticated (investing as legal entities or having earned a key investor status) (Günther et al., 2015), or from higher-income areas (Hervé et al., 2019) make larger investments than their counterparts. The results regarding the effects of investor location are less clear, which is in line with previous research finding that local bias varies by platform, investor type, and industry (Hornuf et al., 2022) and that big city effects vary by city (Günther et al., 2018). Our novel control variable *gift investment* has a negative coefficient, suggesting that investors make smaller investments when pledging money for someone else than when investing for themselves.

Table 8
Two-stage least square regressions of the natural logarithm of the number of investors.

	Last 6 months		Last 9 months		Last 12 months	
	1st stage	2nd stage	1st stage	2nd stage	1st stage	2nd stage
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Ratio of funding ratios (6 months)	0.058***					
	(0.015)					
Ratio of funding ratios (9 months)			0.055***			
			(0.017)			
Ratio of funding ratios (12 months)					0.070***	
					(0.022)	
Listing plan		2.493**		2.563**		2.460*
		(1.086)		(1.304)		(1.328)
Previous retractions	−0.012	−0.188	−0.025	−0.189	−0.047	−0.188
	(0.031)	(0.130)	(0.033)	(0.131)	(0.036)	(0.130)
Funding target (ln)	0.085***	0.242*	0.080***	0.236	0.077***	0.244*
	(0.025)	(0.134)	(0.025)	(0.145)	(0.025)	(0.145)
Orientation (0 = B2B, 1 = B2C)	0.003	0.360**	0.007	0.359**	0.007	0.360**
	(0.038)	(0.159)	(0.038)	(0.160)	(0.038)	(0.159)
Company age (years)	0.000	−0.003	0.001	−0.003	0.000	−0.003
	(0.002)	(0.009)	(0.002)	(0.009)	(0.002)	(0.009)
Professional investor	−0.075	0.272	−0.078*	0.276	−0.078	0.270
	(0.047)	(0.207)	(0.047)	(0.212)	(0.048)	(0.211)
Free float offered (ln)	−0.073***	−0.118	−0.068**	−0.114	−0.070**	−0.120
	(0.027)	(0.133)	(0.027)	(0.141)	(0.028)	(0.141)
Duration (days)	−0.001	−0.000	−0.001	−0.000	−0.001	−0.000
	(0.001)	(0.003)	(0.001)	(0.003)	(0.001)	(0.003)
Minimum investment (kEUR)	−0.028	−0.207	−0.029	−0.206	−0.027	−0.208
	(0.035)	(0.147)	(0.035)	(0.149)	(0.035)	(0.148)
Number of words (ln)	−0.066	0.444*	−0.070	0.449*	−0.077	0.442*
	(0.051)	(0.227)	(0.051)	(0.233)	(0.052)	(0.232)
Entrepreneur's networks	−0.019	−0.668**	−0.011	−0.669**	−0.003	−0.668**
	(0.066)	(0.274)	(0.066)	(0.276)	(0.066)	(0.273)
Team size	−0.002	0.056**	−0.002	0.056**	−0.001	0.056**
	(0.007)	(0.028)	(0.007)	(0.028)	(0.007)	(0.028)
Social media activity (ln)	−0.006	0.241***	−0.008	0.242***	−0.010	0.241***
	(0.008)	(0.035)	(0.008)	(0.036)	(0.008)	(0.036)
Previous success	0.128**	0.000	0.134**	−0.009	0.129**	0.005
	(0.061)	(0.295)	(0.061)	(0.312)	(0.061)	(0.312)
Simultaneous campaigns	−0.002	−0.052*	−0.004	−0.052*	−0.007	−0.052*
	(0.007)	(0.028)	(0.007)	(0.028)	(0.007)	(0.028)
Foreign campaign	0.051	−0.789***	0.044	−0.791***	0.035	−0.788***
	(0.054)	(0.228)	(0.054)	(0.231)	(0.054)	(0.229)
Campaign start 2015–16	0.017	0.758**	0.051	0.755**	0.060	0.759**
	(0.076)	(0.321)	(0.077)	(0.324)	(0.077)	(0.321)
Campaign start 2017–18	0.063	0.419	0.139	0.416	0.230*	0.421
	(0.106)	(0.447)	(0.110)	(0.452)	(0.121)	(0.447)
Campaign start 2019–21	0.053	1.145	0.133	1.148	0.255	1.143
	(0.171)	(0.710)	(0.179)	(0.716)	(0.196)	(0.709)
Constant	−0.547	−4.146**	−0.430	−4.120**	−0.350	−4.159**
	(0.453)	(1.934)	(0.454)	(1.964)	(0.455)	(1.948)
Observations	287	287	287	287	287	287
R2	0.147	0.418	0.133	0.410	0.131	0.421
F-statistic	14.976		10.361		9.765	
Durbin *p*-value		0.071		0.119		0.153
Wu-Hausman *p*-value		0.082		0.132		0.169

First-stage dependent variable: listing plan. Second-stage dependent variable: number of investors (ln). Standard errors in parentheses. Conventional standard errors are used to allow calculation of endogeneity statistics. Two-tailed *p*-values: ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

4.3. Effect of campaign outcome on secondary market listing

Thus far, we have studied the impact of a listing plan on investors' decisions to invest in equity crowdfunding campaigns. We now turn to assess the drivers of entrepreneurs' actual decisions to list after a campaign. Recall that only 45 campaigns were followed by a listing, even though there were 166 successful campaigns. Although a listing plan entails no formal obligation (since it is not a binding commitment but an announcement made prior to or during a campaign), the costs of retracting from a listing plan (as outlined in Section 2.3) suggest a positive effect of a listing plan on the likelihood of listing.

Given the fundraising benefits of listing plans documented in Sections 4.1 and 4.2, the fact that only one-third of the successful companies eventually listed corroborates the existence of the costs associated with listing and suggests that, as outlined in the development of H2, companies with more successful campaigns are more likely to list.

First, to offer partial evidence on the relationship between campaign success and listing, let us examine the sample statistics on the extent to which a campaign's outcome is related to the decision to list. As evidenced in Table 10, startups that planned to list and eventually did so were very successful (average funding ratio of 230 %), while those who planned to list but did not were much less successful (funding ratio 125 %). In contrast, startups that did not plan to list but eventually did so were also quite successful (funding ratio 195 %), while those who did not plan to list and did not list were again much less successful (funding ratio 99 %). Partly, this reflects the fact that campaigns concluded as unsuccessful cannot lead to listings in the first place. In addition, however, these findings suggest that an unsatisfactory campaign outcome (e.

Table 9
Linear regressions of the natural logarithm of investment size.

	Baseline	Main effects	Split sample: Legal entity or key investor	Split sample: Regular (other) investors	Split sample: <30-Jun-16	Split sample: ≥30-Jun-16	Interaction
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Listing plan		0.285**	0.100	0.321**	0.478**	0.240*	0.525**
		(0.137)	(0.128)	(0.147)	(0.226)	(0.141)	(0.242)
Investor gender (0 = male, 1 = female)	−0.217***	−0.209***	−0.137**	−0.218***	−0.104*	−0.273***	−0.219***
	(0.062)	(0.058)	(0.063)	(0.067)	(0.060)	(0.065)	(0.059)
Investor age	0.011***	0.012***	0.016***	0.011***	0.014***	0.011***	0.011***
	(0.002)	(0.001)	(0.002)	(0.001)	(0.003)	(0.002)	(0.001)
Investor income (kEUR)	0.013***	0.013***	0.023***	0.009***	0.014***	0.014***	0.014***
	(0.002)	(0.002)	(0.002)	(0.003)	(0.004)	(0.003)	(0.002)
Investor in company city	−0.236**	−0.217**	0.128	−0.293***	−0.211**	−0.116	−0.162
	(0.093)	(0.088)	(0.089)	(0.091)	(0.087)	(0.143)	(0.104)
Investor in capital	−0.025	−0.020	−0.210***	0.045	0.014	0.009	0.015
	(0.087)	(0.083)	(0.052)	(0.092)	(0.082)	(0.088)	(0.093)
Legal entity as investor	0.894***	0.899***			0.722***	0.971***	0.903***
	(0.058)	(0.058)			(0.101)	(0.067)	(0.060)
Key investor	0.723***	0.726***			0.914***	0.644***	0.748***
	(0.086)	(0.084)			(0.143)	(0.072)	(0.082)
Gift investment	−0.509***	−0.507***	−0.854***	−0.399***	−0.276**	−0.660***	−0.470***
	(0.093)	(0.093)	(0.114)	(0.102)	(0.117)	(0.113)	(0.101)
Available campaigns	0.015	0.016	0.014	0.017	0.067***	0.014	0.022**
	(0.012)	(0.011)	(0.010)	(0.013)	(0.019)	(0.012)	(0.011)
Before/after competition	−0.659***	−0.659***	−0.522***	−0.697***			
	(0.192)	(0.184)	(0.124)	(0.208)			
Investment after cutoff							0.862***
							(0.144)
Listing plan × inv. after cutoff							−0.270
							(0.270)
Constant	5.696***	5.573***	5.907***	5.726***	4.126***	5.590***	4.617***
	(0.193)	(0.187)	(0.171)	(0.216)	(0.318)	(0.207)	(0.231)
Observations	25,874	25,874	6270	19,604	7710	18,164	25,874
R^2	0.259	0.268	0.101	0.207	0.289	0.188	0.288

Dependent variable: investment size (ln). Standard errors clustered at campaign level in parentheses. Two-tailed p-values: ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$. VIF values are all below 4.

g., just barely reaching the minimum target) may reflect increased fears of the costs of a secondary market listing.

We perform regression analyses to substantiate this observation and thus provide a formal test of H2. Table 11 presents logistic regression models predicting the probability that a company will list on the secondary market. As only companies with successful campaigns can list, the data exclude unsuccessful campaigns. In line with our argumentation above, we include the funding ratio variable to measure campaign success. Model (2) substantiates the positive effect of a listing plan and the negative effect of retractions by previous campaigns on the probability of listing. The companies that planned to list are approximately 30 percentage points more likely to list than the others. In Model (3), we find that companies with higher funding ratios are more likely to list, which lends support to H2. A one-unit increase in the logarithm of the funding ratio (that is, a 172 % increase ($e^1 - 1 = 1.72$) in the funding ratio) increases the probability of listing by 12 percentage points. The positive effect of the funding ratio is consistent with the potential costs associated with listing. A low funding ratio may indicate low investor interest and thus suggest lower demand in subsequent primary market rounds, lower prices in upcoming trades, and reputational risks. In contrast, a high funding ratio provides a strong signal to the market about the corresponding company's potential and investor interest, and it may increase the entrepreneur's trust in his/her company's ability to perform in the secondary market and raise funds in later primary market offerings despite a secondary market presence. The larger shareholder base of more successful campaigns may also induce the corresponding companies to list even if they did not originally plan to. Most of the control variables do not affect the probability of listing; however, B2C companies are more likely to list than B2B companies and foreign companies are less likely to become listed.

As a final piece of evidence, we present data about whether the companies with successful campaigns were still active as of May 2021 (or whether they were bankrupt, in liquidation, or dissolved) and whether they had received subsequent equity financing from a financial player, from crowd investors via another equity crowdfunding campaign, or from a strategic buyer. It is beyond our scope to infer any causality in relation to listing, but the data highlight a positive correlation between becoming listed and these other variables (Table 12). For instance, 20 % of the startups that were still active were listed, as opposed to 3 % of the defunct startups. In the same vein, 45 % of those that raised follow-up funds were listed, but only 9 % of those that did not raise further funds were listed. Although far from conclusive in terms of causality, these observations suggest that only startups facing little reputational cost list (e.g., because they have had highly successful first rounds of financing, as indicated in Table 11) and thus that these startups are also more successful in conducting a second equity crowdfunding round. In contrast, startups with significant concerns about the costs of listing do not list and are not able to raise further funds either.

5. Discussion and conclusion

Using data from the world's first secondary market for equity crowdfunding, we have shown that secondary markets can improve entrepreneurial firms' fundraising capacity in private markets. To reach our conclusions, we have taken the perspectives of investors and entrepreneurs. In particular, fundraising campaigns that explicitly commit to a post-campaign secondary market listing are more successful. This positive effect is due to both more investors choosing to invest and investors choosing to invest larger sums. We observed these effects especially during the first years of the secondary market's operation but not later, which supports our conjecture that because investors value liquidity, secondary markets are beneficial for companies' fundraising capacity as long as investors have reason to believe that these markets work efficiently. Furthermore, we observed the effect specifically for

Table 10
Campaign outcome statistics of campaigns by listing plan and by listing.

	N	Mean	Median	Std. dev	Min	Max
Plan and listed						
Amount raised (EUR)	20	755,640	669,915	689,349	60,680	2,499,266
Number of investors	20	250	154	286	10	1222
Campaign successful	20	0.95	1.00	0.22	0.00	1.00
Funding ratio	20	230.3 %	194.1 %	198.6 %	33.1 %	1008.4 %
Funding target (EUR)	20	400,397	270,000	382,522	31,260	1,494,000
Active (0 = no, 1 = yes)	20	0.95	1.00	0.22	0.00	1.00
Subsequent funding	20	0.40	0.00	0.50	0.00	1.00
Plan and not listed						
Amount raised (EUR)	12	456,522	263,232	562,399	2603	2,040,933
Number of investors	12	156	45	266	3	891
Campaign successful	12	0.67	1.00	0.49	0.00	1.00
Funding ratio	12	124.6 %	78.5 %	147.5 %	5.4 %	531.6 %
Funding target (EUR)	12	765,915	408,311	1,157,828	25,000	4,259,288
Active (0 = no, 1 = yes)	12	0.83	1.00	0.39	0.00	1.00
Subsequent funding	12	0.00	0.00	0.00	0.00	0.00
No plan and listed						
Amount raised (EUR)	25	686,659	344,495	644,303	5501	1,968,750
Number of investors	25	269	137	271	0	745
Campaign successful	25	0.96	1.00	0.20	0.00	1.00
Funding ratio	25	195.1 %	170.9 %	104.1 %	11.0 %	488.0 %
Funding target (EUR)	25	399,232	249,834	467,877	20,000	1,995,000
Active (0 = no, 1 = yes)	25	0.96	1.00	0.20	0.00	1.00
Subsequent funding	25	0.64	1.00	0.49	0.00	1.00
No plan and not listed						
Amount raised (EUR)	230	248,226	101,847	394,229	293	2,250,360
Number of investors	230	91	29	176	0	1670
Campaign successful	230	0.50	0.50	0.50	0.00	1.00
Funding ratio	230	99.4 %	55.2 %	112.6 %	0.2 %	661.3 %
Funding target (EUR)	230	258,983	175,013	301,330	20,000	2,990,000
Active (0 = no, 1 = yes)	230	0.72	1.00	0.45	0.00	1.00
Subsequent funding	230	0.13	0.00	0.33	0.00	1.00

regular crowd investors rather than larger or more experienced investors, which is consistent with the notion that exit opportunities are particularly important to regular investors, who are prone to liquidity shocks (Lee and Parlour, 2022). We further found that despite this positive effect, most companies choose not to list even when listing entails no fees or formal requirements. Possible reasons for this choice include risks pertaining to subsequent funding rounds, downward pressure on valuation, reputational costs, and additional resource requirements. An important determinant of the listing decision is the level of crowdfunding campaign success, consistent with the idea that these costs matter.

5.1. Contributions

This study contributes to the academic literature in several ways. First, to the best of our knowledge, we are the first to examine the impact of secondary markets for equity crowdfunding. Other studies have examined peer-to-peer lending (Holden et al., 2020) and the individual stocks of unicorns (Alon-Beck, 2018; Larcker et al., 2018). Both are different markets in terms of liquidity needs and fundraising, as we have mentioned before. Given the richness of our sample, our approach is unique in that we are able to study the impact of listing plans on campaign success. Therefore, we directly contribute to the equity crowdfunding literature that investigates the extent to which equity crowdfunding offers a new funding channel for entrepreneurs. We document the conditions under which the presence of a secondary market is an important determinant of investment decisions in the context of equity crowdfunding. In particular, we find that the increased fundraising experienced by entrepreneurs is driven both by greater investor participation and by larger individual investments. Our study therefore has policy implications, as it highlights how participation in startup finance can be increased through well-functioning secondary markets; we discuss this more below.

Second, we contribute to the entrepreneurial finance literature on investor decision-making, as we are able to document that, similar to venture capital funds and business angels, investors care about exit routes as early as the time of investment. The existing equity crowdfunding literature has not yet studied exit-related issues. An exception is the emerging literature on investment performance at exit (Blaseg et al., 2021; Hornuf et al., 2018; Signori and Vismara, 2018; Walthoff-Borm et al., 2018b), which, however, is still at an early stage of development due to a lack of data. Most equity crowdfunded startups have not yet offered exit opportunities to their investors. These studies document the performance of these investments, but they are silent about the extent to which exit opportunities drive investment choices.

Third, we contribute to the entrepreneurial finance literature examining growth ventures' funding paths by documenting the antecedents of listing decisions. In particular, we show that secondary market listings are not adopted equally by all equity crowdfunded ventures but rather favored by those that are more successful in their fundraising because – as we argue – the costs associated with listing are lower for companies with more successful primary market campaigns. This finding is consistent with the view that quality signals are particularly crucial in the context of equity crowdfunding (see, for instance, Ahlers et al., 2015). We extend this view by documenting its applicability to listings on secondary markets.

5.2. Implications for theory development

Given that secondary markets are beginning to emerge as a partial

Table 11
Logistic regression of the probability of becoming listed (marginal effects).

	Baseline	Listing plan and retractions	Full model
	Model 1	Model 2	Model 3
Listing plan		0.288***	0.265***
		(0.059)	(0.058)
Previous retractions		−0.068***	−0.069***
		(0.020)	(0.022)
Funding ratio (ln)			0.117***
			(0.042)
Funding target (ln)	0.185***	0.135***	0.146***
	(0.041)	(0.037)	(0.037)
Orientation (0 = B2B, 1 = B2C)	0.257***	0.250***	0.227***
	(0.067)	(0.063)	(0.056)
Company age (years)	−0.006	−0.002	0.001
	(0.005)	(0.003)	(0.003)
Professional investor	0.015	0.022	−0.009
	(0.068)	(0.062)	(0.061)
Free float offered (ln)	−0.114**	−0.065	−0.066
	(0.045)	(0.042)	(0.043)
Duration (days)	0.000	−0.000	−0.000
	(0.001)	(0.001)	(0.001)
Minimum investment (kEUR)	−0.020	0.026	0.021
	(0.055)	(0.043)	(0.039)
Number of words (ln)	−0.166**	0.011	0.010
	(0.068)	(0.075)	(0.075)
Entrepreneur's networks	−0.052	−0.002	−0.014
	(0.109)	(0.090)	(0.089)
Team size	0.006	0.007	0.000
	(0.010)	(0.009)	(0.009)
Social media activity (ln)	−0.013	−0.005	−0.009
	(0.012)	(0.011)	(0.011)
Foreign campaign	−0.448*	−0.323**	−0.303**
	(0.243)	(0.161)	(0.152)
Before/after competition (0 = no, 1 = yes)	0.182**	0.146**	0.137*
	(0.073)	(0.071)	(0.070)
Observations	166	166	166
Pseudo R^2	0.255	0.415	0.457
Chi-squared	48.436	78.819	86.776

Marginal effects are presented. Standard errors based on the delta method in parentheses.
Two-tailed p-values: ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$. VIF values are all below 4.

Table 12
Bivariate tests of post-campaign outcomes.

Active vs. not active companies	Active	Not active	Mean		
			Active	Not active	Difference
Listing plan	218	69	0.133	0.043	0.090**
Listed	218	69	0.197	0.029	0.168***
Funding ratio	218	69	1.309	0.767	0.542***

Companies with vs. without subsequent funding	Funding	No funding	Mean		
			Funding	No funding	Difference
Listing plan	53	234	0.151	0.103	0.048
Listed	53	234	0.453	0.090	0.363***
Funding ratio	53	234	1.847	1.027	0.820***

Significance level represents chi2 test result for indicator variables and two-tailed t-test result for continuous variables. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

solution to the exit channel problem of crowd investors, studying them appears to be particularly timely and relevant. Such research can offer valuable insights for further theory development and implications for practice. Our empirical setting is particularly suited to studying the impact of listing plans and showing their impact on campaign success; in this way, the called-for initial understanding of how secondary market liquidity affects investor decision making in the context of equity crowdfunding can be established (McKenny et al., 2017). On the theoretical front, our hypotheses enable us to link investment decisions with exit needs, which is consistent with the notion that liquidity is important to investors in the context of equity crowdfunding (Lee and Parlour, 2022).

Our findings further offer an initial discussion of the costs and benefits associated with the need for platforms and entrepreneurs to offer exit routes to crowd investors, which are often neglected in the current business models of equity crowdfunding. New theory is needed to understand how secondary markets impact equity crowdfunding. A recent study that contributes to this debate is that of Andrieu and Groh (2021); while these authors study a theoretical model of secondary markets for venture capital, their work can be adapted to the context of equity crowdfunding. In particular, they highlight the importance of strategic exits through secondary markets, which may also take place in equity crowdfunding. However, more research is needed. While Andrieu and Groh (2021) model secondary markets with constrained liquidity in a way that corresponds to equity crowdfunding, a significant difference lies in their modeling of contracts and investor involvement. Equity crowdfunding investors are passive and thus generally purchase simple types of securities. Another unique feature is our suggestion that secondary market listings may negatively affect companies' future fundraising due to the associated costs.

Our study also introduces new layers to the theory of information asymmetry in the context of entrepreneurial finance. Previous research has mainly focused on the direct channel through which information asymmetry between entrepreneurs and prospective investors adversely affects entrepreneurs' access to capital (Mochkabadi and Volkmann, 2020), an issue that companies can alleviate through signaling their quality in the cases of both equity crowdfunding (Ahlers et al., 2015) and other forms of entrepreneurial finance (Busenitz et al., 2005). However, our findings support the notion that information asymmetry affects follow-up funding particularly strongly when secondary markets are operating, since future investors may infer the quality of a startup from trading activities on secondary markets. This can lead companies to choose not to pursue a secondary market presence at all. This, in turn, can spill over as a negative effect back onto the primary market, where investors may punish companies for not committing to listing on the secondary market. Therefore, in the presence of secondary markets, fundraising companies may be subject to a twofold negative effect of information asymmetry: first, as a hindrance to transparent and credible investor communication in the primary market, and second, as a deterrent to follow-on rounds of primary market funding.

5.3. Implications for practice

Our findings also offer practical implications for platform managers, entrepreneurs, and policy makers regarding the impacts of the development of secondary markets on future practice. Secondary markets seem to be an effective mechanism to foster equity crowdfunding activities, as they allow entrepreneurs to raise more money during campaigns. However, we suggest that this is true only if crowd investors view the secondary market as efficient. In this regard, our study highlights how participation in startup finance through equity ownership can be increased through well-functioning secondary markets.

We foresee certain important challenges that practitioners may face when seeking to establish or facilitate secondary markets. One challenge is the achievement of a sufficient level of liquidity. Holden et al. (2020) find that in P2P lending markets where an efficient secondary market could be established, positive spillovers to the primary market could be realized. Their finding can, however, be only partially transposed to the context of equity crowdfunding, which has significantly lower primary and secondary market volumes than P2P lending. This may even lead to negative spillovers to the primary market if trades on the secondary market drive demand away from the primary market (Chen et al., 2013).

Given that secondary market volumes are low even for venture capital transactions, it is unlikely that the liquidity needed for equity crowdfunding can be realized. The second challenge stems from the fact that the important elements of efficient markets include proper information disclosure (Diamond and Verrecchia, 1991). Currently, investors who consider buying shares on the secondary market do not possess much information on the startups since they cannot access the same information as existing shareholders. This could lead to lemon markets, where the information asymmetry between current shareholders and potential external investors induces only shareholders of poorly performing startups to sell their shares. More information must be disclosed to buyers to overcome this asymmetry. In turn, this requires that startups that pursue listing also commit to disclosing information to the market. A third challenge is posed by price setting, as most crowd investors are not able to price such shares properly. Different platforms have adopted different solutions, including applying industry guidelines implemented by the secondary market managers themselves so that sellers and buyers cannot negotiate prices. The fourth challenge involves platforms making the business case for operating a secondary market financially feasible. Setting up and running a secondary market is costly. As most equity crowdfunding platforms are rather small compared to, e.g., lending platforms, it is difficult to ensure a sufficient volume of trades to incur enough fees to cover these costs. Furthermore, given the size of startups and the difficulty of price formation, the shares traded on these platforms are highly illiquid.[8] Therefore, some platforms do not set up their own secondary marketplace but collaborate with an existing one that already offers secondary transactions for private companies. This has been the approach of Invesdor. Because of the small market size and investors' not viewing secondary markets as their primary exit route, platforms may benefit from cooperating with each other or with third parties to establish a scale sufficient to render secondary markets operationally feasible. This would improve the currently lacking interoperability of secondary markets and thereby establish a larger pool of possible market participants (Roth et al., 2021). In fact, our focal platform, Privanet, closed its separate list for equity crowdfunded securities in the fall of 2020 and transferred the shares of equity crowdfunded companies to their other lists, which also contain non-equity crowdfunded companies. Another important hindrance relates to the reputational perspective. Platforms and companies may be reluctant to openly present trading data on stocks with low liquidity and high volatility, as these data may suggest a lack of demand or modest pricing that companies may not consider reflective of their actual value. In addition, trades of existing shares on a secondary market may further reduce demand for new shares on the primary market and limit companies' fundraising capacity for follow-up capital. In addition to possibly hurting companies running a campaign, such trades backfire by harming the platform. Andrieu and Groh (2021) derive a similar rationale for why secondary markets for venture capital investments may not work. These are reasons why not all entrepreneurs have a listing plan at the time of their campaigns and may not want to be listed on a secondary market, despite the possible benefits for their investors.

Taken together, these different factors make secondary markets for equity crowdfunding difficult to operate. From a regulatory perspective, establishing secondary markets can be demanding, making their creation even more costly. European platforms may be subject to Markets in Financial Instruments (MiFID) II regulation if they are classified as "multilateral trading facilities" (equivalent to "alternative trading systems" in the United States).[9] In avoiding this burden, platforms may be limited in the way they can organize trading and thus in the efficiency of their secondary market. Despite these challenges, some platforms, including Seedrs and Funderbeam, have managed to establish and maintain secondary markets.

Furthermore, our study offers insights into which type of investors may be more likely to benefit from secondary markets. In particular, we show that regular retail investors are more prone to react to the existence of such markets than larger or more experienced investors. These differing results for these two types of investors also likely hold implications for platform operators and policymakers. From the perspective of the former, we argue that platforms specialized in attracting regular retail investors may be more inclined to develop well-functioning secondary markets, since gains for entrepreneurs are improved in this context, which in turn affects the attractiveness and profitability of the platform. From the perspective of policymakers, the differences between investor types indicate a need to support the emergence of liquid secondary markets to facilitate the participation of retail investors in the equity ownership of startups. This is in contrast to the situation of business angels and other types of larger investors, who require other policy measures to enhance their participation.

The development of secondary markets may be further fostered through recent technological progress. An emerging strand of literature discusses exit opportunities for equity crowdfunding based on blockchain technology, arguing that campaigns that are set up on a blockchain can facilitate secondary trading more easily and with lower transaction fees than those employing current secondary market solutions (Hughes and Wang, 2019; Roth et al., 2021). However, blockchain is merely a technology that can facilitate secondary markets' functioning. However, the fundamental tradeoffs and challenges faced in establishing well-functioning secondary markets remain the same. At best, the use of blockchain technology may create a larger investor pool than those of regular platforms since such markets are more easily accessible across country and continent borders.

5.4. Future research and concluding remarks

Our study offers some theoretical guidance for future research. First, we suggest certain initial insights into the tradeoffs inherent in platforms' establishment of secondary markets and entrepreneurs' use of them. While the ultimate costs and benefits remain to be studied, we offer insights to future theoretical work by discussing several possible channels that could be at play (without formally testing them). We outline competition effects from the primary market, downward pressure on valuation, reputational costs, and additional resource requirements as possible factors that may deter entrepreneurs from allowing crowd investors to make use of secondary markets.

The previous entrepreneurial finance literature has mostly considered information asymmetry between entrepreneurs and primary market investors (Bellavitis et al., 2017; Chod and Lyandres, 2021; Denis, 2004). In the context of secondary markets, however, the agent space expands to include prospective secondary market investors, and their lack of company information becomes salient. Given that secondary market investors can rarely access timely information that companies make available during primary market offerings or internal company information shared with only existing shareholders outside funding rounds, the issue of information asymmetry becomes increasingly accentuated in this context, and theory should consider the nature and implications of such asymmetry. For instance, it may hinder price and volume setting in the secondary market and therefore adversely affect liquidity in two ways. First, while in the primary market setting, at least one party (the entrepreneur) has information to support investment and pricing decisions, the secondary market setting can give rise to situations where neither buyers nor sellers possess the information necessary to make investment decisions or determine pricing. Second, if current shareholders possess more information about a company than outsiders, their willingness to sell may be an indication of a deterioration of the

[8] Some markets also restrict trading through regulation. For instance, in the United States, crowd investors are restricted from selling their shares during the first year of ownership (SEC, 2016).

[9] For a precise definition of a multilateral trading facility, please refer to Directive 2004/39/EC (MiFID I), Article 4 (15). The same definition applies under MiFID II.

company's prospects, and on a larger scale, this may cause secondary markets to become lemon markets (Akerlof, 1970; Andrieu and Groh, 2021).

Finally, our study offers avenues for broadening the theory on transaction costs in the field of entrepreneurial finance. Previous literature has juxtaposed digitalized entrepreneurial finance with traditional forms of entrepreneurial finance due to its ability to dramatically reduce transaction costs (Kim and Viswanathan, 2019; Löher, 2017). However, secondary markets can mitigate this transaction cost advantage. As high information asymmetry typically entails high transaction costs (Walthoff-Borm et al., 2018a), the secondary market environment can become a high-transaction-cost environment where investors incur search costs, evaluation costs, and charges from secondary market operators striving to maintain the financial viability of their operations. While our study indicates that secondary markets for equity crowdfunding can exhibit both high transaction costs and low liquidity, new theory is needed to map the interrelationships among information asymmetry, transaction costs, and secondary market liquidity. In conclusion, our findings on the promise and challenges of secondary markets call for theory that disentangles the different sources of costs and benefits of secondary markets for entrepreneurs and investors.

In light of these conclusions, we consider that the exit problems of crowd investors are not that different from those of venture capital funds and business angels, who also hold illiquid shares and must wait for a trade sale or an IPO to fully realize their returns on investment. An important question is whether secondary markets can become merely an exit channel for a few impatient investors or a general mechanism that allows all crowd investors to sell their shares. More research is needed to understand these mechanisms, and one way to address these questions is to study other secondary market mechanisms, including those of Seedrs and Funderbeam, which offer their own secondary market solutions and different pricing solutions for the listed shares. The study of different currently offered solutions may help reveal which practices are best for the equity crowdfunding market to uncover the "missing link" in equity crowdfunding.

CRediT authorship contribution statement

Anna Lukkarinen: Conceptualization, Methodology, Software, Formal analysis, Data curation, Writing – original draft, Writing – review & editing. **Armin Schwienbacher:** Conceptualization, Methodology, Writing – original draft, Writing – review & editing.

Declaration of competing interest

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Data availability

The authors do not have permission to share data.

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Online appendix. Supplementary materials

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