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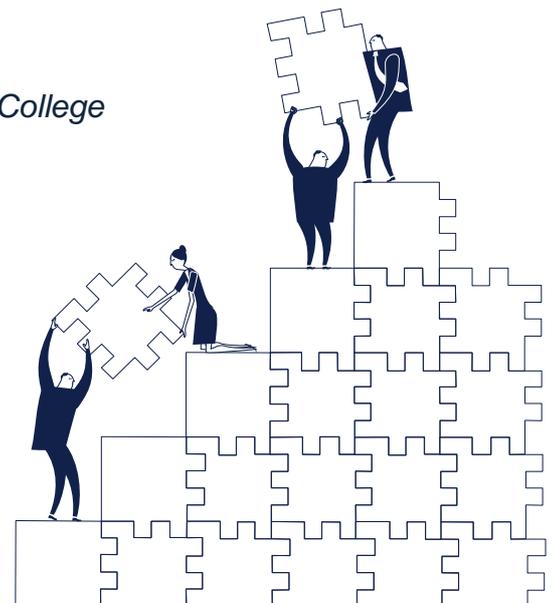
# Ownership Dynamics within Founder Teams: The Role of External Financing

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# Ownership Dynamics within Founder Teams: The Role of External Financing

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## **Research summary**

The paper examines how founders within a start-up team dynamically re-adjust their relative ownership stakes. It identifies a trade-off between efficiency and fairness, both at the time of founding, and as the venture develops. The analysis shows that relative founder stakes are more likely to change in the presence of external investors. Larger rounds, and lower valuations are also associated with more founder ownership changes. Founder teams that emphasize fairness at the start, initially splitting their equity holdings equally, are subsequently less likely to modify their relative ownership arrangements. The paper leverages a unique dataset from British Columbia, Canada, which contains detailed information on founder ownership over time.

## **Managerial summary**

Setting the relative equity stakes of founders involves a trade-off between efficiency versus fairness. This delicate choice has to be made not only when founder teams initially agree on a division of equity, but the decision can also be revisited as the venture develops over time. This paper finds that changes in the division of founder ownership coincide with external financing rounds, suggesting that tensions between founders are more easily resolved in the presence of outside investors. Teams that have a strong preference for fairness, as shown by equally splitting the original founder equity, are less likely to change their relative stakes at a later point. They are also more likely to invest identical amount when providing founder financing to the venture. Overall the data suggests that founder share allocations are not set in stone, but that notions of team fairness inhibit changes to the relative ownership stakes of founders in start-ups.

## 1. Introduction

In recent years entrepreneurship researchers have developed a growing interest in understanding entrepreneurial teams (Klotz et al., 2014). Considerable progress has been made in understanding the origins of founder teams, and the importance of founder team characteristics for start-up growth (Åstebro and Serrano, 2011, Colombo and Grilli, 2005, Ruef and Aldrich, 2003; Ruef, 2010). Of particular significance is the work of Beckman and Burton (see Burton, Sørensen and Beckman, 2002; Beckman, 2006; Beckman, Burton and O'Reilly, 2007; Beckman and Burton, 2008), which looks at how founders put an imprint on their ventures, and how this affects the subsequent evolution of companies. The work of Baron, Burton, and Hannan (see Baron, Burton, and Hannan, 1996, Hannan, Burton, and Baron, 1996, Baron, Hannan, and Burton, 2001) further underscores the long-term implications of original founder teams and their culture. Their interest lies mainly in understanding when companies undergo organizational changes, and how the initial imprint moderates these dynamic changes. A related literature looks at how founder teams are augmented and sometime replaced by professional managers (Ewens and Marx, 2017, Hellmann and Puri 2002, Wasserman 2003).

While the importance of the founding team has now firmly been established, much less is known about the allocation of the relative ownership within founder teams, possibly due to data constraints. One recent exception is Hellmann and Wasserman (2016) who provide a theory and empirical analysis of the initial choices of founder teams to split founder shares equally or not. Their analysis suggests a fundamental trade-off between an 'efficiency' logic that is based on efficient bargaining (Nash (1953), Binmore and Rubinstein (1986)) and pushes teams towards unequal splitting of share ownership, versus a 'fairness' logic (Adams, 1965, Dawes and Fowler, 2007, Deutsch 1975, Fehr and Schmidt, 2006, Skott, 2005) that pushes teams towards equal splitting.<sup>1</sup> Furthermore, Wasserman (2012) examines several insightful case studies of how initial ownership within founder teams changes over time. However, to the best of our knowledge, to date there is no systematic study about the dynamics of founder ownership.

Our focus in this paper is entirely on the founder team itself. Our main research question concerns the determinants of how founder teams change their relative share allocation amongst themselves. This is a delicate yet important team decision, as it determines the relative rewards to entrepreneurial activity, as well as economic incentives and the social status within the founder team. Let us clarify upfront that in this paper we are not interested in the standard finance question of how founder ownership gets diluted as companies issue shares to investors. Instead we are solely focused on how the relative shares of the founders evolve over time. Founder team members can in principle change their relative ownership at any time.

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<sup>1</sup> The fairness logic is sometimes also referred to as an 'equity' logic. Throughout the paper we avoid this term, because of a likely confusion with the other meaning of 'equity' as company shares.

However, any adjustment has to be agreed upon somehow, and may be viewed as going back on the original agreement that was forged at the start of the company.

The two central research questions in this paper are

- (i) What is the role of external financing in triggering dynamic ownership changes within founder teams?
- (ii) How does a founder teams' initial fairness choice affect the willingness to subsequently adjust relative founder ownership over time?

Data is a major constraint for researching founder team dynamics in general, and the sensitive nature of ownership data makes this even more challenging. The few financial databases that provide information on start-up investments and ownership do not report data on the internal division of ownership shares. The survey data of Wasserman (2003, 2006, 2017) takes an important step forward by collecting detailed data on the original allocation of founder shares. However, even in this dataset it is not possible to systematically follow founder ownership over time. In this paper we exploit a unique dataset of start-ups in the Canadian province of British Columbia (BC). The British Columbia Investment Capital Program provides a tax credit to qualifying BC investors who invest in equity of qualifying BC companies. As part of the program participating companies disclose their legal share registries to the administrator. These share registries record every individual share issue of the company, and form the core of our dataset. The dataset therefore contains extremely accurate and detailed information concerning share ownership over time. We focus on companies with multiple founders. Using both internal documents of the companies themselves, as well as extensive online searches, we identify which individuals are the original founders of the companies. We then trace the relative ownership of the founders over the duration of the share registries.

The descriptive data already contains several interesting background facts. Relative founder ownership changes occur in 12% of all company quarters in our sample, and in 23% of all quarters with external financing. This already suggests that ownership changes are not rare, and that they occur disproportionately often in the presence of external investors. Another interesting finding is that 18% of all external financing rounds also include investments by founders. A careful analysis of founder ownership changes therefore needs to take into account founders' financial investments.

The starting point of our theoretical framework centres on the fundamental trade-off between efficiency and fairness. This builds on Hellmann and Wasserman (2016), who derive and empirically test a formal theory that explains how an efficiency logic encourages founder teams to choose unequal share split at the start, whereas a fairness logic encourages equal splitting. In this paper we extend this logic by expanding our horizon beyond the initial founder agreement, considering the dynamics of founder ownership changes over time. We argue that the efficiency logic encourages teams to continuously reconsider their relative ownership stakes, reflecting new insights and changing circumstances that affect the efficient allocation of relative

founder shares. By contrast, the fairness logic encourages teams to stick to their initial share allocation, rather than going back on what was originally agreed, just because circumstances have changed.

With this dynamic outlook, an important question becomes: which events, if any, trigger changes to relative founder ownership? We focus specifically on the role of external investors. They are much less encumbered by the internal social dynamics within the founder team. Instead, they are primarily motivated by the financial success of the venture. External investors therefore have an economic interest that the founder team choose an efficient relative ownership structure. They may try to persuade, or even pressure, founders to re-adjust their ownership stakes accordingly. In addition, they provide external legitimacy to founders who favour changes to the relative ownership within the team.

We obtain two main sets of empirical results. Our first set of results concerns the role of external financing. We find that changes to relative founder ownership are significantly more likely in the presence of external investors. While founder teams can change their ownership structure anytime, the incidence of change is significantly higher at the time of raising external funding. In addition, we obtain several results about the structure of financing. We find that larger external financing rounds are associated with more relative founder ownership changes. We also find that lower pre-money valuations are associated with more relative ownership changes among founders. A natural way of interpreting this last result is that for a given funding amount, lower pre-money valuations imply more dilution of all existing shareholders. The pre-money valuation and the round amount findings both suggest that more dilutive rounds are associated with more frequent relative ownership changes among founders. We also ask whether venture capital financing is associated with more relative founder ownership changes, but find no evidence to that effect.

Our empirical analysis does not make any causal claims that outside investors directly produce founder ownership changes. This would not be justifiable because our paper does not contain any advanced identification analysis, such as a controlled experiment or instrumental variable regressions. Generating data from a controlled experiment seems almost impossible in this context. We would also argue that it is conceptually not entirely clear what it would actually mean to say that “investors cause ownership changes.” Instead our discussion notes that ownership changes should be thought of as an equilibrium interaction between investors and founders. Put differently, our core hypothesis that investors ‘trigger’ founder ownership changes allows for a rich interplay between investor and founder interests. It may be that investors’ pressure companies to make those changes, but at the same time certain founders may also leverage the legitimacy of an investment round, or even hide behind the investors, to bring about ownership changes.

Our second set of empirical results concerns the relationship between initial fairness and dynamic fairness. Empirically we find that teams that choose an equal equity split at the start are less likely to change their relative founder ownership over time. This means that teams that

adopt a ‘static’ fairness logic at the start, are more likely to also adopt a ‘dynamic’ fairness logic as their venture develops over time. We also consider the interactions between equal splitting at the start and the response to subsequent financing events. Of particular interest here is the response to founder financing. In addition to external investors, start-ups receive investments from within the founder team itself. This mechanically generates changes in relative founder ownership, except for some special cases. In particular, if all founders hold identical stakes and all invest identical amounts, then they receive an identical number of new shares, and thus preserve their relative ownership shares. We conjecture that fairness-oriented teams that split the equity equally at start, are also more likely to also make identical investments. The data support this conjecture. As a consequence of this, relative founder ownership responds less to founder financing for teams that split the equity equally at the start.

The remainder of the paper is structured as follows. Section 2 develops the main hypotheses for the analysis, and relates them to the prior literature. Section 3 discusses our data. Section 4 contains the empirical analysis. Section 5 concludes and provides an outlook on future research.

## **2. Hypotheses and related literature**

### **2.1. The trade-off between efficiency and fairness**

In this section we develop the main hypotheses and relate them to the prior academic literature. Our starting point is that founder teams face important choices regarding the allocation of ownership amongst themselves. The ownership allocation choice can be governed by two very different types of logic. A first logic is an economic calculus that is based on “efficiency,” and holds that the division of ownership is mainly driven by a negotiation that is based on outside options, productivity, and incentives. The efficiency logic that we refer to here is concerned with the overall maximization of the company value, as well as with the individual utility maximization in a bargaining context. A large economic bargaining literature examines such division problems. Some of the early seminal contributions assume cooperative bargaining behaviour, such as the influential work of Nash (1953) and Shapley (1953). Later contributions by Rubinstein (1982), Rubinstein and Wolinsky (1985) and Binmore and Rubinstein (1986), show how very similar bargaining outcomes can be derived in certain non-cooperative games. The work of Holmström (1982) and Grossman and Hart (1986) explore bargaining problems with important incentive problems. Overall this literature suggests that differential share ownership can be explained by founders making contributions of different value, facing different incentives, or having different outside options.

A second, very different logic comes from theories of fairness. At the philosophical level the concept of fairness is deeply complex, but in the applied social science literature, the concept of fairness has been widely understood as equal compensation of people that are doing observationally equivalent jobs (see Akerlof and Yellen, 1990, Leventhal, 1976, Kacperczyk and

Bachalandran, 2016, Lazear, 1989, Pfeffer and Davis-Blake, 1992). In our context this pragmatic concept of fairness suggests that all founders should get the same stake in the company. This is also known as the  $1/n$  rule, where each founder in a team of  $n$  gets an equal fraction of  $1/n$  of the founder shares.

The central trade-off that we explore in this paper is how founder teams chose between the efficiency and fairness logic. This choice has been extensively studied in the economic fairness literature, and in particular in the influential work of Fehr and Schmidt (1999, 2006). Hellmann and Wasserman (2016) focus specifically on founder teams. They examine the initial allocation of founder shares, focusing especially on the distinction between ‘equal splitters’ (teams that allocate founder shares in equal proportion, i.e., use the  $1/n$  rule) versus ‘unequal splitters’. Their theoretical and empirical analysis establishes equal splitting as a fairness-driven choice, and unequal splitting as an efficiency-driven choice.

For large parts of the prior literature, including the works cited above, the trade-off between efficiency and fairness is considered in a static framework, where there is a single one-off ownership allocation. In this paper, however, we raise the much less studied question of the dynamics of this trade-off. Our starting premise is that in the context of entrepreneurial ventures, founder teams constantly face this efficiency-versus-fairness trade-off as their venture develops. Moreover, the dynamic perspective adds interesting and new aspects to this trade-off. From an efficiency perspective, founder roles, skills, outside options, and incentives are likely to change over time. Thus there are numerous opportunities to reconsider an original agreement. The renegotiation literature, starting with the seminal work of Dewatripont (1989), explores the various implications of renegotiation in a dynamic bargaining context. This problem is also central to the literature on hold-up (Grossman and Hart, 1985; Williamson, 1975). Closer to our context, Hellmann and Thiele (2015) develop a theory specifically focused on the dynamics of founder negotiations. The model allows for renegotiation and looks at how founder ownership can change over time.

Let us contrast this dynamic efficiency rationale against a dynamic fairness logic. In a dynamic context, fairness is often associated with sticking to the original agreement. There is a sense that deviating from the original agreement is unfair, because at least one party ends up with a lower relative share than in the original agreement. The underlying notion is that changes in the original agreement are driven by random shocks to the parties’ bargaining strength that expose all parties to undesirable risk. An extreme version of the (static and dynamic) fairness logic dates back to Rawls (1971), whose notion of ex-ante equality would suggest that an optimal allocation is an equal division that never changes. Overall, we note that the dynamic trade-off between efficiency and fairness concerns the degree to which an originally agreed-upon division of founder equity can be changed over time.

Figure 1 represents a simple two-by-two matrix summarizing the core trade-off between efficiency and fairness faced by founder teams.

**Figure 1: Theoretical framework**

	<b>EFFICIENCY LOGIC</b>	<b>FAIRNESS LOGIC</b>
<b>INITIAL DIVISION OF RELATIVE FOUNDER OWNERSHIP (STATIC)</b>	Unequal splits are chosen, reflecting differences between founders	An equal split is chosen, reflecting the conviction of the founder team
<b>POTENTIAL REVISION OF THE PRIOR OWNERSHIP ARRANGEMENT (DYNAMIC)</b>	Adjust relative ownership over time, in response to changed economic circumstances	Preserve original ownership agreement, in order not to renege on initial agreements

## **2.2. External financing and relative founder ownership changes**

We are now in a position to explore the main hypotheses of this paper. We divide our discussion into two parts. In this subsection we focus on how financing can affect ownership, in the next we focus on how a team’s initial fairness choices affect subsequent ownership changes. In terms of Figure 1 this means that we initially focus on the lower row and analyse the circumstances under which relative founder ownership is modified over time. In the next subsection we combine this with the issues in the upper row, addressing how an initial fairness logic affects these dynamic ownership changes.

As a first step it is useful to make a distinction between founder financing and external financing. Our analysis focuses mostly on external financing, but it is useful to briefly raise the issue of founder financing. Start-ups sometimes raise some money from within the team. Naturally the individual founders expect to receive some shares in return for investing their own money. Consequently we might expect relative founder ownership to change as a result of founder financing, except for some special cases discussed later. Here we simply note that as long as these special cases do not always apply, founder investments should affect founder ownership. Hence we record our first hypothesis as follows.

### **Hypothesis 1: Founder financing is a trigger for changes in relative founder ownership.**

Let us now turn our attention to the role of external financing. As discussed above, our fundamental premise is that founder teams face a trade-off between the efficiency and fairness logics. By contrast, we now argue that compared to founders, outside investors are clearly skewed towards efficiency. They do not share the social obligations and ties of the founder team, instead they are investing in the venture with the hope of generating a financial return. Therefore they have a simple economic self-interest in promoting the efficiency logic.

If founder teams face a trade-off between efficiency and fairness, but outside investors favour efficiency, we should expect that investors try to ‘persuade’ founder teams to readjust their ownership shares, if and when there are efficiency benefits to be realised. We can think of a spectrum of ‘persuasive’ methods, where on the soft end the investors may simply raise the

issue, and on the ‘hard’ end investors manage to impose founder ownership changes as a condition for their investment. This leads to our second hypothesis.

**Hypothesis 2: External financing is a trigger for changes in relative founder ownership.**

Our notion of a ‘trigger’ in Hypothesis 2 does not require a unidirectional causal effect. We think of external funding as the event that allows entrepreneurs and investors to find a new relative ownership allocation. This change may be due to investor pressure, but it may also be due to (complementary) founder pressures. Certain founders may conveniently hide behind their investors to bring about ownership changes. Even though founder ownership changes can be made at any time, having an external financing event provides legitimacy to such a change. Put differently, rather than directly requesting a larger ownership share, certain founders might wait for an external funding round which already involves dilution of the overall founder stake, and thus provides an opportunity to also change relative founder shares.<sup>2</sup>

The argument of Hypothesis 2 is based on the distinction between periods where an external financing round occurs or not. Let us now focus on those periods where external financing occurs, and ask whether the structure of these rounds affects the likelihood of ownership changes. A natural conjecture is that larger rounds are more frequently associated with founder ownership changes. One channel could be that as the amount of money raised gets larger, the investors’ influence also becomes larger. Another channel could be that larger rounds are generally associated with bigger financial stakes, hence a larger cost of inefficient founder arrangements, and thus greater pressure by the external financiers.

A variant of this argument focuses on valuations and dilution. The argument can be understood in two related ways. First, it might simply be argued that companies with lower valuations have less bargaining power. Second, we can think of valuation as impacting dilution of the aggregate founder stake. Formally speaking, the dilution in a round is calculated as the amount of external financing divided by the so-called post-money valuation (which itself is the sum of the pre-money valuation and the round amount). Hence, for a given round amount, a lower valuation implies greater dilution, and hence greater pressure for change. This leads to our third hypothesis.

**Hypothesis 3: Changes in relative founder ownership are more likely to occur with larger external financing rounds, and with lower valuations.**

As a next step, we consider the possibility that external investment pressure depends on the type of investors that are involved in the company. A significant strand of the entrepreneurial finance literature suggests that investors are not homogenous, and that there are important differences between informal investors (such as family, friends, or angel investors) and

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<sup>2</sup> In addition, there may also be a more mundane transaction cost rationale, namely that registering ownership changes requires a lawyer. It may be cheaper to do the change at a time when the lawyers already record the other changes in the share registry.

professional investors, especially venture capitalists (Colombo and Grilli, 2010, 2013, Da Rin et al., 2012, Hellmann and Puri, 2002). These venture capitalists invest on behalf of other investors and are therefore subject to greater accountability in their investment behaviour. They explicitly focus on generating financial returns, and tend to have disproportionately large control rights (Kaplan and Strömberg, 2003, Prowse, 1998, Wong, 2010). Venture capitalists also tend to achieve better investment performance (Colombo and Grilli, 2010, Davila et al. 2003, Engel and Keilbach, 2007). One might therefore expect that the pressure to change founder ownership is higher in the presence of such venture capital investors. This suggests our fourth hypothesis.

**Hypothesis 4: Investment rounds with venture capital are a stronger trigger for founder ownership changes than rounds without venture capital.**

Another interesting question is when the external financing effect is strongest. If we think that most of the inefficiencies in founder ownership arrangement occur at the time of founding (when founders make decisions without the guidance of investors), then we might expect that the first external financing round has the biggest impact on relative founder ownership. The idea is that once a company has been exposed to the wisdom of external investors, fewer additional changes are needed. It is also possible to formulate an alternative hypothesis here, namely that inefficiency changes occur randomly over time. In this case there is nothing special about the first external financing round. If anything, later rounds may be more likely to involve founder ownership changes, as more inefficiencies may have accumulated by then. Ultimately this an empirical question, but we find it simplest to state our fifth hypothesis as follows.

**Hypothesis 5: First external financing rounds are a stronger trigger for founder ownership changes than subsequent external financing rounds.**

### **2.3. The interaction between initial and dynamic fairness**

We now turn to the interaction between initial (static) fairness, as reflected in an equal founder ownership split at the start, and dynamic fairness, as reflected in the commitment to stick to an original agreement. This brings us back to the theoretical framework in Figure 1, which identifies both a static and a dynamic dimension for the fairness and the efficiency logic.

Our first and most fundamental hypothesis is that teams that prefer one logic at the start also maintain a preference for that logic over time. Specifically, we would expect teams that favour the fairness logic at the start, and therefore split the equity equally, to also favour the dynamic fairness logic, and therefore maintain their ownership structure over time. We are not suggesting that a team of equal splitters never deviates from its original agreement, we are merely suggesting that if such a team preferred the fairness logic at the start, it would also prefer a fairness logic over time. Thus it would more likely resist changes to the ownership

structure. From now on we use the term ‘Equal Splitters’ to describe founder teams that split their equity equally at the start. With this we state our next hypothesis.

**Hypothesis 6: Equal splitters are less likely to change their relative founder ownership over time.**

Hypothesis 6 is unrelated to any financing argument. The next step is to consider how a preference for fairness at the start affects the role of financing. The main hypothesis of interest deals with founder financing. We already noted that relative founder ownership changes when founders invest, except for special cases, such as if founders with equal ownership stakes all invest the exact same amount. Our first conjecture is that teams with strong fairness preferences will not only want to split the equity equally, when making founder investments they will also try to invest the same amounts. This is a logical extension of the fairness norm, where all founders get the same returns provided they all provide the same basic inputs. Thus we should find that equal splitter teams are less likely to change ownership in response to founder financing, precisely because their equal investments do not result in relative ownership changes. Our next hypothesis thus contains two interrelated parts.

**Hypothesis 7: When providing a founder financing round, equal splitters are more like to invest identical amounts. Consequently, the likelihood of changes in founder ownership during founder financing rounds is lower for equal splitters than for non-equal splitters.**

Finally, we briefly discuss the relationship between an initial preference for fairness, and the response to external financing events. In principle there are arguments for equal splitters to respond more or less to external pressure, so the theory does not suggest a clear hypothesis. As noted in Hypothesis 6, we expect preferences for fairness to be resilient. This suggests that equal splitters are more likely to resist investor requests for ownership changes. For example, equal splitters might be less willing to listen to their investors. However, while equal splitters may be more opposed to changing ownership, there may also be greater pressure to do so, because there are greater efficiency gains to be achieved from such a change. Moreover, in the absence of any external pressure, equal splitters may almost never change their ownership, which could actually lead to a relatively bigger response to external financing. Without a clear hypothesis, we consider the differential response of equal splitters to external financing an empirical question.

### **3) Data**

#### **3.1. The British Columbia Investment Capital Program**

Our primary data source is the Government of British Columbia, who administers the British Columbia Investment Capital Program (henceforth BCICP). The BCICP offers a tax credit of 30% of the amount invested in the equity of eligible entrepreneurial companies. The 30% tax credit is available (up to some maximum annual amount) to BC-resident individuals, as well as BC-

based corporate investors. Eligible companies are BC-based companies that, at the moment of registration under the BCICP, do not employ more than 100 employees and contractors; that pay at least 75% of the wages and salaries to BC employees; and that “engage in an eligible activity”, i.e. primarily R&D of proprietary technology, manufacturing, and digital media. BC securities legislation also imposes some rules on companies that issue securities in BC (see British Columbia Securities Commission, 2017). The appendix contains further detail on the BCICP eligibility criteria for investors and companies, as well as BC securities legislation.

In order to establish compliance with certain program rules, companies frequently submit their entire share registries to the BCICP administrator. These registries are of particular importance because they identify all the shareholders, not only the investors who received a tax credit. The share registries contain a complete history of all shareholder transactions in the company, from the founding moment to the time of the filing. From a research perspective this provides the highest level of accuracy one can have for tracking ownership over time. Unfortunately the filing of these share registries is not a formal requirement, as there are other ways of showing compliance with the program rules. Therefore not all companies chose to submit share registries. We now proceed to explain the details of our sample.

### **3.2 Definition of sample and founders**

The everyday use of the term founder is not always very precise, and some people consider themselves founders if they joined a company “relatively early.” In our analysis we use a conservative approach of only admitting those to founder status who satisfy some objective criteria. We deliberately focus on the “original founders,” i.e., those individuals who actually received their first shares at the time of company founding. Formally, we require all founders to appear on the share registry in the initial quarter (we call this quarter 0) of the share registry. However, not all shareholders in quarter 0 are necessarily founders. We therefore require positive identification of the quarter-0 shareholders as founders from other sources. When companies register under the BCICP they typically submit their business plans to the program managers. Often (though unfortunately not always) these business plans list the original founders of the companies. To complete the data, we used web searches to identify founders for companies for which we did not have a business plan or where the business plan did not identify the founders. Specifically, we attempted to find founders through company websites, Google and LinkedIn profile searches, as well as searches of the internet archive called the Wayback Machine (<http://archive.org/web>). We used a strict rule in these searches, and only called an individual a founder if he or she was positively identified as such in at least one of those additional sources.

Our company dataset derives from the 759 entrepreneurial companies that received financing supported by the BCICP between 1990 and 2009 (most of which in the 2000s). For 308 companies we have share registries. Because of our interest in ownership changes, we focus on

those companies that have two or more quarters of activity in their share registries. Among those we are able to identify one or several founders in 198 companies, using the methodology described above. Because our analysis focuses on founder teams we exclude all companies with a single founder, leaving us with a final sample of 84 companies, all of which have multiple founders and transactions across multiple quarters. For these 84 companies we analyse the data through two different sampling lenses. The first sample includes all quarters, from the founding quarter to the last quarter covered by the share registries. This sample consists of 1371 ‘company quarters’. The second sample includes all quarters with some external financing event (defined below), which consists of 515 ‘financing rounds’. Our analysis is focused on founder ownership *changes*, which, by construction, is not defined in the initial quarter. The regressions are therefore based on either 1287 company quarters, or 480 financing rounds.<sup>3</sup>

It is useful to briefly discuss the strengths and limitations of our data. In terms of strengths, the data is very accurate concerning the key dependent variable, namely founder ownership and its dynamics, as well as the key independent variables, namely investments, including their precise amounts and precise timings. This is because the legal share registries we have for our companies precisely record the initial share allocation and all subsequent ownership changes at the individual shareholder level. This means we have accurate information not only on founders, but on all other shareholders too. Naturally this precision comes with some limitations. First, our sample is relatively small. We are looking at a specific context, where all the companies in the sample apply to a tax credit program, and all of them raise some money from investors who participate in that program. Our analysis is therefore limited to certain growth-oriented start-ups that manage to attract external funding. Moreover, we do not have share registries for all the companies in the program. Second, while we observe individual shareholders of companies and the evolution of their shareholdings, founders are not always identified in the BCICP data. For companies whose founder information was not described in the BCICP data, we took a pro-active approach to identify founders using broad but systematic web searches. Third, we have limited information about how the underlying ventures evolve in terms of their business fundamentals, and we have no information on the economic circumstances of the individual founders.

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<sup>3</sup> Note that the difference between 1371 and 1287 is exactly 84, the number of companies. The difference between 515 and 480 comes from the 35 companies that receive their first investment in quarter 0. Note also that when a company raises money, not all transactions are recorded on exactly the same day. We therefore group our data into quarters, and consider all investments made in a quarter as pertaining to the same investment round. For example, if a company issues 5,000 shares to one investor on February 15th and another 5,000 on March 15th, then we would consider all 10,000 shares to be part of the same investment round. We also performed some robustness checks where we allowed investments in the subsequent quarter to be included in the same round (say an investment on April 15th). We find that this does impact our results, because such close-by investments remain rare in the data.

### 3.3. Variable definitions

Table 1 explains all the variables used throughout our analysis. Our dependent variable is *Ownership Change*, a dummy variable indicating if there is a change in relative ownership of any of the founders in the quarter. A founder's relative ownership is computed by dividing the number of shares owned by that founder by the total number of shares owned by all founders in the team. For example, assume a company has issued 30,000 shares, of which 10,000 are owned by its two founders. If founder A owns 6,000 of the founder shares and B the remaining 4,000, then A has a relative ownership of 60% and B of 40%. Suppose now this company issues another 10,000 to some new investors. In this case the total number of company shares rises to 40,000, but the number of founder shares remains at 10,000, and the 60%-40% remains in place, so no relative founder ownership changes took place. However, suppose the company issued another 2,000 shares to founder A. In this case the relative ownership is changed to 66.67%-33.33%, and our dummy variable records this as an ownership change.<sup>4</sup>

Our key independent variables concern financing events of the company. We distinguish between founder investments and external investments. The former are the investments made by those who we identified as founders, the latter by all other investors. The dummy variable 'Founder Financing' ('External Financing') indicate whether in a particular quarter any founder (external investor) made an investment or not. Note that both these dummies can potentially be set to one in a certain quarter, as founder investments may occur alongside external investments. The 'Founder Amount' ('External Amount') variables record the size of investments made in that quarter.

The other key independent variable is "Equal Split" that indicates whether a company starts with an equal ownership split among founders. Specifically, Equal Split equals 1 if each founder at the start receives  $1/n$  of founder ownership, where  $n$  is the number of founders.

Our share registries contain very detailed information on all these transactions, and therefore also generate a complication around what we call "sweat equity." Consider the above company issuing an additional 2,000 shares to founder A. Suppose that this share issuance is meant to recognize valuable contributions made (or to be made) by founder A. In order for the company to issue these shares, for tax and legal reasons it may have to charge a deeply discounted price. Suppose the price per share paid by other investors was \$20. What we would often find is that the shares to the founder are offered at a price of \$0.01, thus requiring the founder to pay a total of \$20 for 2,000 shares that are valued at \$40,000. In the share registries we would find a founder investment of \$20, which is due to the way that share issuance are technically

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<sup>4</sup> Mechanically, relative ownership changes between founders can be done either through transfers of shares between founders, or by issuing additional shares to some, but not all founders. Note that founders can also pre-program relative ownership changes by writing dynamic agreements at the start (Wasserman, 2012). We do not have direct evidence about the existence of such arrangements, but can capture their effect, as we know all the ownership changes that actually happen.

implemented. Clearly we should not consider this \$20 a proper investment, instead we should think of it as an administrative step for the issuance of sweat equity. Consequently our definition of founder investments requires that founders pay the full share price, which we established from the nearby transactions of external financiers. More generally, we do not consider as investments any transactions involving deeply discounted shares.

For the valuation of rounds we focus on the pre-money valuation, which, by definition, excludes the total of the current round amount. To calculate the valuation we use all the existing shares prior to the round and multiply by the full price in the round.

Our analysis includes a dummy on whether a financing round involves venture capital financing or not. We identify an investor as a venture capitalist if the investor is not an individual, but rather some investment vehicle, and (i) the vehicle is one of the eight venture capital funds recognized under the BCICP tax program, or (ii) the vehicle's name matches with any of the venture capital names in the Capital IQ and VentureXpert (ThomsonOne) datasets, or (iii) a web search reveals that the vehicle is a venture capital fund. In the latter case, we located a website of the fund, or the fund manager, that claimed that the fund was a venture capital fund or the fund manager a venture capital firm. We then require that the information on the website establishes that the fund is managed by a team of investment professionals. We identified a total of 34 distinct VCs in our dataset, mostly through VentureXpert.

One of the controls we use in our regressions is whether our companies filed a US patent application in the quarter. The reason for incorporating patent applications is that founder dynamics may depend on significant development in the company. The works of Conti et al. (2013), Hsu and Ziedonis (2013) and Vo (2017) suggest that patents play a role in the financial development of entrepreneurial companies. We track US patent applications by manually matching our companies with companies recorded in the Disambiguation and Co-authorship Networks of the U.S. Patent Inventor Database 1975 – 2010 (Lai et al., 2011) and also on the website of the US Patent and Trademark Office. We focus on the application of new patents: *Patent application* equals 1 whenever the company applied for a new US patent in that quarter.

The construction of the industry and geography dummies is very standard and further explained in Hellmann and Schure (2010) and Hellmann, Schure, and Vo (2017).

### **3.4 Descriptive statistics**

Table 2 contains descriptive statistics. Panel A reports the average and confidence intervals for all the company specific variables. It is worth noting that 55% of all founder teams share their equity equally at the start.<sup>5</sup> The majority of our companies, over 56%, are in the “high tech” sector, with the largest component being the Software industry. Unsurprisingly perhaps, 75% of the companies are geographically concentrated in the greater Vancouver area.

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<sup>5</sup> This is more than in Hellmann and Wasserman (2016), and is likely due to differences in sampling procedures.

In Panel B of Table 2 we focus on the key characteristics of financing rounds. In the top section of Panel B we provide statistics at the quarterly level, while in the bottom section we do so at the round level, i.e. we only look at times at which financing occurs. Financing occurs in 39% of all quarters, and relative founder ownership changes occur in 12% of all quarters. Restricting our attention to financing events (bottom part of Panel B), we see that 23% of those lead to a change in relative ownership between founders. Venture Capital financing occurs in 13% of financing rounds. External financing levels are close to 15 times greater than those of founder financing.

In Panel C, we compare descriptive statistics across the two subsamples of companies where founders split the equity equally at the start or not. The stars represent the results of t-test for the significance of the difference across the two subsamples. We discuss these findings in Section 4.

Finally, Table 3 shows the correlation matrix between our key variables of interest. It foreshadows some of the analysis from section 4, so we refrain from discussing further details here.

#### **4. Empirical findings**

Our empirical analysis is motivated by the theoretical discussion and hypotheses from Section 2. However, the logical development of the theory follows a slightly different order than the empirical regression analysis. We now explain the core empirical results, and their connection to the various hypothesis, but not necessarily in the same order as the hypotheses themselves.

Our first empirical question concerns the effect of financing. In particular we are interested in testing Hypotheses 1 and 2 regarding the effect of founder and external financing on founder ownership changes. We examine this in the company-quarter sample which includes all company quarters, irrespective of whether there was a financing event or not.<sup>6</sup> In Table 4 and the subsequent tables the dependent variable is *Ownership Change*, a dummy variable that indicates whether the relative founder ownership shares have changed. To understand these regressions it is useful to recall that financing events by themselves do not necessarily trigger any relative ownership changes amongst founders. By construction the total number of founder shares are always normalized to 1. Any dilution from new share issuances to external investors do not affect the relative founder shares by itself.

In columns (1) and (2) of Table 4 the key independent variable is '*Financing*', a dummy indicating the presence of any financing event in that quarter. In columns (3) and (4) this variable is broken out into two (non-mutually exclusive) categorical variables: 'External

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<sup>6</sup> As noted in section 3, the initial quarter of every company has been excluded since by definition ownership cannot change at the start. This gives us 1287 observations across 84 companies. Columns (1) and (3) have 1208 observations due to the Probit regression dropping some observations.

Financing’ and ‘Founder Financing’. Columns (1) and (3) report the results from Probit panel regressions, columns (2) and (4) report results from linear regression with company fixed effects.

We use two sets of control variables. The first set vary at the company level, and therefore disappear in columns (2) and (4) with company fixed effects. In this set we have the ‘Equal Split’ dummy which equals to 1 whenever the founder team chose to split the equity equally at the start, 0 for an unequal split; we have a variable for the number of founders; and we have a set of dummies for industry and location. The second set varies at the company-quarter level and contain non-financial variables, namely whether the company filed a patent in that quarter, and the age of the company in that quarter. All our regressions also include unreported quarterly calendar fixed effects, and a constant term.

The first important result from Table 4 is that *Financing* (in columns (1) and (2)), as well as *External Financing* and *Founder Financing* (in columns (3) and (4)) all have positive and highly significant coefficients. The coefficient is larger for founder financing, but remains large for external financing as well. This result immediately confirms Hypothesis 1 and Hypothesis 2.

Table 4 also addresses Hypothesis 6 about the main effect for founder teams choosing to split their shares equally. The coefficient for *Equal Split* is negative and statistically highly significant in both columns (1) and (3). This confirms that equal splitter teams are less likely to change their original ownership structure, suggesting that an initial team preference for fairness also predicts a preference for dynamic fairness (“sticking to the original agreement”). This result confirms Hypothesis 6.

Hypotheses 3 and 4 are tested in the model of Table 5. It uses the financing round sample, which consists of the subset of quarters where external financing events occur. This sample allows us to focus on the structure of external financing rounds. The sample includes 480 observations across 80 companies. The dependent variable is again *Ownership Change*, the same as in Table 4. From now on we focus on the model with company fixed effects (similar to columns (2) and (4) of Table 4).<sup>7</sup> All the regressions include the time-varying company controls, namely whether the company filed a patent in that quarter, and the age of the company in that quarter, as well as the unreported quarterly calendar fixed effects, and the constant term. They also include the founder financing dummy whose coefficient is always positive and highly significant, consistent with the results form Table 4.

The main variables of interest concern the structure of external financing. The coefficient for the (log) amount of external financing is positive and highly significant at the 1% level. This is consistent with the first part of Hypothesis 3 which argues that the likelihood of a change in relative founder ownership is higher in larger rounds. In column (2) we add the (log) valuation as a second explanatory variable, and find that it is negative and significant at the 10% level.

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<sup>7</sup> As a robustness check we also ran Probit panel regressions (similarly to columns (1) and (3) of Table 4) and found qualitatively very similar results.

This is consistent with the second part of Hypothesis 3, which suggests that lower valuation, and therefore greater dilution, is associated with more relative ownership changes for founders.

We perform several robustness checks. From an economic perspective we note that the argument of a lower valuation can be intuitively understood as the effect of greater dilution. From the empirical base specification we prefer to use the pre-money valuation, which is not mechanically related to the investment amount. However, as a robustness check we also construct a dilution variable, which combines amount and valuation.<sup>8</sup> Despite the mechanical correlation between this dilution measure and the amount measure, we continue to find the same result pattern. In particular, we find that both the amount and the dilution variables have positive and significant coefficients.

In column (3) we add the distinction between venture capitalists versus informal investors. As shown in Table 1, 13% of all financing rounds involve venture capitalists. Hypothesis 4 conjectured that the presence of venture capitalists in a financing round would increase the likelihood of a founder ownership change. Column (3) includes the VC dummy, but shows it to be insignificant. This suggests that the type of investor has little impact in this context, contrary to Hypothesis 4. As a robustness check we augmented our measure of venture capital to also include corporate investors, who are arguably also professional investors, but again found similarly insignificant results.

For Hypothesis 5 we consider Table 6. The most important result concerns column (1), which extends the regression model of column (4) of Table 3. The sample is company quarters and we use company fixed effects. The key difference is the addition of the interaction term *First Round X External Financing*, which identifies any differential effect of the first external financing round. The coefficient is positive and significant at the 10% level, providing support for Hypothesis 5. In particular, this result suggests that external investors play a bigger role during their first investment in the company.

Columns (2) and (3) go beyond Hypothesis 5 and ask whether the details of the external financing deal also matter more in the first external round. The regressions extend the model from Table 5 by adding an interaction effect to the amount and valuation variables. In column (2) we find that the interaction term *First Round X External Amount* is positive and significant at the 10% level. In column (3) find that neither of the interaction terms are significant.

Table 3 already addresses Hypothesis 6, showing a negative statistical relationship between equal splitting and ownership changes. It shows that those teams that reveal a preference for static fairness by initially splitting the equity equally, also exhibit a preference for dynamic fairness by a greater tendency to preserve their ownership structure over time. The next question is whether equal splitters get triggered differently by investments. Hypothesis 7

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<sup>8</sup> Formally we define  $Dilution = 'External\ amount' / ('External\ amount' + 'Valuation')$

focuses specifically on founder financings. In our empirical analysis we look at this, but also expand the analysis to look at external financings. Specifically, Table 7 describes how the interaction effects of equal splitting with founder and external financing affects changes in founder ownership. Before discussing this table, however, let us first discuss some descriptive statistics about the relationship of equal splitting with founder and external financing.

Panel C of Table 2 contrasts several variables between companies with equal and non-equal splitting founder teams. Let us focus on the financial variables. First, equal splitters have significantly fewer financing rounds (35% as opposed to 44%). Second, this difference is entirely driven by external financing rounds (33% as opposed to 43%). The t-test for the significance of differences is significant at the 1% level. This result is consistent with the findings of Hellmann and Wasserman (2016) who provide a much more comprehensive analysis of the relationship between equal splitting and external financing.<sup>9</sup>

Consider next the question of whether all founders invest identical amounts. The first part of Hypothesis 7 conjectures that equal splitters are more likely to invest identical amounts. To test this, we look at *'Equal Founder Amounts'*, a variable takes the value 1 if all founders invest identical amounts in the founder round. This variable is conditioned on the presence of founder investments. Panel B of Table 2 shows that 28% of all founder financing rounds involve identical investment amounts. However, there is a notable difference between equal and unequal splitters. In panel C we see that for equal splitters 48% of all founder rounds involve identical amounts, compared to 2% amongst unequal splitters. The t-test for the significance of differences is significant at the 1% level. This confirms that equal investing is significantly more common for equal splitter. This is consistent with their preference for fairness, and confirms the first part of Hypothesis 7.<sup>10</sup>

Let us now examine Table 7, which addresses the remaining part of Hypothesis 7. The first column of Table 7 extends the regression model from column (4) of Table 3. The sample is company quarters and we use company fixed effects. The key difference is the addition of two interaction terms, *Equal Split X Founder Financing* and *Equal Split X External Financing*. We find that the coefficient on *Equal Split X Founder Financing* is negative and significant at the 5% level. In columns (2) and (3) the effect remains negative, although its significance drops a little, probably due to the smaller sample size. However, these findings are in line with the second part of Hypothesis 7.

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<sup>9</sup> It is worth noting in passing that Table 3 also shows that equal splitters are less likely to raise venture capital (10% of financing rounds, as opposed to 15%), and their average pre-money valuations are significantly lower (approx. \$5M, as opposed to \$10M). Finally, we find no difference in the number of founder financing rounds between equal and non-equal splitters, although equal splitters have somewhat smaller amounts.

<sup>10</sup> Note that equal investments preserve relative ownership for teams with equal split, but not for teams with unequal splits. In principle it is possible for unequal splitters to preserve their ownership in a founder round, namely by investing in proportion to their current (unequal) ownership stakes. However, we only find a single instance of this among all the financing rounds.

Table 7 also allows us to examine whether equal splitters respond differently to external financing. In our theoretical discussion we already noted that arguments can be found for the effects to go either way. In column (1) the coefficient on *Equal Split X External Financing* is negative but insignificant. Columns (2) and (3) focus on the financing round sample, similar to the analysis of Table 5. They consider the interaction terms *Equal Split X External Amount* and *Equal Split X Valuation*. *Equal Split X External Amount* is never significant. *Equal Split X Valuation* is positive and significant at the 10% level. We consider this evidence inconclusive, i.e., the data does not seem to support the notion that equal splitters systematically respond more or less to external financing pressures than non-equal splitters.

## 5. Conclusion

In this paper we consider the trade-off between efficiency and fairness. We specifically focus on the dynamics of founder ownership changes, asking under what circumstances teams change their original relative share structure. We obtain two important sets of results. First, external financing events are an important determinant of the likelihood of relative ownership changes amongst founders. Founder ownership changes are clustered around financing events. Larger investment rounds are more likely to trigger such changes, and lower company valuations are also associated with more such changes. Second, we find evidence of perseverance in fairness choices. A key result is that founder teams that initially split their founder equity equally, are less likely to subsequently change their relative shares. Another intriguing finding is that founders in equal splitter teams are more likely than in non-splitters teams to invest the same amount and receive the same number of shares (so that relative founder ownership division remains intact). This finding further reinforces the notion that an initial team preference for equality persists over time.

We believe that this paper is the first to examine the dynamics of relative founder ownership within teams. Of course there is a lot more research that needs to be done in this area. For example, while our analysis focuses on the role of investors, we believe that the phenomenon of founder ownership is richer. With additional data, future research could consider at least two complementary sets of questions. The first area of future research concerns company circumstances that lead to ownership changes. Do founder teams consider changing the original set-up mainly when the company is undergoing difficult times, or rather when then opportunity looks particularly bright. Our results about the negative relationship with valuation tentatively suggests that difficult times triggers changes. With richer company performance data, it would be interesting to look more deeply at the business circumstances under which these ownership changes occur. The second area of future research concerns the role of individual founder characteristics, and circumstances that justify receiving higher or lower stakes. Which founders exactly win and lose under which circumstances, and why? Our data is not well suited to address this important question, as we do not have access to additional data about the individuals, their skills, their contributions, or their economic circumstances.

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**Table 1: Variable definitions**

Variable	Description
<b><i>Dependent variable</i></b>	
<i>Ownership Change</i>	Dummy variable indicating whether, for any founder, the <i>relative founder ownership</i> changed in the current quarter. <i>Relative founder ownership</i> of founder $f$ = number of shares owned by $f$ divided by number of shares owned by all founders of the company. This variable is defined for all quarters except the initial quarter (Quarter = 0), when the initial ownership structure is set up.
<b><i>Investment-related explanatory variables</i></b>	
<i>Financing</i>	Dummy variable indicating whether the company received a financing round in the quarter. $Financing = 1$ if $External Financing = 1$ or $Founder Financing = 1$
<i>External Financing</i>	Dummy variable indicating whether the company received a financing round in the quarter that involved any non-founder(s).
<i>Founder Financing</i>	Dummy variable indicating whether the company received a financing round in the quarter that involved any founder(s). Excludes sweat equity transactions.
<i>External Amount</i>	Natural logarithm of one plus the external financing amount (in Can\$). Note: if $External Financing = 0$ in the quarter, then $External Amount = \log(1) = 0$ .
<i>Founder Amount</i>	Natural logarithm of one plus the founder financing amount (in Can\$). Note: if $Founder Financing = 0$ in the quarter, then $Founder Amount = \log(1) = 0$ . A special case of $Founder Financing = 0$ , hence $Founder Amount = 0$ is when there is a sweat equity transaction involving a founder.
<i>Equal Founder Amounts</i>	Dummy variable indicating whether all founders invest identical amounts in a founder financing round. This variable is conditioned on $Founder Financing = 1$ .
<i>VC Financing</i>	Dummy variable indicating whether the company received an external financing round in the current quarter that involved a venture capitalist. Note: $VC Financing = 1$ does not exclude other investors invest alongside with the VC(s).

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**Table 1 (cont.)**

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<b>Control variables</b>	
<b>(a) Time-dependent company characteristics</b>	
<i>Valuation</i>	Natural logarithm of one plus the pre-money valuation (in Can\$) since the most recent financing round. Note: in quarters in which no round takes place, the valuation of the most recent financing round applies.
<i>Patent Application</i>	Dummy variable indicating whether the company initiated a new patent application in the US in the current quarter. The patent data is obtained from Disambiguation and Co-authorship Networks of the U.S. Patent Inventor Database 1975 – 2010, as well as the US patent office.
<i>Age</i>	The company's age (in quarters). Age = {0, 1, 2, ...}. Quarter 0 is the quarter for which the company issued its first shares as found in the BCICP share registry data.
<b>(b) Time-independent company characteristics</b>	
<i>Number of Founders</i>	Number of founders on the founding team as identified in the company business plan, company website, or through web searches
<i>Equal Split</i>	Dummy variable indicating whether the members on the founding team all have equal shares when the company was founded (as identified on the company share registry).
<i>First Round</i>	Dummy variable indicating whether it is the first time the company received an external financing round in the quarter.
<i>Industry</i> (set of dummies)	Set of dummy variables for each of the following industries: Biotech; Cleantech; IT & Telecom; Software, Manufacturing; Other industry. Information about the companies' operation are collected from the BCICP data and from web searches for the period between 1995 and 2009.
<i>Region</i> (set of dummies)	Set of dummy variables for each of the following regions: Victoria; Vancouver; and Rest of BC. Information about the companies' locations are collected from the BCICP data and from web searches for the period between 1995 and 2009.
<b>(c) Other controls</b>	
<i>Calendar Time</i>	Quarterly non-parametric clock, i.e., dummies for each calendar quarter.

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<b>Table 2 - Descriptive Statistics</b>				
<b>Panel A - Company Characteristics</b>				
Statistics on company's characteristics are reported at a company level.				
	# Obs	Average	[95% CI]	S.D.
Number of Founders	84	2.51	[2.31-2.71]	0.92
Equal Split (dummy)	84	0.55	[0.44-0.66]	0.5
All industries	84	-	-	-
Biotech (dummy)	84	0.14	[0.08-0.24]	0.35
Clean Tech (dummy)	84	0.02	[0.00-0.08]	0.15
IT & Telecom (dummy)	84	0.10	[0.04-0.18]	0.30
Software (dummy)	84	0.33	[0.23-0.44]	0.47
Manufacturing (dummy)	84	0.24	[0.15-0.34]	0.43
Other Industry (dummy)	84	0.17	[0.09-0.26]	0.37
All BC regions	84	-	-	-
Victoria (dummy)	84	0.07	[0.03-0.15]	0.26
Vancouver (dummy)	84	0.75	[0.64-0.84]	0.44
Rest of BC (dummy)	84	0.18	[0.10-0.28]	0.39
<b>Panel B - Financing Round Characteristics</b>				
Statistics on key characteristics are reported in the company quarter sample and the financing round sample.				
	<b>Company Quarter Sample</b>			
	# Obs	Average	[95% CI]	S.D.
All company quarters	1371	-	-	-
Ownership Change (dummy)	1287	0.12	[0.10-0.14]	0.32
Financing (dummy)	1371	0.39	[0.36-0.42]	0.49
External Financing (dummy)	1371	0.38	[0.35-0.40]	0.48
Founder Financing (dummy)	1371	0.08	[0.07-0.10]	0.27
Ownership Change X Financing	1287	0.09	[0.07-0.11]	0.29
Ownership Change X External Financing	1287	0.08	[0.07-0.10]	0.28
Ownership Change X Founder Financing	1287	0.05	[0.04-0.07]	0.23
Patent Application (dummy)	1371	0.03	[0.02-0.04]	0.17
Age (# quarters)	1371	10.57	[10.11-11.03]	8.73
	<b>Financing Round Sample</b>			
	# Obs	Average	[95% CI]	S.D.
Ownership Change (dummy)	480	0.23	[0.19-0.27]	0.42
VC Financing (dummy)	515	0.13	[0.10-0.16]	0.33
Founder Financing (dummy)	515	0.18	[0.14-0.21]	0.38
External Amount (\$)	515	636,488	[514K-759K]	1,413,196
Founder Amount (\$)	515	43,148	[19K-67K]	279,264
Valuation (\$)	515	7,618,542	[6,031K-9,205K]	18,300,000
Equal Founder Amounts (dummy)	109	0.28	[0.2-0.37]	0.45

**Table 2 (cont')**

<b>Panel C - Descriptive Statistics of Subsample of Companies by Equal Split of Founder Ownership at Start.</b>				
Key characteristics are compared between two subsamples by equal split in the company, company quarter, and financing round sample. Results of tests of significant difference between the two sub samples are reported. *, **, *** indicate significance at the 1%, 5%, and 10% levels, respectively.				
	Companies with Equal Split=1		Companies with Equal Split=0	
	# Obs	Average	# Obs	Average
<b>Company Characteristics</b>				
Number of Founders	46	2.35*	38	2.71
Biotech (dummy)	46	0.15	38	0.13
Clean Tech (dummy)	46	0.04	38	0.00
IT & Telecom (dummy)	46	0.11	38	0.08
Software (dummy)	46	0.28	38	0.39
Manufacturing (dummy)	46	0.20	38	0.29
Other Industry (dummy)	46	0.22	38	0.11
Victoria (dummy)	46	0.07	38	0.08
Vancouver (dummy)	46	0.8	38	0.68
Rest of BC (dummy)	46	0.13	38	0.24
<b>Company Quarter Sample</b>				
Ownership Change (dummy)	716	0.09***	571	0.16
Financing (dummy)	762	0.35***	609	0.44
External Financing (dummy)	762	0.33***	609	0.43
Founder Financing (dummy)	762	0.08	609	0.08
Patent Application (dummy)	762	0.03	609	0.03
Age (# quarters)	762	11.13***	609	9.86
<b>Financing Round Sample</b>				
Ownership Change (dummy)	236	0.20	244	0.26
VC Financing (dummy)	252	0.10*	263	0.15
Founder Financing (dummy)	252	0.19	263	0.16
External Amount (\$)	252	562,154	263	707,714
Founder Amount (\$)	252	20,505*	263	64,846
Valuation (\$)	252	5,011,046***	263	10,116,980
Equal Founder Amounts (dummy)	63	0.48***	46	0.02
Patent Application (dummy)	252	0.06	263	0.04
Age (# quarters)	252	10.65***	263	8.8

**Table 3 - Correlation Matrix****Panel A - Company Quarter Sample**

Correlations between several key variables I the company quarter sample. \*\*\*, \*\*, and \* indicate significance at the 1%, 5%, and 10% levels, respectively. Actual p-values are in parentheses.

	Ownership Change	Financing	External Financing	Founder Financing	Equal Split	Patent Application	Age	Number of Founders
Ownership Change	1							
Financing	0.2835*** (0.0000)	1						
External Financing	0.2602*** (0.0000)	0.9726*** (0.0000)	1					
Founder Financing	0.5757*** (0.0000)	0.3685*** (0.0000)	0.2787*** (0.0000)	1				
Equal Split	-0.1093*** (0.0001)	-0.0911*** (0.0007)	-0.1038*** (0.0001)	0.0131 (0.6274)	1			
Patent Application	0.0466* (0.095)	0.0975*** (0.0003)	0.1028*** (0.0001)	0.0795*** (0.0032)	-0.0148 (0.584)	1		
Age	-0.0283 (0.3109)	-0.0839*** (0.0019)	-0.0771*** (0.0043)	-0.1209*** (0.0000)	0.0724*** (0.0073)	0.0285 (0.2908)	1	
Number of Founders	0.088*** (0.0016)	0.0654** (0.0154)	0.0662** (0.0142)	0.0356 (0.1873)	-0.2436*** (0.0000)	-0.009 (0.7397)	-0.0417 (0.1225)	1

**Table 3 (cont')****Panel B - Financing Round Sample**

Correlations between several key variables in the financing round sample. \*\*\*, \*\*, and \* indicate significance at the 1%, 5%, and 10% levels, respectively. Actual p-values are in parentheses.

	Ownership Change	VC Financing	Founder Financing	External Amount	Founder Amount	Valuation	Equal Split	Patent Application	Age	Number of Founders
Ownership Change	1									
VC Financing	0.045 (0.3257)	1								
Founder Financing	0.632*** (0.0000)	0.0079 (0.8583)	1							
External Amount \$	0.0894* (0.0504)	0.6323*** (0.0000)	0.0535 (0.2269)	1						
Founder Amount \$	0.1884*** (0.0000)	0.032 (0.4685)	0.2664*** (0.0000)	0.0806* (0.0676)	1					
Valuation	-0.087* (0.0567)	0.0281 (0.5251)	-0.0915** (0.0379)	0.1616*** (0.0002)	-0.0256 (0.5619)	1				
Equal Split	-0.0702 (0.1244)	-0.0796* (0.0711)	0.0455 (0.3023)	-0.0515 (0.243)	-0.0794* (0.0716)	-0.1394*** (0.0015)	1			
Patent Application	-0.021 (0.6465)	0.1527*** (0.0005)	0.0792* (0.0726)	0.1721*** (0.0001)	0.0188 (0.6705)	0.027 (0.5404)	0.0227 (0.6078)	1		
Age	-0.0995** (0.0293)	0.0403 (0.361)	-0.1778*** (0.0000)	0.1018** (0.0209)	-0.156*** (0.0004)	0.1479*** (0.0008)	0.1196*** (0.0066)	0.0387 (0.3808)	1	
Number of Founders	0.0255 (0.5771)	0.0728* (0.0991)	0.0265 (0.5485)	0.0328 (0.4581)	0.0852* (0.0534)	0.0011 (0.9804)	-0.221*** (0.0000)	-0.0467 (0.2899)	-0.0549 (0.2138)	1

**Table 4 - Ownership Change and Company Financing**

Results of panel Probit regressions (column 1 & 3) and panel OLS regressions with company fixed effect (column 2 & 4) in the company quarter sample. The dependent variable, Ownership Change, is a dummy variable indicating whether relative founder ownership changed in the current quarter. The main independent variables are dummy variables indicating whether the company received financing, external financing, and founder financing in the current quarter. The reported control variables are dummy variable indicating if each of the members on the founding team had equal shares of ownership when the company was founded, dummy variable indicating whether the company applied for a new patent in the current quarter, company age in the current quarter, number of founding members, industry dummies, and region dummies. The unreported control is a set of dummy variables measuring calendar time in quarters. A constant was also included but not shown. All variables are defined in Table 1. Robust standard errors, clustered at the company level, are reported in the parentheses. \*\*\*, \*\*, and \* indicate significance at the 1%, 5%, and 10% levels, respectively.

VARIABLES	Company Quarter Sample			
	(1) Ownership Change	(2) Ownership Change	(3) Ownership Change	(4) Ownership Change
Financing	1.045*** (0.125)	0.192*** (0.0276)		
External Financing			0.521*** (0.108)	0.0634*** (0.0194)
Founder Financing			2.876*** (0.257)	0.736*** (0.0486)
Equal Split	-0.363** (0.156)		-0.603*** (0.171)	
Patent Application	0.220 (0.287)	0.0225 (0.0801)	-0.133 (0.454)	-0.0196 (0.0766)
Age	0.00429 (0.0116)	1.087*** (0.0453)	0.0125 (0.0132)	1.004*** (0.0172)
Number of Founders	0.0794 (0.0785)		0.0900 (0.0681)	
Biotech	0.584** (0.290)		0.765* (0.392)	
Cleantech	-0.331 (0.310)		-0.939 (0.775)	
IT & Telecom	0.503 (0.387)		0.456 (0.480)	
Software	0.294 (0.266)		0.229 (0.362)	
Hitech Manufacturing	0.423 (0.319)		0.387 (0.429)	
Victoria	0.149 (0.276)		0.372 (0.348)	
Vancouver	-0.0300 (0.238)		-0.212 (0.313)	
Controls	YES	YES	YES	YES
Observations	1,208	1,287	1,208	1,287
Log Likelihood	-378.6	-	-283.8	-
R-squared	-	0.126	-	0.379
Number of companies	84	84	84	84

**Table 5 - Ownership Change and External Financing - Amount**

Results of panel OLS regressions with company fixed effect in the financing round sample. The dependent variable is a dummy variable indicating whether relative founder ownership changed in the current quarter. The main independent variables are the logarithm of external amount, the logarithm of the company pre-money valuation, and a dummy variable indicating whether the company received VC financing in the current quarter. The reported control variables are a dummy variable indicating whether the company received founder financing, a dummy variable indicating whether the company applied for a new patent, and company age in the current quarter. The unreported control is a set of dummy variables measuring calendar time in quarters. A constant was also included but not shown. All variables are defined in Table 1. Robust standard errors, clustered at the company level, are reported in the parentheses. \*\*\*, \*\*, and \* indicate significance at the 1%, 5%, and 10% levels, respectively.

VARIABLES	Financing Round Sample		
	(1) Ownership Change	(2) Ownership Change	(3) Ownership Change
External Amount	0.0465*** (0.0130)	0.0574*** (0.0111)	0.0588*** (0.0119)
Valuation		-0.0593* (0.0325)	-0.0604* (0.0325)
VC Financing			-0.0185 (0.0784)
Founder Financing	0.748*** (0.0485)	0.736*** (0.0496)	0.735*** (0.0492)
Patent Application	-0.114 (0.0810)	-0.0928 (0.0775)	-0.0939 (0.0783)
Age	-0.00297 (0.00293)	0.000643 (0.00371)	0.000965 (0.00399)
Controls	YES	YES	YES
Observations	480	480	480
R-squared	0.496	0.506	0.506
Number of companies	80	80	80

**Table 6 - Ownership Change and External Financing - Interaction with First Round**

Results of panel OLS regressions with company fixed effect in the company quarter sample (column 1) and in the financing round sample (column 2 & 3). The dependent variable is a dummy variable indicating whether relative founder ownership changed in the current quarter. The main independent variables are a dummy variable indicating whether the company received external financing, the logarithm of external amount, and the logarithm of the company pre-money valuation in the current quarter. A set of interaction terms between the main independent variables and First Round is included. The reported control variables are a dummy variable indicating whether the company received founder financing, a dummy variable indicating whether the company applied for a new patent, and company age in the current quarter. The unreported control is a set of dummy variables measuring calendar time in quarters. A constant was also included but not shown. All variables are defined in Table 1. Robust standard errors, clustered at the company level, are reported in the parentheses. \*\*\*, \*\*, and \* indicate significance at the 1%, 5%, and 10% levels, respectively.

VARIABLES	Company Quarter Sample	Financing Round Sample	
	(1) Ownership Change	(2) Ownership Change	(3) Ownership Change
External Financing	0.0515*** (0.0193)		
First Round X External Financing	0.120* (0.0653)		
External Amount		0.0450*** (0.0130)	0.0550*** (0.0112)
First Round X External Amount		0.0115* (0.00592)	0.00800 (0.0350)
Valuation			-0.0533 (0.0348)
First Round X Valuation			0.00156 (0.0287)
Founder Financing	0.724*** (0.0485)	0.736*** (0.0494)	0.727*** (0.0502)
Patent Application	-0.0252 (0.0756)	-0.104 (0.0810)	-0.0873 (0.0757)
Age	0.0155*** (0.000568)	0.000647 (0.00379)	0.00342 (0.00466)
Constant	0.419*** (0.0161)	-0.682*** (0.191)	-0.0250 (0.499)
Controls	YES	YES	YES
Observations	1,287	480	480
R-squared	0.383	0.504	0.511
Number of companies	84	80	80

**Table 7 - Ownership Change and External Financing - Interaction with Equal Split**

Results of panel OLS regressions with company fixed effect in the company quarter sample (column 1) and in the financing round sample (column 2 & 3). The dependent variable is a dummy variable indicating whether relative founder ownership changed in the current quarter. The main independent variables are a dummy variable indicating whether the company received external financing, the logarithm of external amount, the logarithm of the company pre-money valuation, and a dummy variable indicating whether the company received founder financing in the current quarter. A set of interaction terms between the main independent variables and Equal Split is included. The reported control variables are a dummy variable indicating whether the company applied for a new patent, and company age in the current quarter. The unreported control is a set of dummy variables measuring calendar time in quarters. A constant was also included but not shown. All variables are defined in Table 1. Robust standard errors, clustered at the company level, are reported in the parentheses. \*\*\*, \*\*, and \* indicate significance at the 1%, 5%, and 10% levels, respectively.

VARIABLES	Company Quarter Sample		Financing Round Sample	
	(1)	(2)	(2)	(3)
	Ownership Change	Ownership Change	Ownership Change	Ownership Change
External Financing	0.0808** (0.0308)			
Equal Split X External Financing	-0.0342 (0.0374)			
External Amount		0.0462*** (0.0166)	0.0602*** (0.0111)	
Equal Split X External Amount		0.00252 (0.0279)	-0.0151 (0.0241)	
Valuation				-0.0942*** (0.0354)
Equal Split X Valuation				0.102* (0.0549)
Founder Financing	0.852*** (0.0384)	0.842*** (0.0576)	0.806*** (0.0663)	
Equal Split X Founder Financing	-0.203** (0.0899)	-0.185* (0.109)	-0.139 (0.109)	
Patent Application	-0.0261 (0.0753)	-0.114 (0.0784)	-0.103 (0.0773)	
Age	0.0155*** (0.000607)	-0.00439 (0.00300)	-0.00289 (0.00388)	
Controls	YES	YES	YES	
Observations	1,287	480	480	
R-squared	0.386	0.501	0.519	
Number of companies	84	80	80	

## **Appendix: Relevant aspects of the British Columbia Investment Capital Program and BC securities regulation**

The fundamental premise of the 30% BC tax credit for equity investments under the BCICP is that it is available to BC-resident individuals, as well as to corporate investors that have a permanent establishment in BC. There are additional eligibility criteria for investors and companies as well as certain maxima that we will review below. The BCICP allows for individuals and companies to invest into eligible companies directly, or indirectly, through an eligible investment vehicle, such as VC fund or angel fund. Eligible investment vehicles that have attracted funding must invest these funds within a specific time frame.

As for additional investor criteria, first, tax credits are only available to investors that do not directly or indirectly control the eligible small business that receives the equity investment. Also, there is a cap on the tax credits investors can receive. Individual investors can claim up to \$60,000 in refundable tax credits annually (representing eligible investments of \$200,000). The tax credits for corporate investors have no dollar maximum, but they are non-refundable. Both individual and corporate investors can apply unclaimed tax credits in the current tax year to the next four tax years as well.

Eligible investee companies must be BC-based companies that, together with affiliate companies, if any, do not employ more than 100 employees and contractors. They must also pay at least 75% of the wages and salaries to BC employees. There is also an industry requirement that companies be “substantially engaged in a prescribed activity”. This criterion is satisfied if the prescribed activity reflects the majority of the assets and expenses of the business. The main prescribed activity is “Research and Development of Proprietary Technology”, which covers, for example, life sciences, information and communication technology, alternative energy development technology, or environmental technology. However, some other activities satisfy the prescribed activity as well, primarily “Destination Tourism” and “Manufacturing, Processing or Export of Value-Added Goods Produced in BC”. For further details, please see Government of British Columbia (2017).

In addition to the BCICP restrictions on companies, there are some restrictions on private companies that arise from BC securities legislation (security legislation in Canada is handled at the provincial level, here BC). Even though there is formally a prospectus obligation for raising equity (which could become very costly for companies), BC regulation for privately-held companies de facto grants a large degree of freedom for companies seeking exemption from this obligation. Besides a “private issuer exemption” (up to 50 security holders in BC, not including employees and former employees), companies can issue equity without a prospectus to the following investors: directors and senior officers of the issuer; or their family members, “close” personal friends, and “close” business associates; accredited investors; and also to “anyone, regardless of their relationship, wealth or the amount of securities purchased” under the offering memorandum exemption. Under this exemption a risk acknowledgement form and an offering memorandum suffice for the issuer. For further details, please see British Columbia Securities Commission (2017).