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Institutions, Dominant Actors, and Financial Markets: The Case of Venture Capital for Biotechnology in Switzerland

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Abstract: Since the 1990s, the new economic sociology has directed attention toward markets and, in particular, financial markets. Thus far, neo-institutional theory has not been able to make substantial contribution to this research front. We identify reasons for this shortcoming and aim to expand the scope of institutional analysis by focusing upon the constitution and governance of financial markets. Referring to the case of venture capital markets for biotechnology in Switzerland, it will be shown that the formation of the market has been strongly linked to the big Swiss pharmaceutical companies. Data are presented which indicate that the emerging market for biotechnology in Switzerland resembles contextual features such as collective arrangements and risk-averse investment strategies. The case illustrates that both the set-up of the market and its characteristic features are only loosely coupled to an abstract worldwide financial market, and, instead, are deeply interwoven with the national and sectoral context.

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JEL classification: A14; N24; O16

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1. Introduction

Why is there a need for an institutional analysis of risk capital markets? For a long time there was an established division of labor in the social sciences; the economy was an object studied by economics, whereas other social sectors were the domain of a broader range of the social sciences which included sociology. This division of labor was put into question as economics expanded into almost every field of the social sciences – including politics, education, family life, and inequality (for a programmatic foundation cf. Becker, 1976, 1996) – and, correspondingly, contemporary economy attracted the attention of sociology and related disciplines. One effect of the latter trend has been the emergence of a vital new economic sociology (Beckert and Zavirovski, 2006; Dobbin, 2004; Swedberg, and Nee, 2005). Its research is not restricted to issues of production, industrial relations, and work. Instead, core issues of economic rationality (Hasse and Krücken, 2012) and markets – particularly financial markets – have been identified as major research objects (e.g. Davis and Marquis, 2005).

To date the new institutionalism which has developed quite successfully in many research fields of the social sciences has not made a substantial contribution to these lines of research. One reason probably is that initial contributions to the new institutionalism primarily focused upon non-profit organizations and on fields where competition seemed to be weak.¹ Thus, institutional perspectives appeared less appropriate in the for-profit sector. However, it soon became common to argue that the distinction between institutional and technical environments is strictly analytical and any organization, including business firms, is embedded in an institutional context and has to cope with issues of legitimation in order to enhance its survival (cf. Hasse and Krücken, 2009). Although this programmatic modification offered new research perspectives which allowed focus on the entire range of organizations, the ongoing emphasis on “soft” cultural dimensions and the inherent devaluation of “hard” economic issues has had the effect that the new institutionalism has hardly been able to

¹ This focus was based on the assumption that non-profit organizations are embedded predominantly in an institutional environment in which resource acquisition is based on conformity with cultural standards. Consequently, it was argued that these organizations are in permanent need of legitimation. Business firms, by contrast, were said to be embedded in a context in which technology and market constraints determine organizations and their survival (Meyer and Scott 1983).

make a substantial contribution to the understanding of economic core features of financing.² This shortcoming goes along with a programmatic foundation of a field characterized by a sharp analytical distinction between macro and micro oriented contributions. While the former continuously focuses upon the world polity and its diffusion (including loose coupling), the latter is concerned with actors and their strategic or practical capacities, which are discussed mainly as institutional entrepreneurship and institutional work.³ This frontline has led to neglect of the interaction between different levels. Although this limitation has been discussed in the broader structure agency debate with reference to the paradox of embedded agency (Battilana, Leca and Boxenbaum, 2009; Dorado, 2005; Garud, Hardy and Maguire, 2007; Garud and Karnoe, 2003), the importance of dominant actors *and* their imprinting by institutional contexts has remained rather vague.

To overcome this shortcoming, it is important to emphasize that financial markets are also based on models or blueprints which are objects of processes of diffusion and translation into local contexts. Accordingly, concrete financial markets can be seen as economic structures, which can be explained by referring to institutions ranging from organizations as dominant players within organizational fields to the rules of the game which characterize fields, national contexts, and economic sectors (Fligstein, 1990; Powell et al., 2009). The basic idea is that, although abstract global principles and models diffuse worldwide, they have to be translated into the respective local context in order to fit in with existing cultural conditions (Djelic, 2008; Sahlin-Andersson, 1996; Sahlin and Wedlin, 2008). The establishment of local practices is therefore profoundly influenced by institutional factors and dominant actors who establish these practices. Additionally, institutions and dominant actors can be seen as mediators between the global and the local. From this point of view, institutional settings, which include dominant organizational actors with their worldviews and

² Without doubt, there are important exceptions, as, for example, the contributions of Fligstein (1990, 2001), Fiss (2009), Djelic and Quack (2010) and Hasse and Krücken (2013), but these contributions thus far have not been considered as a main part of the programmatic development.

³ For the diffusion perspective particularly, cf. John Meyer (2010), Strang and Meyer (1993), and Schneiberg and Clemens (2006). The agency perspective was successfully set up by DiMaggio (1988) and Beckert (1999), before it was elaborated (cf. Lawrence et al., 2009) and critically reflected (Hwang and Colyvas, 2011).

scripts, determine the setup of concrete financial markets, and thus need to be taken into consideration to understand the emergence and development of financial markets.

Against this background, we explore an institutional perspective on the formation of a distinct segment of financial markets. The venture capital market for biotechnology in Switzerland serves as an empirical case to show how dominant actors embedded in institutional contexts determine characteristic features of this market, such as market coordination and investment strategies, and transpose the institutional logic of one organizational field (or domain) into another field. The line of argument is organized as follows. In the first section, we present detailed information about research methods and data. Subsequently, we highlight the institutional embeddedness of the venture capital market for biotechnology in Switzerland. The case illustrates that both the setup of specific markets and its ongoing characteristic features can be explained by institutional factors. It is shown that the financial market for biotechnology in Switzerland is only loosely coupled to an abstract worldwide financial market, and that this market is deeply integrated with its national and sectoral context. Finally, the case will be discussed against the outlined theoretical background to explore how basic insights from the new institutionalism can contribute to a better understanding of financial markets. We conclude that the emergence and development of financial markets can be described as a mediation process, in which powerful organizations implement global models and modify them according to specific institutional settings.

2. Empirical data

Our empirical results are mainly based on case studies of biotechnology start-ups, which were conducted in the context of our research project “Founding organizations”.⁴ From the Swiss life sciences database,⁵ we chose nine biotech companies active in pharmaceutical biotechnology. In order to retrace the development of these companies, we classified them into three cohorts of founding: (1) 2005–2006; (2) 1999–2002, and (3) 1995 and older. Company interviews were conducted with the CEOs or, in some

² The project "Founding Organizations – The Impact of Organizational Characteristics and Contextual Variables on the Development of Start-ups in Biotechnology" (2006–2009) has been supported by the Swiss National Science Foundation (SNF).

³ www.swisslifesciences.ch

cases, the CSOs of the respective companies. We also focused on the relevant organizational environment of the companies and, therefore, conducted interviews with providers of capital, technology transfer offices, entrepreneurial professors, consulting companies, and other important organizations. In total, we conducted 39 interviews. The gathered information has been supplemented by archival analysis of secondary data (OECD statistics, annuals reports, internal company reports, press releases).

Secondly, we analysed the formal market for risk capital quantitatively. For this purpose, we had to determine the population of investors of the formal risk Capital market. We categorized the population by the following criteria:

- (1) general characteristics with respect to year of foundation and origin (Switzerland/ foreign country),
- (2) focus of investment (life sciences, high technology companies),
- (3) portfolio composition (Switzerland, USA, others),
- (4) qualification of employees (scientific degree with/without PhD, economic degree with/without PhD, both without MBA, others).

In order to address issues of coordination and syndication, we also differentiated the population into five subgroups:

- (1) Swiss venture funds investing in biotechnology with the distinction single vs. multiple investor,
- (2) foreign venture funds investing in biotechnology with the distinction single vs. multiple investor,
- (3) other Swiss investors investing in biotechnology (banks, assurances, etc.),
- (4) state-like institutions which invest in biotechnology,
- (5) others (venture funds, banks, etc. which do not invest in biotechnology, etc.).

In a final step, we encoded multiple investors, their equity holdings, and common equity holdings (syndication). Their relations were visualized by UCINET. We also focused on relations between the three big pharmaceutical companies and venture funds by detecting ties which are based on former employment relations.

3. Case illustration: the formation of the Swiss market for risk capital

Markets for risk capital constitute a sub-segment of financial markets (Haemmig, 2003; Taga and Forstner, 2002). Often, they are regarded as a precondition for the successful development of high tech sectors (Casper, 2007; Prevezer, 2000; Saxenian, 1994). The characteristic feature of risk capital is to invest in early stages of a product development, when start-ups are still in their infancy stage (Ferrary 2003).⁶ In Switzerland, and with respect to biotechnology, a market for risk capital developed in the mid-1990s. Compared with the US, this is a rather recent development (see Prevezer 2000 for the US development). Further differences to the US development are firstly that the development of the biotech sector in Switzerland could neither utilize an already existing infrastructure for high technologies like information technology nor an already existing entrepreneurial start-up culture, furthermore the commercialization of university research as well as university-industry collaborations like the ones described for Silicon Valley (Saxenian 1994, 2000) happened rarely. However, it could benefit from the drug development expertise of the big pharmaceutical companies in Switzerland.

In this specific context, the formation of the risk capital market is strongly linked to a “quasi-outsourcing” of biotechnology as a new research front of the pharmaceutical industry. The interest of the big pharmaceutical corporations in biotechnology can be dated back to the mid-1980s, when Sandoz and later CibaGeigy as well as Roche built up co-operations with US biotech companies and US research institutions. However, Sandoz, CibaGeigy, and Roche did not relocate their entire research facilities to the United States in the following years. Instead, they established Basel as their company-wide research headquarters for biotechnology. The merger of CibaGeigy and Sandoz to create Novartis in 1996 reconfirmed this decision. It can also be regarded as a triggering event for the take-off of the Swiss risk capital market. Until the merger, the big pharmaceutical companies were already strongly linked to each other through numerous co-operations. It may even be argued that since the foundation of the industry at the end

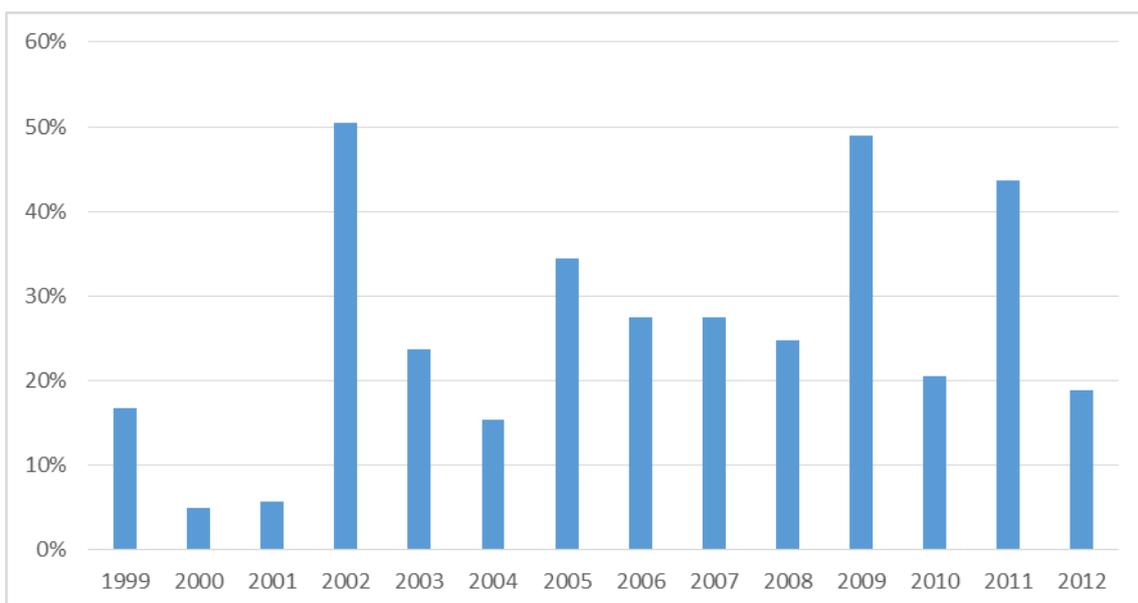
⁶ These investments are extremely risky, because return on investment is in the distant future. Additionally, it is rather uncertain whether any return can be expected, due to a low success probability (Haemmig, 2003; Taga and Forstner, 2002; Thalmann, 2004).

of nineteenth century, they have tried to control the pharmaceutical market cooperatively (see Lüönd, 2008).

As the merger resulted in an overcapacity of employees, an industrial venture fund (Novartis Venture Fund) was founded. Originally, this fund was considered as a solution to the overcapacities resulting from the merger. It was designed to serve social purposes and was not expected to persist in the long run. Nonetheless, Novartis Venture Fund subsequently acted as a driver for the development of the risk capital market for biotechnology. As the fund developed more successfully than expected, strategic aims were modified. Novartis Venture Fund became more financially oriented. Even more importantly, it was considered as a means to realize the strategic aims of its mother company. To put it short, in contrast to the US development, the foundation of the risk capital market in Switzerland was initially driven by the big pharmaceutical industry.

The Novartis Venture Fund is not the only capital provider in Switzerland. In sum, we can distinguish between four types of investors: (1) the industrial venture fund of Novartis which for biotechnology in Switzerland has become one of the most important investors in seed finance; (2) regular venture funds which have co-evolved with the Swiss biotech sector – and which particularly flourished in the aftermath of the merger (3) business angels; and (4) cantonal banks of research intensive regions.

Figure 1: Percentage of private equity investments in life sciences 1999–2012



Source: Own presentation, data taken from the EVCA Yearbook statistics of Switzerland

As illustrated in figure 1, investments in life sciences by the formal market for risk capital fluctuated strongly at the beginning as well as after the financial crisis in 2008. Capital expenditure at the turn of the century was relatively low, whereas in 2002 a peak of 50% of total equity was reached. Nearly 50% were also reached in 2009.

Business angels are a part of the informal segment of the market for risk capital. Typically, they are wealthy persons with experiences in financing, entrepreneurship or management. Business angels do not only invest their money in young companies, but also provide these companies with knowledge and access to networks (Fueglistaller, Müller, and Volery, 2004, p. 265; Riffelmacher, 2006, p. 6). Business angels have played a role previously in the Swiss economy, but their significance was lessened by the merger. As a consequence, business angels gained more organizational strength and increased their degree of professionalization.⁷

Cantonal banks are well established players in the Swiss financial sector. However, their core activities are concentrated in more traditional bank activities, and risk financing is still a less important part of their business. Cantonal banks are public institutions which, comparable with German thrifts, are protected by government liability. According to their codified statutes, their aim is not to maximize profit, but to support and contribute to the economic development of the respective canton. Swiss cantons are comparatively small political districts with an average population of less than 400.000, and each canton has its cantonal banks. Cantonal banks are regionally powerful actors deeply embedded in the local economy. In the 1990s, some cantonal banks of research intensive regions started a program to support high technology start-ups in their respective canton. Risk capital is allocated either by convertible bonds or mezzanine money. The program supports a limited number of companies (about twenty per year) according to an investment limit of 15 Mio CHF per year.

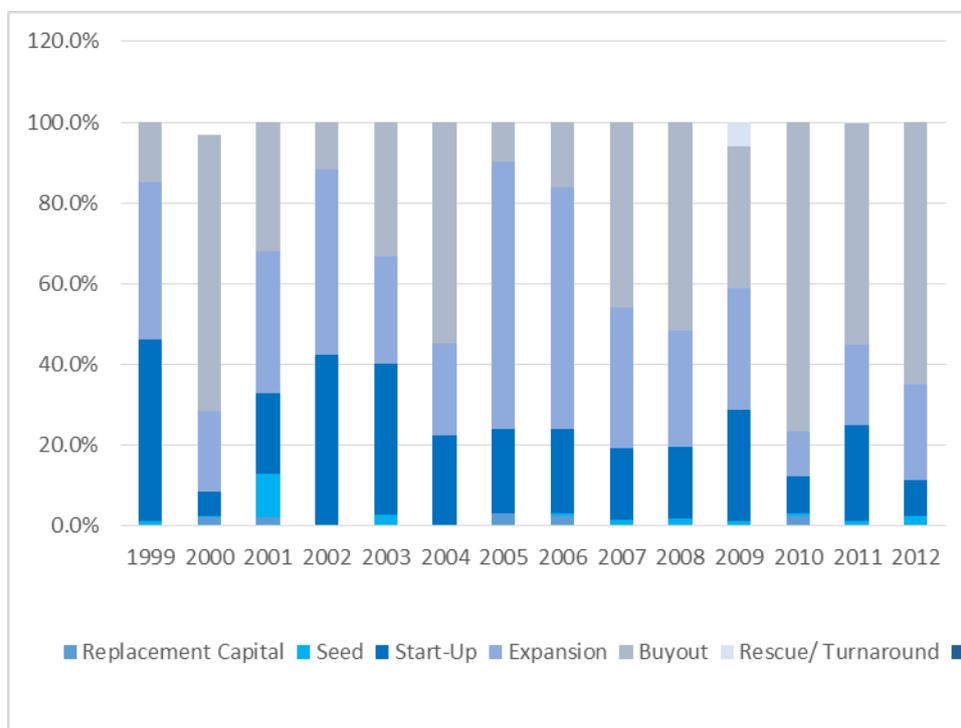
3.1 *Investment strategies*

The characteristics of the Swiss risk capital market have been strongly linked to the institutional context as well as the dominant actors in the field, namely the big

⁷ In 2001, only 157 business angels were recorded; in 2004, this number was already 475. The umbrella association of business angels was founded in 2003, and in 2005, eight business angels-networks existed.

pharmaceutical companies. This can be shown with regard to investment strategies and modes of coordination. The characteristic feature of venture capital, generally, is to invest in early stages of a product development. In the US, biotechnology companies are virtually all initially funded by venture capital (Casper and Kettler 2010) and there is also sufficient provision of venture capital in the early phases financing phases like the seed and start-up phase (Motohashi 2012). These investments are extremely risky, because return on investment is in the distant future. Additionally, and due to the low success probability, it is rather uncertain whether any return can be expected.

Figure 2: Private equity investments per stage 1999–2012



Source: Data taken from the EVCA Yearbook statistics of Switzerland

Figure 2 gives a rough overview of the investment behaviour of venture capital funds, with reference to total private equity investments. Obviously, there are rarely any investments in seed financing, where the percentage of investments fluctuates between 0 and 3%. Only in 2001 could a unique record of 11% be reached. Investments in the start-up stage are fluctuating on a more or less moderate level, whereas the expansion stage and particularly the buy-out stage have been stronger. Our interviews confirm this

rather risk averse impression of venture capital funds, particularly with regard to biotechnology. Accordingly, venture capitalists clearly prefer to invest in later stages. They do not, for example, give money to projects which have not passed the clinical test stage (phase 2a). Lack of dense competition among providers with venture capital and the high degree of coordination between them result in the reproduction of this practical rule. Although it is also reported that venture capitalists elsewhere tend to avoid early stage-financing (Taga and Forstner, 2002, p. 23), their entrance is much earlier than those of their Swiss counterparts (Ferrary and Granovetter, 2009, p. 344). Consequently, in the US there is a much higher investment in seed and early stage financing (Motohashi 2012)⁸. Not financing indicates that a sufficient number of potential clients remains, who can be provided with venture capital. As there are no indicators for a shortcoming of clients who have survived the early stage, early stage-provision with capital seems to be sufficient, although venture capitalists do not invest in early stage-research.⁹

In contrast to venture funds, the other three types of investors invest at an early stage. However, their strategies are based on more than pure financial considerations. The industrial fund has primarily the strategic orientation of finding new research collaborations for its parent company. Thus, early stage-financing is to be seen predominantly as an investment in research. It is an alternative to in-house research, and only to a much lesser extent a financial investment in a strict sense. Additionally, in-licensing presents a way of benefiting from current research by minimizing the downside risk at the same time. It also presents a way of controlling the pharmaceutical sector and keeping a central position within the innovation network. As the fund is financed by its parent company, it is obviously less dependent on its financial performance than regular venture funds.

Business angels do not only invest money, but also provide young companies with knowledge and access to networks (Fueglistaller et al. 2004, p. 265; Riffelmacher, 2006, p. 6). Generally, business angels have already been successful in the business

⁸ Motohashi compares US and Japanese biotech companies and venture capital investment and comes to the conclusion that Japanese venture capitalists also prefer to invest in later stages which might, in part, be a result of a not yet developed private equity industry in Japan compared to the US. This might also one reason in Switzerland.

⁹ It should be noted that a sufficient number of clients is to be seen of course as a function of the number and density of competing venture capitalists.

world. In many contexts, their “help to get a start-up started from scratch” is highly valued and a prestigious activity. Ascribed motivations often cannot be reduced to strict financial investments as a means to make profit.

For cantonal banks, finally, the financing of small and medium companies of the regional economy is an integral part of their identity. As supporting small innovative companies is highly appreciated by the public and by the media, investments in start-ups can symbolically be utilized to signal responsibility for the socio-economic context. Providing start-ups with risk capital can therefore be seen as a strategy for achieving legitimacy. One interviewee emphatically claimed “that the primary aim is not to make money, but to be part of a success story.” Furthermore, cantonal banks can set up relations, because they are at the center of the regional economy of their canton. Providing start-ups with capital is also seen sometimes as an investment in potential follow-up businesses. Such follow-ups, then, correspond more closely to the traditional activities of banks and thrifts such as financial security, loans, assurances, etc.

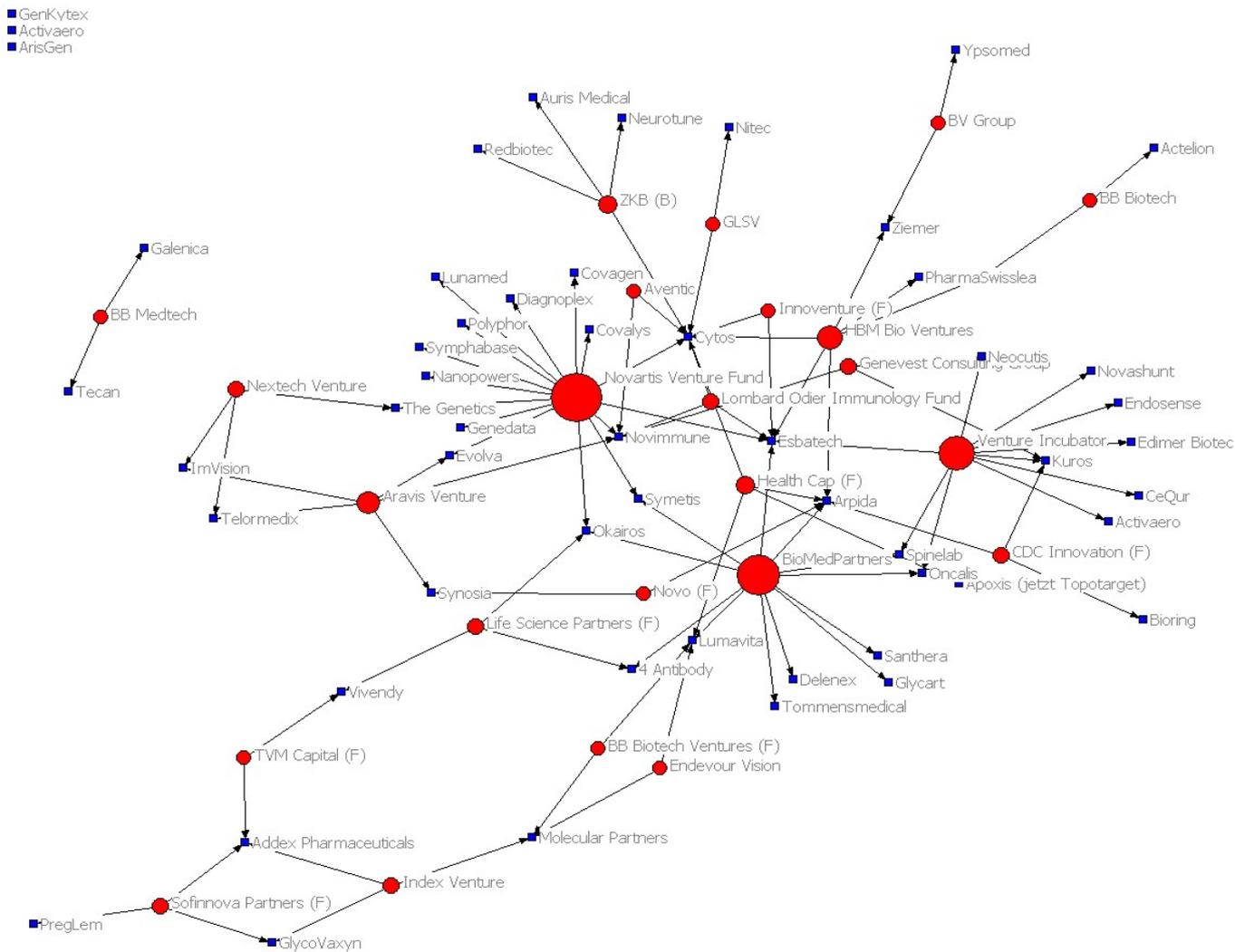
3.2 *Coordination*

Seen from an abstract point of view, risk capital is in need of a large number of potential clients. Firstly, it is important to select the most promising start-ups from those which focus upon less promising projects. Secondly, the risk of investments in start-ups with high profit chances can only be reduced to a feasible extent if a large number of candidates compensate the low success probability of a single project. Start-ups, by contrast, can benefit from low degrees of concentration of venture capital as negotiations between demand and supply are more power balanced. Additionally, dense competition triggers specialization and makes it more likely to find an appropriately specialized venture capitalist.

Figure 3 illustrates that Switzerland, by contrast, is characterised by a small number-market, which is dominated by very few central actors such as Novartis Venture Funds, BioMedPartners, and Venture Incubator. Furthermore, there are only a few foreign venture funds, and the market is characterized by low entry and exit rates. As a consequence, actors know each other personally, and demand and supply are rather limited in comparison with US technology clusters.

One interview partner was convinced that “if one is part of the real risk capital scene, he or she gets to know every dossier which will pass”. Due to the small number of potential capital providers, the allocation of risk capital in therapeutic research can be based on high levels of non-market coordination. Hence, terms and conditions are not subject to free negotiations between start-ups and venture capitalists. Instead, they are determined by arrangements between venture capitalists. It should be noted that similar effects are also reported for locally situated venture capitalists in the Bay Area. In California, however, non-local venture capitalists enter the stage as soon as a considerable excess demand for venture capital emerges. Swiss biotechnology, by contrast, as can be seen in figure 3 (F=foreign), remains largely a domain for Swiss venture capital.

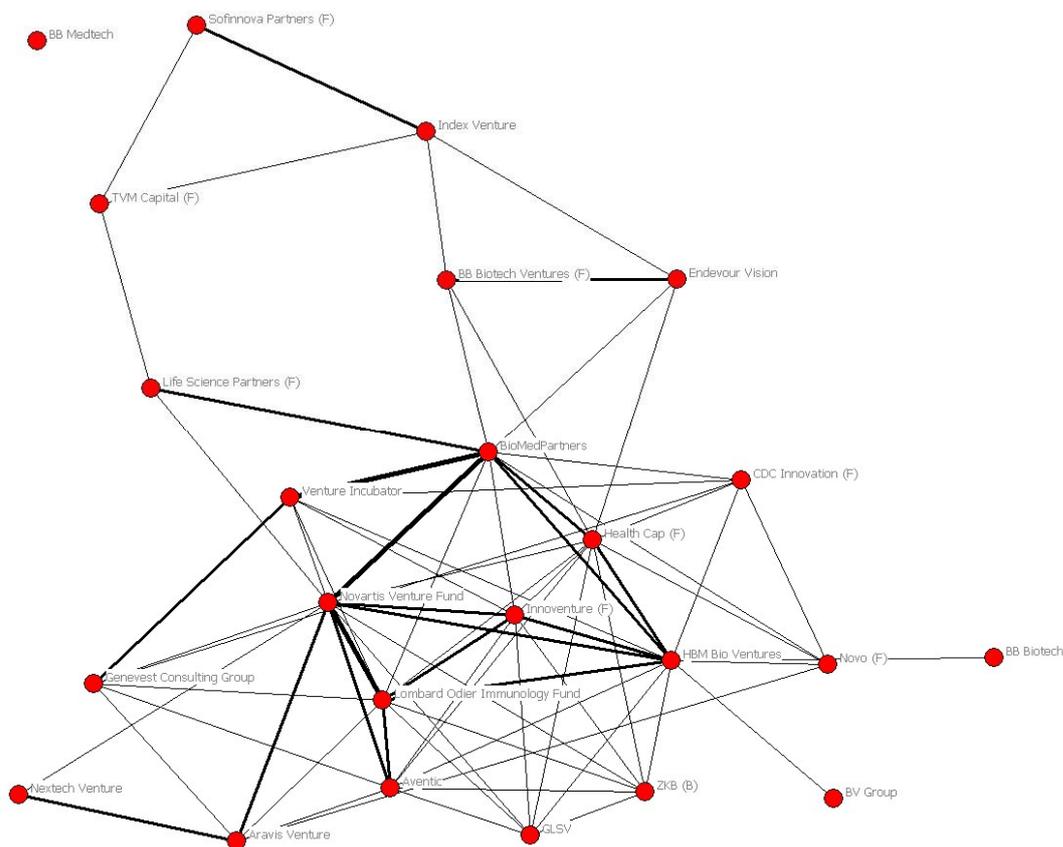
Figure 3: Market for risk capital (multiple investors)



Source: Passarge 2011

Strong ties and a high degree of coordination between venture capital companies are also based on the fact that CEOs are often members of several supervisory boards of biotech companies. As a result, biotech companies seem to have sufficient access to risk capital in Switzerland, but risk capital is reported to be more expensive than in Anglo-Saxon countries where a higher amount of competition among venture capitalists is to be found. It also should be noted that, although the market is small, Swiss venture funds tend to prefer joint investments. Hence, syndication patterns can be observed, which are visualized in figure 4.

Figure 4: Syndication



Source: Passarge, 2011

Coordination modes of business angels resemble those of corporate venture funds. Business angels are organized in local clubs. The business plans of biotechnology start-ups are either selected after a presentation in club meetings or by

being recommended by other business angels. Typically (and similar to venture capitalists), there are a very few business angels who decide whether or not a start-up will receive funding from business angels. These business angels at the core also usually select one of the business angels to take an active role in the company. The involvement then ranges from being chief executive to providing a company with access to networks, but business angels also deal with marketing issues or the acquisition of new investors.

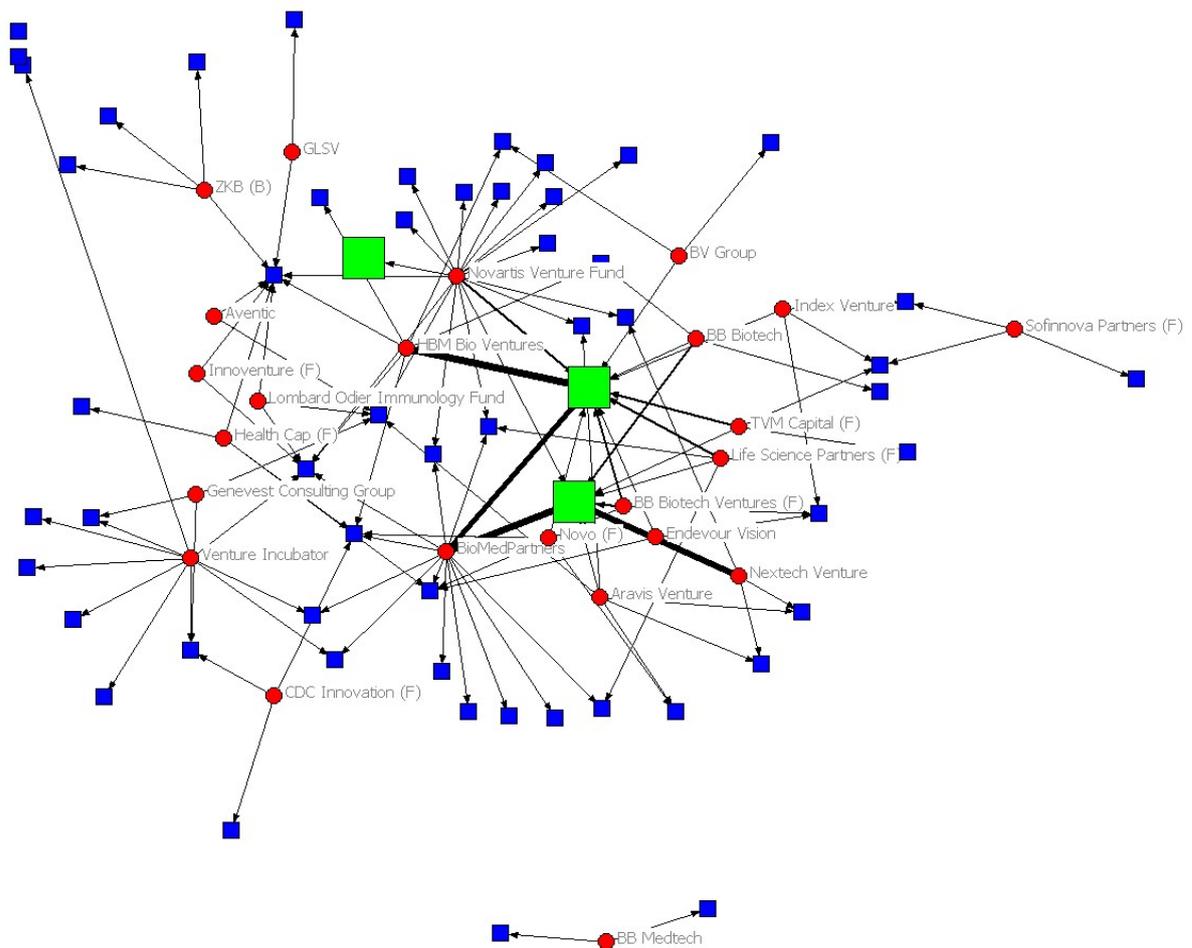
The allocation of risk capital by cantonal banks differs due to their very specific features. Cantonal banks are restricted to the respective canton. As a consequence, and almost by definition, there is no competition, cooperation or specialization of different cantonal banks; e.g., the cantonal bank of Zürich is not designated to invest in Start-ups in Basel or Geneva. It also should be noted that cantonal banks are not represented in the supervisory boards of biotech companies. This difference helps the banks to avoid potential conflicts of interest. Furthermore, it reduces responsibilities which in the case of cantonal banks may be more pronounced due to their status as public institutions. The structure resembles the way thrifts and cooperative banking associations in coordinated market economies are committed to small and medium enterprises in their regional context. However, as already mentioned, cantonal banks are exceptional capital providers and their contribution to financing start-ups is rather small.

As the market is small, different types of capital providers participate in the same networks. In fact, investment decisions are often made on the basis of recommendations of venture funds, which technically are to be seen as competitors of other capital providers. An interview partner of a cantonal bank, for example, explained that cantonal banks tend to co-invest with those venture funds and business angels they had positive experiences with and which are characterized by a similar understanding of business ethics and culture. Moreover, the different players are rather complementary to each other in terms of investment, and in most of the cases they do not compete with each other. For this reason, reputation is a crucial resource for start-ups to acquire capital successfully.

It also needs to be emphasized that the financial community, particularly venture capitalists, have strong relations to the Swiss pharmaceutical industry through former employment relations. Due to these relations, capital providers are fairly well informed

about research interests, plans for the future, and strategic considerations of the pharmaceutical industry. As a result, venture capitalists can select the projects they invest in according to their attractiveness for the big pharmaceutical companies. The interest of the pharmaceutical industry is crucial, because it offers an exit option for venture capitalists. In illustrating the density of these ties, an interview partner even described the relation between the big pharmaceutical corporations and venture funds as “incestuous”. Personal networks between risk capitalists and managers of the pharmaceutical industry enable the latter not just to influence the development of the biotech sector with regard to research topics, but also empower them to determine the organizational survival of biotech start-ups (Hasse and Passarge, 2009; Passarge, 2011).

Figure 5: Relations between pharmaceutical companies, venture capitalists, and biotech companies



Source: own calculations, based on the respective websites and yearbooks

Figure 5 illustrates the relations between pharmaceutical companies and venture capitalists. It shows highly hierarchical structures and demystifies any notion of “egalitarian” networks as a requirement of high tech sectors. The central and dominant actors are clearly the pharmaceutical companies, which govern the orientation of the biotech sector through their relations with the venture capital industry. Biotech companies are situated at the bottom on the periphery, i.e., they are highly dependent on the venture funds whose decisions are strongly influenced by the big pharmaceutical companies.

Hierarchical structures, power imbalances, and corresponding modes of coordination within the Swiss market for risk capital have three important effects:

- Firstly, dense networks and close collaborations have obviously created high barriers to entry, which can be shown with respect to the small amount of foreign funds (see also figure 3).
- Secondly, they have led to low domestic founding rates, which resulted in a low volatility of the market. This can be illustrated by comparing the Swiss case with the Californian situation, as, for example, described by Suchman et al. (2001). The Swiss capital market for biotechnology has never flourished, and nor has it shrunk so notably as its counterparts in the US and UK. Instead, we find quite inert reactions to the overall economic development.
- Thirdly, and probably most importantly, these features of the capital market have profound impacts on the development of the biotechnology sector. The low degree of competition between capital providers enables them to evaluate and select biotech startups thoroughly. For those startups which receive funding, this implies high probabilities of economic success, because funding does not only provide them with capital, but also with a strong signal which can be utilized to acquire further resources and to set up collaborations of technical importance (Podolny, 1993, Ferrary, 2003).

To sum up, the constitution and characteristics of the Swiss market for risk capital can only be understood with a closer look at the historical development and the specific institutional context. The institutional context is not only reflected in the

foundation of the market; it has also shaped the strategies and practices of involved actors. Originally conceptualized as a “side product” of the merger of two pharmaceutical giants, the market for risk capital soon attracted other capital providers. Among those were new venture funds, as well as already established organizations such as the cantonal banks or business angels, which seized upon new opportunities. Regardless of the formation of the risk capital market for biotechnology, the pharmaceutical industry is still the dominant actor in the field. On the basis of the described network characteristics, it governs the biotechnology sector through the provision of risk capital. This is perfectly in line with the historical imprinting of the sector as the institutional logic of the pharmaceutical industry in Switzerland can be characterized by highlighting cooperation and avoiding competition since its foundation at the end of the nineteenth century. It seems that this institutional logic has been transferred to the market for risk capital and to other new circumstances such as the biotechnological revolution. Hence, it has structured this sub-segment of the financial sector and still shapes the organization of the market (for a similar perspective on a different case cf. Zajac and Westphal, 2004). However, this model seems to be highly successful so far.

4. Discussion

The case illustrates that institutional settings and dominant actors have played a central role in the constitution and development of the risk capital market for biotechnology in Switzerland. The formation of this market is strongly linked to a “quasi-outsourcing” of biotechnology as a new research front of the pharmaceutical industry. The interest of the big Swiss pharmaceutical corporations in biotechnology can be dated back to the mid-1980s, when Sandoz and CibaGeigy built up co-operations with US biotech companies and US research institutions. For further development, it was crucial that both companies did not relocate their entire research facilities to the United States. Instead, Basel was built up as company-wide research-headquarter for biotechnology. This strategic decision was reconfirmed after the merger in the mid-1990s.

Based on their US-experiences, the pharmaceutical companies transferred the successful involvement in US-high tech sectors to Switzerland. However, the

innovation model needed to be translated in order to match the specific requirements of the domestic institutional setting. As the central precondition for the successful development of high tech sectors such as biotechnology was seen in the availability of sufficient risk capital, a market for risk capital was initiated. Its characteristic features, however, differed strongly from the US-model. Venture funds had to be founded and business angels needed to strengthen their involvement. Additionally, cantonal banks which had not been engaged in risk financing before took their chance.

The described characteristics of the Swiss risk capital market for biotechnology are strongly linked to the dominant actors in the field, particularly with respect to modes of coordination. Cooperation and collective arrangements of different risk capitalists are still the rule and not the exception. Dense personal networks do not only exist among risk capitalists, but also between risk capitalists and the pharmaceutical industry. This enables the latter to determine the development of the biotech sector with regard to research topics and the organizational survival of biotechnology start-ups. Thus, it may be argued that the power relations and institutional logics of the pharmaceutical sector have been transferred to the emerging market for risk capital. The central position of the pharmaceutical companies is strengthened by their dense relations to the venture companies. This has resulted in hierarchical network structures in which biotech companies are rather isolated from each other and strongly depend on the more powerful actors.

It should be noted that the picture presented contradicts not only blueprints like Silicon Valley, but also from widespread assumptions about the successful development of high tech companies (which have been basically derived from the Silicon Valley model); it is postulated that network structures among research companies are decisive for their success as they provide fast access to information, resources, and knowledge (Porter and Powell, 2006; Powell and Smith-Doerr, 1994).¹⁰ Nonetheless, the Swiss model has been a success story thus far.

Against this background, it may be questioned whether the role of big companies as promoters of new industries or sectors has been underestimated and too much

¹⁰ The importance of network structures and numerous informal relations between scientists, engineers, and managers, which support the circulation of knowledge and increase therefore the innovation capabilities of companies, have been extensively analyzed with regard to Silicon Valley (see also Casper, 2007; Powell, 1996; Prevezer, 2000; Saxenian, 2000).

emphasis has been put on organizational forms, which are similar blueprints to the US-model (i.e., a culture that supports small innovative start-ups, high rates of founding and mortality, competitive venture capital markets, absence of established industrial giants, etc.). However, non-high technology regions with different institutional contexts might follow different development paths including a different organization of risk capital markets which might equally work, at least in continental Europe (see also Trippel and Tödting, 2007 for the Austrian biotech development). Consequently, one could ask whether the Swiss case presents a viable European model.

The Swiss case indicates that the investment strategies of the different players of the risk capital market reflect the specific institutional context:

- Classic venture funds are clearly profit-oriented, but they are also highly risk averse, which, in general, is typical for banks, but not risk capitalists. Consequently, they have entered the field as new players, but have translated the idea of risk capital into the institutional setting of Switzerland, which, typically, can be characterized as bank based.
- Cantonal banks and business angels may invest in early stage, but they are not profit-oriented in a narrow sense. Whereas business angels describe themselves as being motivated by self-fulfillment and entrepreneurial aspirations, cantonal banks emphasize that supporting young companies is highly appreciated by the public and can be seen as a means to achieve higher levels of legitimation.
- Finally, the industrial venture fund predominantly serves its parent company Novartis to maintain a central position within the innovation network. The dominant position of the pharmaceutical industry as collaborator for start-ups and as capital provider, hints at the high degree of inclusion of biotechnology in the pharmaceutical industry, which seems to be a characteristic feature of the Swiss case. Against this background, it may even be considered whether the biotech sector needs to be characterized as a new sector, or whether it can also be seen plainly as an expansion of the research base of the pharmaceutical industry.

To conclude, the case indicates that the formation and shaping of markets do not constitute a homogenous process, which is determined by global models and blueprints. Instead, the characteristic features of the institutional context and strategies of dominant actors have profound effects on markets. Institutional context and strategies of dominant actors do not just vary across time, but also across sectors and nations (Dobbin, 1994; Hollingsworth and Boyer, 1997; Lounsbury and Hirsch, 2010; Powell et al., 2009; Schneiberg and Bartley, 2010). In the three successful biotechnology regions in the USA, Powell et al. (2013) have shown the central role of so-called anchor tenants; well connected organizations which mobilize others and foster collective growth (439). However, in contrast to the US, the Swiss case shows that regions where one type of organization (here big pharma) dominates and dictates the rules, cross network alignment and the transposition of ideas and models have been possible and successful. Although rates of firm formation and dissolution are rather moderate, labor mobility between the pharmaceutical industry, venture capitalist companies, and biotechnology companies enables the cross network transfer of knowledge. However, the community can be described as rather hierarchically organized.

Globally, diffusing economic models and blueprints may present a “device” for market actors (Callon, 2005; MacKenzie, 2009), but they need to be contextualized in concrete social settings. As regards approaches of social embeddedness (Granovetter, 1985; Uzzi, 1999; Uzzi and Lancaster, 2003), a closer look at social relations and networks of relations is crucial. However, from an institutional perspective, specific conditions of the context, the historical imprinting, and strategic considerations of dominant actors also need to be taken into consideration.

In order to focus on adjustments and modifications of global models, institutional theory has explored a broad range of concepts such as translation, loose coupling, imprinting, and enactment, which help to explain the shaping of concrete markets (Fiss and Zajac, 2004; Fligstein, 2001; Strang and Meyer, 1993). In line with the above mentioned concepts it may be concluded that the formation of markets is a contingent process, which is streamlined by dominant actors and the institutional context. The case of biotechnological risk capital in Switzerland particularly sheds light on the impact of related sectors, whose institutional dispositions and organizational

strategies have been transposed from one domain to another and, therefore, have determined the enactment of a new market.

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