

How selection mechanisms in financial institutions contribute to regional path development

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Abstract

This paper addresses an issue absent in most studies on regional economic development, the role of financial institutions. The study concentrates on how the financial institutions select which firms and projects to fund, and how the selection mechanisms enable or constrain development trajectories in their respective regions. The study is guided by an evolutionary perspective on regional economic development, invoking the concept of path dependency. In that context, financial institutions may contribute to path extension, path renewal, path transplantation or path creation. The paper is based on a study of financial institutions in four Norwegian regions, and offers micro-level insights on what is selected to form the four respective path developments. We find that banks primarily support path extensions and to some degree path renewal. Venture capital has turned into private equity funds and has become more risk averse. They contribute primarily to restructuring of existing industries. Seed capital to fund start-ups is scarce, and has become even scarcer after the financial crisis.

1 Introduction

Financial institutions are obviously a vital element in the regional innovation ecology. However, they are mostly absent in accounts of regional innovation systems. When financial institutions are dealt with in this context, the focus is generally confined to the role of venture capital. Surprisingly, the role of banks in regional development are left out. This paper addresses this gap by discussing the role of a differentiated set of financial institutions, including banks, venture capital, seed capital and wealthy individuals.

In the decade after the financial crisis, we have seen scepticism about the value of some of the activities in the finance sector. In other industries, we assess the benefits of an industry by its so-called added value. The added value of the car industry is the difference between the selling price and the cost of the various materials that go into it. This added value is in turn

distributed to the employees that build the car and as profits to the owners. The economic value of a play is measured by adding up what people pay for the tickets. These methods are not straightforward in the finance sector. Few financial services are paid for in the direct way that cars and theatre tickets are paid for. The profits of finance institutions stem largely from varieties of trading. In its simplest form, banks earn money from the difference between the rates at which they borrow money and the rates at which they lend money. The profits of the finance sector are partly a return to risk, and the adjustments necessary to reflect a true and fair view are complex and hard to evaluate (Kay 2015). Another way to judge the economic value of the financial sector to the domestic or regional economy is to pose qualitative questions related to what the industry is doing for businesses by facilitating payments, offer advice, allocation of capital and controlling risk.

More specifically, we intend to assess their role in four different regional trajectories: path extension, path renewal, path transplantation and new path creation. It is of course difficult to turn that qualitative assessment into numbers, so we do not intend to compare the value of the financial industry to other industries.

The paper proceeds as follows: The next section outlines an evolutionary perspective on regional development with a focus on path dependence. Section 3 describes the research method, and Section 4 offers a brief description of the financial institutions located in the respective regions. Section 5 contains the main results from the study, and discusses the selection mechanisms that the financial institutions use in their evaluations of which projects and firms to support.

2 Theory and conceptual framework

In general, evolutionary perspectives share at least two characteristics. First, their purpose is to explain the movement of something over a time period, or explain how it got there at a moment in time. Second, an evolutionary explanation includes both random elements which may generate variation in the variables under study, and mechanisms that systematically select on extant variation (Dosi and Nelson 1994). Evolutionary models involve processes of learning and discovery as well as selection mechanisms. These mechanisms differentially select or selectively eliminate certain types of variations. Some variations or ideas are more suitable than others in acquiring resources – like financial support – or legitimacy, and are thus selected. Generally, selection criteria operates through market forces, competitive

pressures, the logic of internal organizational structuring and conformity to institutionalized norms (Aldrich 1999).

This paper discusses various transformations of regions. Regions thus represent the aggregate level; however, in order to explain regional transformations, growth or decline; we need an account of the actual behavior of agents. The agents in this study are firms and representatives of financial institutions. Regional dynamics are the outcome of interactions among multiple individual behaviours in heterogeneous firms and a variety of financial institutions. We attempt to describe those behaviours as closely as possible by the micro-evidence made available through in-depths interviews with managers in a differentiated set of financial institutions in four Norwegian regions.

The study builds on Schumpeterian theories of innovation-driven economic growth (Schumpeter 1934). Not only did Schumpeter introduce evolutionary economics, he also underlined the necessity of finance: “in carrying out new combinations, financing as a special act is fundamentally necessary, in practice as in theory” (p. 70). With that point of departure, it is natural to suggest that technologies or innovations represent the natural unit of selection. Intuitively, technologies may be interpreted as loose equivalents of genes in biology, and firms the phenotypes. To validate this intuition, it may be argued that firms select technologies (products, services, business models etc.) as the outcome from their innovation processes. However, we take one step up the hierarchy of micro-foundations, and argue that in the end of the day the selection mechanisms work on firms and their behavior. The portfolio of technologies is incorporated within firms, whose relative competitiveness (“fitness” in evolutionary terms) is mediated through their behavioral patterns; their decision rules concerning investments, R&D, diversification, attitudes towards risk etc.

The market is the primary selection mechanism for private firms and their technologies. Financial institutions constitute another salient selection mechanism, and it emerges from our data that their unit of selection seldom is merely the technology in itself, but rather the management, the history and present situation of the firm. We have more to say later about which characteristics of the firm and its history they evaluate. In other words, firms operate in various selection environments affecting their survival and growth paths, first of all the product-markets and the market for finance (Dosi and Nelson 1994).

In evolutionary theory, history matters, which is expressed through the concept of path dependency (Arthur 1994). Path dependence is a ubiquitous phenomenon, which pertains to firms and institutions, as well as regional development. The literature has documented many potential causes for path dependence from the micro level to system dynamics, in this case from the technology to the firm level and to the regional innovation system level. Path dependence occurs when the current realization of socio-economic processes depend on previous states, even back to the initial conditions (Castaldi and Dosi 2014). There are several potential causes for path dependency. The first candidate is the process of learning. When agents learn, their behaviour depends on their memory of the past, i.e. on their prior experience. The degree of path dependence may diminish when agents also change their “models” of the world, i.e. the very interpretative structures through which they process information from the environment. At a more aggregate level, formal (financial institutions, for instance) and informal institutions such as conventions and customs influence decisions and selection criteria at the individual level.

Another general source of path dependency is associated with the presence of increasing returns in production or in the adoption of technologies and products (Arthur 1994). Information has the property of high up-front cost in its generation, but can be used repeatedly by others afterwards. Furthermore, information is typically non-rival in use, meaning that it can be used indifferently by one or a million people. Path dependent learning is influenced by the trade-off between “exploitation” and “exploration” (March 1991), whether selection mechanisms favour the refinement and exploitation of what one already knows, or exploration and search for new potentially valuable knowledge and technologies. Knowledge accumulates and displays dynamic increasing returns when the new knowledge cumulatively builds upon existing knowledge, often making present improvements easier. These dynamics are related to technological innovations that are shaped and constrained by particular technological paradigms and proceed along specific technological trajectories (Dosi 1982).

At the regional level, path dependency may result from so-called agglomeration effects (Krugman 1991). These include technological spillovers among producers, access to specialized labour in the region, and easier interactions with advanced suppliers. As new paths evolve, networks emerge of producers, suppliers, universities and support organizations (in our case financial institutions) that institutionalize specific paths of development.

The issue is how much history actually matters, how dependent is the path dependency of the history. David (2001) suggests the following categorization: weak history, moderate history, and strong history. Partly in correspondence with this gradation, we will use four categories which have emerged in economic geography in the past decade: Path extension, path transplanted, path diversification and new path creation (Lester 2005; Isaksen and Tripp 2014).

Path extension applies to the upgrading and extension of an industry through the infusion of new production technologies and business models or the introduction of product or service enhancements. It entails more incremental innovation than the radical or potentially disruptive innovations related to new path creation. Firms improve what they already know. Path extension may be positive when an industry is being built up in a region and the firms achieve benefits from increased scale and scope. It may also be negative when an existing industry or product portfolio is “locked-in” to a present (and maybe outdated) trajectory.

A straightforward mechanism of “de-locking” is firms imitating products or services from elsewhere; or when an established industry from elsewhere is imported and transplanted in the focal region, so-called *path transplantation* (Lester 2005). The success of the transplantation is more dependent on imitation and knowledge and technology transfer from outside the region, rather than innovation. It requires absorptive capabilities both at the firm and at the institutional level. In terms of evolutionary economic geography, this transition is the result of an “external shock”. An example of path transplantation is the localization of the (American) oil and gas industry in Aberdeen, UK and Stavanger, Norway (Hatakkenaka, Westnes et al. 2011).

Another “de-locking” mechanism is *path renewal* exemplified by firms that diversify into related activities by redeploying its core technologies and knowledge and thus lead or assist the emergence of a related new industry. This path may evolve when an existing industry goes into decline because of shrinking markets or outdated technology or business models. Or more generally as a result of new combinations enacted by heterogeneous firms in terms of knowledge, behavioural repertoires, strategies and consumer preferences. The heterogeneity stems from managers and firms holding different expectations about the future, diversified mental models and identities.

Finally, a major de-locking force has historically been the emergence of radical innovations and new knowledge bases as a platform for *new path creations*. We can imagine the emergence of an industry with no technological antecedents; it entails the local creation of an entirely new industry. This is the kind of process often associated with universities, with the development of the personal computer and the Internet in Silicon Valley as the prime example. It should be noted, however, and as expected from evolutionary theory, that also in these cases industrial precursors may be identified elsewhere. The emergence of an industry entirely without antecedent is a very rare event. Creation of a new industry inevitably involves a mixture of deliberate agency and accidental and unintended emergence. Entrepreneurs are aware of potentially emerging paths, and invest in and bet on them. In the initial phase, the entrepreneur has only limited insight in the selection environment, hence the outcome of their actions are not always as intended.

Generally, institutions are one of the fundamental carriers of history (David 1994) and hence path dependence. In our context, they generally provide the structure wherein the processes of learning and selection takes place. Furthermore, they tend to reproduce the collective perceptions and expectations of managers in firms and financial institutions, thus influencing the mutual beliefs about the requirements in selection processes; whether a particular technology or firm is selected. Institutions serve as platforms and sources of path dependent opportunities for social learning (Nelson and Sampat 2001) and account for important aspects of the macro-foundations of micro behaviours. Collective norms, shared habits of thoughts and more generally the rules of the game (North 1990; North 2005), together with formal institutions, fundamentally shape and constrain “mental models”, preferences and behavioural patterns. History is frozen in incumbent institutions and exert strong self-reproducing effects (Castaldi and Dosi 2014).

Above we have outlined some general mechanisms behind various degrees of path dependence. The degree of path dependence and the respective paths that will emerge depends on the degree of newness of the innovations and firms selected. In addition to selections through product market competition, innovative efforts are shaped and selected by the criteria financial markets and financial institutions have implemented to allocate resources to business enterprises (Dosi 1990). Innovative processes and selection mechanisms are both path and institution-dependent. Our task is to document the influence financial institutions may have on the paths taken or not taken. According to Dosi, in a path dependent

evolutionary system of technological change, firms as well and financial institutions have the capacity to search, make mistakes and sometimes obtain unexpected successes, and try to learn through such processes. Secondly, product- and financial markets operate as selection devices among different technologies and firms, thus shaping industrial paths. Third, the aggregate performance of the system changes over time as self-organizing collective properties of the interactions between the respective agents.

The financial institutions operate as a selection device both as a direct source of financial resources to more or less risky endeavours in firms, and as a “disciplining” influence on management behaviour as these institutions and their regulators spell out “the rules of the game”. It should be noted that the financial institutions are permanently facing the dilemma between a prudent management of their funds (on behalf of their investors and depositors) and their capacity to take risk. Financial institutions constitute a crucial bridge between the present and the future, between experience on what has proved to work in the past; and the exploration of what is possible.

3 Research method

The paper is based on in-depth interviews with managers in financial institutions in four Norwegian regions. These interviews offer opportunities to study the micro foundations of regional path development, as they reveal the selection criteria financial institutions use in evaluating firms and their technologies in association with access to financial resources. The interviews include managers of different financial institutions such as banks, venture funds and seed funds. These institutions are expected to have different attitudes towards risk and new ventures. As these managers have a comprehensive overview of their respective regions, they were also asked to give their opinions on a fourth and interesting institution in this context: family wealth.

Three of the regions (Kristiansand, Stavanger and Bergen) are located along the southwestern coast of Norway, whereas the fourth, Finnmark, is located in the northernmost part of the country. In an international comparison, all these regions are small. They are very important in a national context, however, as the three southwestern regions have enjoyed vigorous and growing industries, in particular based on natural, local resources like oil and gas, hydropower and fish farming. These regions are also characterized by a thick institutional environment (Hassink 2005; Isaksen 2014); in contrast to Finnmark. The latter has far fewer financial

institutions. Overall, the four regions offer opportunities to draw comparisons between both similar and different regions. The interviews were carried out over a period of half a year, from November 2014 to June 2015. Each region is represented with 4-6 interviews with the major actors in the respective regions. All interviews were taped and transcribed.

In addition to in-depth interviews, the banks' annual reports were used to get an overview of how banks have distributed their resources (loans) across respective industries, and how this distribution has evolved over the past ten years. The combination of the interviews and the annual reports enables us to study how institutions learn and adopt over time, and how this experience (from both failures and successes) change the selection mechanisms and –criteria over time.

4 A brief description of the financial institutions

This section offers a brief description of the most vital financial institutions in the respective regions.

Banks

Both commercial and savings banks¹ are physically present in the four regions. The commercial banks Nordea, Danske Bank and Handelsbanken (all foreign owned) and DNB are present in three of the regions. Finnmark, by far the smallest region, hosts DNB and Nordea (operated remotely from Tromsø). The four regions also enjoy a presence of regional savings banks, where three regions (except Finnmark) host their respective headquarters. A number of smaller savings banks is also present in the three regions; they have minor interest in this context. DNB, a merger between the former DnC, Bergen Bank, Postbanken and Gjensidige NOR², is the largest financial institution in Norway, in which the state holds a 34% ownership stake. The bank commands a strong international position in shipping, energy, fisheries and fish farming, and has a strong position in the oil and gas sector. Danske Bank, based on the former Fokus Bank is headquartered in Copenhagen. Handelsbanken is owned

¹ As the result of the liberalization of the financial markets in the 1980's savings banks and commercial banks operate very similarly. Norwegian savings banks play a major role in the economy, as in Germany and Austria.

² Gjensidige NOR was a financial corporation formed by the merger between Sparebanken NOR (savings bank) and the insurance company Gjensidige in 1999. This entity ended when in 2003 the savings bank division of Gjensidige NOR merged with Den norske Bank to establish DnB NOR (which was renamed DNB)

by Svenska Handelsbanken, with its head office in Stockholm. Nordea is a Nordic financial services group, headquartered in Stockholm. Nordea Norway is headquartered in Oslo, and the Norwegian presence is based on the former Kreditkassen. Nordea and DNB are world leading on syndicating loans to offshore oil and gas and shipping.

These four commercial banks have a strong international presence, a comparative advantage in relation to firms with international ambitions. Furthermore, they have a Markets division that handles a broad range of investment banking products and services including currencies, equities, debt capital markets, and corporate finance. They also supply advisory services and internationally acknowledged economic research and analysis. These functions serve large, capital-intensive start-ups, mergers and acquisitions or existing companies with extensive projects. This expertise is mainly located in Oslo, but some of the banks in the regions also experience a growing demand for both funding and advice with transactions. The savings banks generally define SMB's as their markets. This is by no means a small market, as most Norwegian firms belong to this category.

Seed and venture funds

The term *seed* suggests that this is a very early investment, meant to raise equity to fund the business, typically technology companies, until it can generate cash of its own, or until it is ready for further investments. Seed money may be provided by seed funds (formal organizations), but may also be obtained through friends and family funding³, angel funding, and crowdfunding. The size of the investments tend to be moderate. In many cases 25-75.000 euro will suffice in the earliest phase, before public funding may be relevant or new investors are invited in. Venture capital is independently managed, dedicated pools of capital that focus on equity and equity-linked investments in privately held, high-growth companies (Lerner 2009). The largest pool of venture capital comes in the form of private limited partnerships (Gladstone and Gladstone 2002). These partnerships are companies that source their funds from pension funds, insurance companies, large foundations and wealthy individuals. The managers of these partnerships are general partners and the investors are limited partners with a passive role. Six seed and PE companies⁴ are present in Bergen with 40 employees.

3 A popular term is «fools, friends and family»

4 Report on “Finansbyen Bergen” from Bergen Chamber of Commerce and Industry, 2013

Argentum, located in Bergen, is wholly owned by the state, and specializes in investments in energy-focused private equity funds. The company has NOK 17 billion under management. The largest wealthy private investors own NOK 88 billion⁵. A substantial part of family fortunes is “old”, meaning that they represent a heritage from former generations. The issue in our context is whether that situation influences the way it is invested, and whether there is a willingness to invest in new ventures. Stavanger hosts Energy Ventures (NOK 7 bill.) and Hitec Vision (NOK 45 bill.). Seven seed and PE companies are present in Stavanger with 63 employees and NOK 55 billions under management, including two internationally acclaimed private equity firms, Energy Ventures (NOK 7 bill.) and HitecVision (NOK 45 bill.). The Kristiansand region hosts a few small seed/venture companies, funded by private investors or the utility company. It is telling that a seed fund with 30 investors recently closed, unable to raise fresh money. There is practically no venture or seed capital, and the number of bank branches is decreasing. A venture capital fund financed by the region’s utility company invested in a greenfield, local oil company, unsuccessfully so far. Hence, there is no money to invest. KapNord, an equity firm in Bodø, has some investments in Finnmark.

5 Selection mechanisms

What is being selected

Generally, evolutionary perspectives encompass selection mechanisms at different levels of analysis: individuals, projects, firms, populations and regions. Aldrich (1999) has proposed two possible units of selection: routines and competencies within organizations, and entire organisations. We think these distinctions are too narrow. Furthermore, Boschma and Martin (2010) argue “that there is a problem in defining what it is about regional economies that follows a path trajectory of development – the region’s firms, its industries or the regional economy as a whole”? (p 8). We take a pragmatic perspective on this issue based on the interviews of representatives from the financial institutions. From an academic point of view, and based on the premise that innovations define the speed and direction of path development, technologies are the obvious candidate as selection unit. If a region experiences continued disruptive technologies, then a new path will emerge. However, the portfolio of technologies is incorporated within firms, whose relative competitiveness (“fitness” in evolutionary terms)

5 From the financial journal Kapitala 400 list of the 400 wealthiest persons

is mediated through their behavioural patterns; their decision rules concerning investments, R&D, diversification, attitudes towards risk etc. A technology is not automatically sold; it depends on the marketing efforts by the firm, the business model, and how the production is organized in order to achieve benefits from scale and scope. Our interviews strongly support this perspective.

Risk policies and selection mechanisms

The selection criteria and mechanisms in financial institutions are obviously related to their risk policies. Banks differ in their strategies and attitudes to risks, and, consequently, to their evaluation and selection criteria. A conservative bank describes their policies: *“We finance growth in existing firms rather than start-ups, companies with customers and proven technology. We pass a person with a promising technology, and we are not competent to link him to the public innovation system. When entering new markets or novel technology, the risk exposure increases. Without a large equity base, we don’t participate”*. Attitudes to risk also varies over time with the economic cycles: In the period 2003-05 start-ups found sufficient capital. That situation worsened significantly after 2007-08 and the global financial turmoil; and it has continued to be difficult. The size of the bank matters, too. The largest banks obviously command a more encompassing knowledge base than the smaller ones. Internal specialization enables them to get involved in all industries, including industries that undergo radical changes at high speed, including mergers and acquisitions. As a rule, these transactions take place within a given industry, thus leading to path extension. The volume of assets under management and the qualifications and skills of the bank go hand in hand. Larger, internationally oriented enterprises have more complex financial needs, and banks wanting to compete for their business need to learn and upgrade their skills correspondingly.

Increasingly, international standards and requirements have a strong influence on the behaviour and risk policies in banks. European regulations like Basel II and Advanced IRB⁶ may hamper the banks' willingness to take risk and thus influence their priorities, which may have a negative influence on entrepreneurs' possibility to obtain funding from banks. Some bank managers are concerned: *"The regulator wants less risk exposure in the banks. What are the consequences for start-ups? Are we developing a less diversified society with less room for innovation? Twenty years ago decisions were taken on a more discretionary individual basis, on intuition and our knowledge of the customer"*. Another informant echoes this view: *"Historically, savings banks carried out micro finance, took a social responsibility to get people started. Now they are risk averse"*. This scenario implies a greater convergence of banks' strategies and risk attitudes. On the other hand, start-ups and innovation are of course not synonymous concepts. Innovation takes place in existing firms, and they may spin off activities and product portfolios to new firms, sometimes to new owners. Profitable incumbent firms possess the capital and competence base required to extend their business and grow, which is very different from an individual that starts from scratch.

The large commercial banks have centralized specialist departments that the respective regionally based branches may access. As a rule, these specialists are located outside the region. The exception is DNB, which has located their expertise on fish farming in Bergen. Nordea has located their specialists in Stockholm, Copenhagen and Oslo. The interviewees disagree as to whether being headquartered outside the region has implications for the capacity to serve the regional businesses. Some argue (mostly neutral observers) that regional credit policies are defined by a head office that necessarily takes the situation of the entire bank into account. If the bank runs into trouble in other countries than Norway (which have been the case after the financial crisis), the credit lines to Norwegian customers will suffer.

⁶ The term "Advanced IRB" is an abbreviation of advanced internal ratings-based approach and refers to a set of credit risk measurement techniques proposed under Basel II capital adequacy rules for banking institutions. Under this approach, the banks develop their own empirical model to quantify required capital for credit risk. Banks can use this approach only subject to approval from their national regulators. In the context of this paper the commercial banks Nordea and DNB, and the major savings banks Sparebank1 SR-Bank, Sparebanken Vest and Sparebank1 Nord-Norge are subject to these regulations. These banks are named "system critical". The implication is that some commercial banks and smaller savings banks are exempt from these specific regulations.

The implication is that foreign owned banks are less predictable than banks with a regional head office. However, this view is disputed by the commercial banks involved.

Selecting technologies or projects

In general, banks are reluctant to fund new product and service development in start-ups, ie. the phase prior to marketing and contracting. The exception from this rule is standard products, in other words when new firms imitate other products rather than innovate. Proven technology and existing markets normally reduces the risks involved. This behaviour typically ends up in path extension. In the fishing industry, mobile structures such as fishing boats are more readily financed than a fixed structure like a fish factory. The boat has a higher residual value if the venture goes wrong because it can be engaged in other areas, contrary to the factory. Boats are mobile, and hence the market larger. Seed funds are constantly risk takers, but has implemented selection mechanisms to take the inherent risk down: *“We prefer ideas that have been evaluated in the “Innovation Park Incubator” or Bergen Technology Office” and obtained grants from innovation Norway. We appreciate that others have done the ruminating”*. Such screening by competent institutions may inhibit that ideas go further than they should, and indicates complementary roles between public agencies and private investors.

This behaviour seems to be confirmed by statistics: *“The innovation park tells us that 70% of their start-ups are still operating after 5 years. Our experience is that 70% of start-ups generally do not survive the first five years”*. Intuitively, it seems obvious that seed-capital funded technologies lead to path creation. That is not always the case, however. Start-ups are often established in extant industries, thus supporting path extension. If the technologies have a disruptive power, it may lead to path renewal. Technologies harboured in spinoffs from existing firms are more readily funded than greenfields: *“An established company with a running cash flow represent a collateral for us; that makes funding easier”*. Most interviewees support this view.

Selecting managers or firms:

Selecting solely on the basis of technologies or projects are often not sufficient. The quality of managers and their firms is taken into account: *“Experience with similar projects is crucial, in particular the proven capacity to implement; the determination to carry through is more decisive than the amount of equity. If the market dips seriously, we know that the manager*

intervenes early, and asks for help if necessary". Knowing your customer is thus paramount. *"It is a great challenge for the client to make the bank confident when both the client and the industry is new to the bank. We have clients that we know are skilful managers, they can create something out of nothing, in different industries. They have a head start."* This view is echoed by another bank manager: *"We often experience that the entrepreneur himself is more important. Some succeed with everything, others fail with everything."* Sometimes the bank is not capable to evaluate the technologies and resort to the quality of the managers: *"We don't have an engineering department here, so the issue is whether you trust the people and their ideas"*.

In accordance with the recent regulations, the firm's capability to create cash flow is decisive. One might argue that *technologies* bring about cash flows. As a rule however, that technology needs to be embedded in a business model and an organization that knows how to market the product. *"We prioritize cash flows. We prefer honest people with integrity that bring predictable and reliable cash flows. The cash flow should be so predictable that we need no collateral. But we demand collateral anyhow. On the other hand, nobody is granted credit on collateral alone. Without cash flow, we politely say no."*

The fish farming industry is very important in three of the regions, next to the oil business. The fish farming corporations are large and internationally owned, so regional banks do not participate in their funding. Local suppliers to that industry are another matter. The selection criteria for a new supplier to fish farming include a long contract that secures a stable cash flow over time, and equity. A fish carrier with no contract requires twice as much equity. Packing-case producers should have a contract large enough to cover 70-90% of the production.

The more conservative banks rule out start-ups altogether: *"We prefer grown-ups, they are more attractive for the bank. It is not our role to finance equity in start-ups"*. A somewhat more nuanced approach: *"We are ownership focused. A private limited company without backing from the mother company will run into problems at our bank. We are sceptical to single-purpose companies that attempt to isolate the risk in a project. We may finance the project when the mother company backs up."*

The European regulatory regime is changing the rules of the game. Physical proximity to and acquaintance with the history of the bank's client led to trust based selection. Today,

regulations have become ubiquitous: *“The financial authorities focus on control, documentation and risk relief. Trust has no value; we cannot say “we trust you”. If I choose to trust someone and take risk, the price of risk-weighted capital spirals, so our profits disappear.”*

Banks may also influence on the behaviour of their corporate clients: *“Any manager needs a bank that requires you to intervene when something turns awry. If so, the bank has to be competent, understand the industry and market, and structure a solution that balances the various stakeholders”. And generally: “What we need is attractive firms with competent managers, so that the capital finds them. When a manager knows his company and is clever, which is indicated through results and energy when something goes wrong, then he/she obtains funding”.*

Are banks doing their selection jobs efficiently? Some bank managers are critical to their own industry: *“Knowledge intensive companies with professional managers obtain capital, and the mediocre, for instance entrepreneurs not understanding their own risks, get no capital. That’s the way it should work, but unfortunately some banks are too lenient.” “I mix with entrepreneurs that know nothing about risk. Nor do they know how to make money. They have a crazy idea, which may be great. They obtain financial support from Innovation Norway and the Research Council, which is wrong. And banks may offer financial support the start-ups are not entitled to”.*

Above we have discussed selection mechanisms at the micro level of technologies and the meso level of firms. As already indicated from the quotes above, both levels are usually involved, as indicated by the following quotations: *“Let’s say a company in the NODE cluster needs to diversify into new markets. First, we need to believe in the new concept. Second, be acquainted with the management and their qualifications to find new markets and products. We need to be convinced that a market actually exists. You have a valid point of reference if you can demonstrate a success in an equivalent situation some years back.”* This analytical approach is repeated by another bank manager: *“We emphasize three elements in our evaluation of entrepreneurs: a) the business concept, b) the person (experience, no payment remarks), c) gut feeling. The quality of management and the board is often underestimated”.* This combined approach also applies for seed funds, as delineated by a seed fund manager: *“We use the following investment criteria: a) Unique and protectable technology, b)*

Sustainable, scalable and well defined business model, c) An attractive/growing market with potential for international expansion d) Commercially oriented founder and/or competent team”.

Selecting industries

Sometimes entire industries are selected or selected away. For instance, the profits in the oil and gas industry have been superior to any other industry; and consequently this industry has become more and more dominant in the three regions on the south west coast. Path extension has been the rule of the game. In recent years, the oil price has been comfortably high (for the oil companies and their suppliers) implying that normal selection mechanisms on the firm level have not functioned. Based on the recent history of the profits in the industry, both the market and the financial institutions have regarded oil and gas related companies as safe bets. The substantial investments in oil and gas have in turn created a need for regional infrastructure, creating great opportunities for the construction industry: *“In the construction and building industry, we have only experienced success stories. No one has lost money. In that situation it is impossible to talk them into doing something else”.* Commercial property is another popular industry: *“Lending to property and property developers are based on expected future cash flow, and an evaluation of the tenants and the period of tenancy. We prefer the state or local government as tenants, next businesses that have delivered satisfactory results over time”.* This industry enjoys support from an external selection mechanism: the Norwegian tax systems that favour investments in commercial property. On the other hand, cultural activities are inherently hard to fund, and are often forwarded to sponsors. These firms are often small and family-owned with a modest profit potential.

Selecting selection mechanisms

Banks use two different selection mechanisms, the expected future cash flow of the company, or on the quality of the offered collateral. In banks using the latter, the lion’s share of their balance is associated with property funding. The banks focused on cash flow finance so-called turnover based businesses, which include most industries. The distinction concerns the competence requirements in the bank. When evaluating the potential and predictability of a future cash flow, the bank needs to understand the industry and its success factors (business models, markets, competition etc.) as well as the quality of the firm and its leadership. The difference in competence is probably the reason why a bank manager exclaims: *“It is a paradox that the two commercial banks, which is not regionally owned, prioritize turnover-*

based undertakings (with more innovation and supposedly higher value creation), whereas the largest local savings bank prefer property and business buildings”.

The size of the local authority to approve loans, at the individual or the bank level, depends on the risks involved. For high-risk applications (as defined by the risk management system) the authorization is smaller, and is forwarded up the hierarchy and in some instances to the head office.

Regional informal institutions

Banks operate in a regional context embedded in informal institutions that have a bearing on selection mechanisms. We use the term institutions in the broader sense as stable, valued, recurring patterns of behavior (Huntington 1965) or more generally the rules of the game (North 1990). In combination with the formal financial institutions outlined above, they fundamentally shape and constrain “mental models”, preferences and behavioural patterns. Institutions serve as platforms and sources of path dependent opportunities for social learning (Nelson and Sampat 2001) and account for important aspects of the macro-foundations of micro .

Based on the modest presence of banks in Finnmark, that region may be characterized as institutionally thin. This statement is supported below: *“It is a new phenomenon from the past ten years that local individuals have made substantial profits in Finnmark. But there is no culture to invest with each other. We are modest on our own behalf, and have too low ambitions related to dividends from our own capital. The profit ambitions are too low. There’s no tradition to see the value in companies. People from western Norway have been successful; they think industry, they have industrialized and invested, they have been engaged in building something.”* This is further elaborated for the important fisheries along the coast: *The fishermen in western Norway have had distinct strategies for their fleets. In Northern-Norway they have operated at sea, made substantial profits, followed by partying. Discarded vessels from western Norway have ended up in northern Norway. We have never been at the frontier of technology. Operating costs have been high because of lacking investments.”*

In Stavanger, investors often invest together to share knowledge and risks. There is a tradition of pulling together - contrary to Finnmark. Networks are strong, and most wealth is created by the present generation. A number of investors team up to do investments in emerging firms, indicating that equity investing is both a financial and a social endeavour. *“They join a team*

they want to play for". Owner-managers of existing industrial companies often organize their financial ambitions in investments firms. These investors are experienced and prepared to engage in repeated equity emissions to realize sizeable projects or start-ups. On the other hand, the mood in northern Norway is described as follows: *"Entrepreneurs that succeed do not let in others. They do not prioritize growth, they are afraid of competition and losing their competitive edge. They prefer organic growth, even if they have access to external finance"*.

A number of observers find that values and informal rules are different among the regions. These cultural traits have obvious bearing on selection and path development: *"In the Kristiansand region people cultivate failures, a cultivation of being unsuccessful. The leading regional newspaper in Stavanger displays a positive attitude to the region, which we never experience with our regional paper. There's a strong and persistent rivalry between the two major towns in the region, much worse than in the Stavanger region"*. The rivalry between Kristiansand and Arendal probably postponed the merger between the two savings banks in the respective towns with several decades. Different cultures were also on display when the two local commercial banks merged. An observer close to the event, explains: *"Privatbanken was the bank for the religious, Sørlandsbanken for the non-religious. What a merger! It took ten years to weld them together"*. A manager new to the region echoes the influence of religion: *"My first impression of Kristiansand when I moved from Bergen was a red Volvo station wagon with the sign "Hello God" in the rear window. We have many free churches and congregations in this region with many business managers as members. Contrary to Bergen and Stavanger, the links between religious organizations and business are strong"*.

There may also be differences between Stavanger and Bergen. A number of interviewees have noted that family fortunes in Bergen are several generations old; often from shipping or commercial real estate; compared to the more recent wealth generation in Stavanger. *"My gut feeling is that the wealthy persons in Stavanger still have the entrepreneurial spirit, and have not yet developed into the more conservative second or third generation."* The perceived risk in the two regions may be different. The oil and gas sector in Stavanger, now 40 years old, has by and large been a continuous success. Investors have not yet experienced substantial risk. The history of Bergen shipping is very different, especially in a 2-3 generation perspective. Shipping has been volatile, and many fortunes have been lost.

Formal regulations, in particular the Basel II and Advanced IRB, strongly influence the behaviour of the banks. The system applies to “system critical” banks only (see footnote 6). The scoring system associated with IRB is based on the banks’ expectations to future cash flows of projects and investments. For the other banks, the familiar requirements for collateral is more decisive. This distinction has motivated non-IRB banks to fund the property and construction industry. In principle, it may also give incentives for these banks to take somewhat higher risks and attach more importance to their trust in their customers. Over the years, these regulations have greatly influenced the micro behaviour of banks. The radical change in risk appetite and behaviour is described as follows: *“Back in the 1980’s we were allowed to lose 1% of assets under management, this is a mirage today. Everything has been tightened sincerely up since the Norwegian bank crisis at the end of the 1980’s and again after the recent global financial crisis.”*

Path dependent selection mechanisms in the financial institutions

Banks and their selection criteria also evolve in a path dependent way. Their present market positions are dependent on their history and the industries in their respective regions. The commercial banks DNB and Nordea are present in all four regions, but command different positions and act differently. This variation cannot be explained without taking their local history into account. DNB is market leader in Bergen and is the result of the merger in 1990 between the former DnC and Bergen Bank, which in turn was a merger in 1975 between the two local commercial banks Bergens Privatbank and Bergens Kreditbank. Bergen has been and still is a shipping region, and DNB enjoys a reputation as world leading on shipping. Based on its shipping traditions, the branch in Bergen is the national competence centre for shipping and the maritime sector.

In Kristiansand, Nordea is still regarded as a local bank because it is built on two former well-reputed local commercial banks, Sørlandsbanken and Privatbanken; whereas its position in Stavanger is substantially weaker. The two largest savings banks in the Kristiansand region merged only recently (2013), and the merged bank’s market share is less than the two commercial banks Nordea and DNB. In Stavanger, the relative strength of the banks is opposite. Sparebank1 SR-Bank was established in 1976 as the merger of 22 former independent savings bank, the first such merger in Norway. It is no coincident that SR-Bank is the market leader in Stavanger.

Path dependence is vividly demonstrated as the regional savings banks have kept most of their local branches across the region. However, the physical presence in all corners is now challenged with the digitalization of most services. Increasingly, this is also the case for business customers. The implication is that the savings banks are becoming more similar to the commercial banks in this respect. Selection criteria are closely associated with risk policies, and the banks' propensity to take risks is highly path dependent. Banks that have obtained a high credit rating through historically prudent lending want to keep it that way, hence are motivated to be cautious.

Learning

Evolutionary models involve not only selection mechanisms, but processes of learning and discovery as well. The performance of selection criteria changes over time and environments. As explicated above, banks generally employ two different and sometimes complimentary selection devices: expected future cash flow and collateral. The latter means lending on security based mortgages, and involves rather straightforward technicalities and a review of the remaining value of the object of the mortgage. This is usually properties, buildings or production equipment.

The alternative selection mechanism is expected future cash flow of the business. A proper evaluation of cash flow is based on a thorough understanding of the company's business model and the success criteria within the relevant industry. For existing industries, a bank will normally possess the necessary knowledge through their experience and learning. However, when a firm presents a potential disruptive technology (which demands a new business model) or a new industry emerges, banks or other lenders may not possess the required knowledge and expertise to evaluate the expected risks in the project or industry. Without that knowledge, the bank or lender will apparently be reluctant, in particular when the new business is based on knowledge alone, with no need for production equipment, and thus no collateral to offer. In that case, the bank takes active steps to acquire the necessary insights in the new industry. The alternative for the bank is to base its evaluation on the reputation of the clients. The logic is the same in the product markets for experience based goods and services.

The evolution of knowledge-based industries combined with the recent regulatory requirements have motivated banks to learn: *"Now we have to understand the human capital in the firms. Our risk models are based on our history; profitability, cash flow and the quality*

of management have become pronounced, and their resources to stave off a potential failure”. Banks thus need to learn from that history to adjust their risk models to their loss experience. Learning also implies to break away from past history: *“Bank employees are trained to think collateral in goods inventories and equipment. They have difficulties in evaluating firms in the service industries”.*

Another quote illustrates the dual role of banks: on the one hand, to lend money and take risks, on the other to manage deposits in a safe manner: *“There is no entrepreneurial thinking in the banks. There was some attempts in the former NN bank. They experienced a row of unfortunate dispositions, however, confirming that a bank should stick to what it knows. Their reputation was severely hurt. They harboured ambitions to be a drive in the region. Now a very conservative and cautious attitude prevails”.* And banks do learn: *“We do not want to expose the bank to potentially great losses. This bank has its history, and at the beginning of the 1990’s the bank could have gone into bankruptcy”.* *“Our bank is careful with fish processing plants, where we have lost money. Land based industry is a larger challenge because volatility and losses.”*

Due to the financial crisis and tougher regulatory requirements, risk management has become a more daunting task. In order to form realistic expectations of future cash flows the bank needs to have updated knowledge about the firm’s market, the basis for its competitive advantage, the workings of the value chain and the effectiveness of the business model. Hence, banks need to strengthen and renew their competencies. One of the savings banks entered the shipping market some years ago and suffered substantial losses. Competing head on with the traditional shipping banks like DNB and Nordea is obviously not without risk. The bank has now reformulated its strategy with a sole focus on SMB’s. Understanding risks in an industry is learnt through experience: *“The risk premium in respective industries is based on our own experience. A fish farmer who has lost money constitutes a higher risk. Larger banks may learn faster, as they have more experience related numbers.”*

Banks learn not only from their experience and history, but also from an expected future. The role of the banks is not to define the future, but to stimulate and help realize the growth potential in the firms. *“We stimulate our customers to reflect about the future”.* Banks need to see firms establish themselves in new industries before they enter the game. For instance, the Stavanger region is highly dependent on oil and gas, and politicians have been keen to

establish alternative industries. The financial institutions are slow to follow up. They hesitate to get involved in industries where they find risks are too high. An example is the possible diversification of parts of the oil and gas industry into renewable energy, in particular offshore or onshore wind. Until now, banks and venture funds have been sceptical. The venture funds have solely focused on oil and gas. Some banks are re-evaluating, however: *“We have initiated a project about how we can become a bank for wind in the future. Regulations and framework conditions are in place, tax incentives have been introduced, the technology is more efficient and construction costs substantially reduced. In sum, the risks have become acceptable, and cables to exchange power with the continent will lead to a price increase. Consequently, we expect a satisfactory future cash flow”*. The bank starts in the commercially conservative end, with the wind power plants located in the region, not the equipment producers that are non-existent in the region. In other words, the selection mechanisms co-evolve with the knowledge in the financial institutions.

Conclusions

The paper concerns the selection mechanisms in financial institutions, the issue of what is actually being selected; and how the selection mechanisms themselves are being selected through learning. Selection mechanisms are derived from the banks' risk policies, and both formal and informal institutions seem to discourage banks from risk taking. Formal regulations, in particular the Basel II and Advanced IRB, strongly influence the behaviour of the banks. The risk management system associated with IRB is based on the banks' expectations of future cash flows of projects and investments. Evaluations of future cash flows are relatively straightforward in established industries, with proven technology and trustful managers. Selection mechanisms evolve in a path dependent way. The implication is that the selection mechanisms in financial institutions work to uphold regional path extension and to some degree part renewal. The venture capital companies in these regions are also driving path extension with their focus on oil and gas. They sometimes define themselves as “energy” companies, indicating that they may support other energy sources. So far, this has not materialised. Seed companies are more versatile, but dwindle compared to banks and venture funds.

Path renewal evolves when the finance sector supports existing firms that diversify into related activities by redeploying its core technologies and expertise. When the bank trusts

both the technology and the technical and managerial expertise, the risk level is moderate. The firms need to convince the banks that new and profitable markets actually exist. This path is exemplified by oil and gas companies diversifying into renewables; in particular onshore and offshore wind. Wind power has proven to be very effective with stable production in these regions. In northern Norway, summer tourism evolves into to all-year tourism with winter tourism most vibrant: northern light, ice hotels and dog sleds. Land-based tourism has diversified into maritime activities.

We find that selection mechanisms are at work at several levels and dimensions. First, in addition to the market, the financial system plays a major role in carrying out the selections. Both formal and informal institutions influence the selection mechanisms. We find that technologies indeed are selected to form path trajectories. However, banks are reluctant to fund new product and service development in start-ups. Most banks find start-ups too risky. They tend to be more positive when the products are standard, in other words when new firms imitate other products rather than innovate. These selections strengthen path extension.

The behaviour of the banks is different when new technologies emerge in incumbent firms. The portfolio of technologies is incorporated in firms, whose relative competitiveness (“fitness” in evolutionary terms) is mediated through additional behavioural patterns; their decision rules concerning investments, R&D, diversification, attitudes towards risk etc. A technology is not automatically sold, it depends on the marketing efforts by the firm, the business model, and how the production is organized in order to achieve benefits from scale and scope. These are all relevant for the banks’ evaluation of the risks and cash flows. As a result, banks seldom select on the basis of technology alone, but in combination with a firm level selection.

Units of selection depend on the relative size of the firm seeking financial support. For start-ups and smaller firms, their vulnerability implies that the entire organization constitutes the selection unit. By contrast, only a few of the component parts like technologies or projects in larger companies are at risk. These organizations may add or drop individual innovations or projects without setting the entire company at risk.

The study has some obvious limitations. We have only taken the perspective of the financial institutions, not the start-ups and incumbent firms on which selection mechanisms are operating. Funding issues are sensitive, so the other part may have different perceptions of the

selection processes. Secondly, a qualitative study cannot shed light on the relative importance of financial institutions in a more quantitative way. Our findings may also be time-sensitive. In the years prior to our data collection, these regions enjoyed record-high investments in oil and gas, unprecedented growth in fish farming, and practically no unemployment.

Policy implications

We have seen that selection mechanisms in financial institutions mainly favour regional path extensions, and path renewal through diversification under some circumstances. Our study of selection mechanisms, and the incentives and regulations strongly influencing the selection criteria, illustrates why this is an expected outcome. The selection mechanisms are derived from the risk policies of the financial institutions, and real assessments of risk are hard to do. A common problem is asymmetric information, the fact that the business manager knows more about the firm than the bank, and that the manager may be unwilling to disclose information that reduces the possibilities of obtaining funding, so-called moral hazard. It is by no means obvious that the present regulations help the financial institutions and their customers to cope with these challenges. According to Kay (2015), the European regulations described above, focus on the efficient functioning of the market, “market integrity”, rather than the interests of market users like companies and savers. The effectiveness of the intermediation between savers and companies in promoting efficient capital allocation through valid selection mechanisms depends on the quality of the information available to the participants. As indicated in the interviews, necessary information is best achieved in the context of a trust relationship (Bhide 2000). Such a relationship is generally necessary to secure that information about the idiosyncrasies of firms and start-ups are honest and directly relevant to the respective cases. True information and knowledge about the firm should not be confused with the ever-growing request for data from the regulators. The present regulatory scheme builds on the notion of “level playing fields”, meaning that all financial actors should have access to identical access to corporate data. Some of our informants underline a (possibly unintended) consequence: the requirements nullify the significance of more qualitative knowledge, which may be decisive in assessing the present and future value of start-ups, innovations and firms. If local, tacit knowledge is set aside, local banks may lose competitive advantage, further impoverishing the regional innovation systems.

The general public may perceive venture capital firms as significant contributors to a venturesome regional economy, but this view has become a misconception. Our data indicate

that venture funds shy away from start-ups and function as private equity funds. This development seems to be a global trend. Bhidé (2008) found that VC-financed start-ups in the US amount to “less than one-half present of the total start-ups” (p.42). This situation is but one reason why firms and regions lack early stage (and risky) start-ups. Some informants suggest that banks may take a role as mediator between start-ups and more conservative investors like venture capitalists. Today banks neither possess such competence, nor see themselves in such a role. The government should initiate additional early phase funds or tax incentives. The need exists in all regions. Furthermore, the present rules of seed companies need to be adjusted. Some seed fund managers argue that they find themselves in a catch 22 situation: According to their mandates, they are supposed not to invest in companies older than five years. However, firms 5-10 years old may still be in the seed phase. Secondly, the seed fund needs to have a co-investor, a sensible requirement. Thirdly, to qualify for seed capital, the firm is supposed not to have made commercial contracts, which is actually what co-investors demand. Obviously, the map needs to be adjusted to the functioning of the real world.

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